Implementing Green Infrastructure Elements for Enhanced Water Quality in the Beaver Lake Watershed

Project #17-1000 FY 2017 CWA Section 319(h)

Presentation June 28, 2022

Becky Roark, Executive Director
Beaver Watershed Alliance

www.beaverwatershedalliance.org | YouTube | Facebook | Instagram | We Are Water Podcast
MISSION:
To proactively protect, enhance, and sustain water quality in Beaver Lake and the integrity of its watershed.

Education & Outreach
Technical Assistance
Planning & Analysis
Beaver Lake Watershed:
West Fork – White River
Middle Fork – White River
East Fork – White River
Headwaters – White River
Richland Creek
War Eagle
Lakeside
1,192 Square Miles
Beaver Lake Watershed 303d Listed Segments
Sediment Reduction Priorities

Issues and Challenges – Sediment Sources

Figure 2-7. Comparison of Existing and Future Sediment Loading (methodology and results described in Supplemental Pollutant Loading Analysis)
Issues and Challenges – Sediment Sources
Addressing Sediment Control

4-5 Truckloads of Sediment removed EVERY DAY from Beaver Water District...approx. 140 truckloads/month!
Preparing for 1 million people by 2045

Urban Growth and Impervious Surface Increases

Figure 2-3. Comparison of Existing and Planned Future Municipal Boundaries

In recent years, the Northwest Arkansas region has been the fastest growing area of the State.

Planning projections show a quadrupling of existing municipal area in the coming decades.
Implementing and Researching Solutions
Implementing Green Infrastructure Elements for Enhanced Water Quality in the Beaver Lake Watershed

Project #17-1000 FY 2017 CWA Section 319(h)

Green Infrastructure – Parking Lot Project, Hickory Creek Boat Launch, Lowell, AR
Project Details:

**Timeframe:** October 1, 2017 through September 30, 2021.

**Project costs:** $499,783 (federal) $377,029 (match) = Total of $876,812

Additional match was secured throughout the program timeframe.

**Goals:**

1. *Demonstrate GI/LID and encourage thoughtful growth in NWA*
2. *Institutionalize and promote GI/LID as a water quality BMP for voluntary adoption*
## Project Steering Committee

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Organization</th>
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<tbody>
<tr>
<td>Mike Kopek</td>
<td>Real Estate Agent</td>
<td>Weichert Griffin</td>
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<tr>
<td>Ray Avery</td>
<td>Engineer</td>
<td>BWD</td>
</tr>
<tr>
<td>Brad Hufhines</td>
<td>Environmental Manager</td>
<td>BWD</td>
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<tr>
<td>Allison Jumper</td>
<td>Project Designer</td>
<td>Ecological Design Group</td>
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<tr>
<td>Anthony Kendrick</td>
<td>Green Infrastructure Specialist</td>
<td>Construction EcoServices</td>
</tr>
<tr>
<td>Sean Harper</td>
<td>Beaver Lake Operations Project Manager</td>
<td>USACOE</td>
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<tr>
<td>Mike Richards</td>
<td>Deputy Operations Project Manager</td>
<td>USACOE</td>
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<tr>
<td>Ted Jack</td>
<td>Park Planning Super</td>
<td>City Fay Parks and Rec</td>
</tr>
<tr>
<td>Alan Pugh</td>
<td>MS4/Staff Engineer</td>
<td>City of Fayetteville</td>
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<tr>
<td>Jim Maclean</td>
<td>Planning Commission/Master Gardener</td>
<td>Huntsville Planning Cmte</td>
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<tr>
<td>Max Poye</td>
<td>Mayor Goshen</td>
<td>City of Goshen</td>
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<tr>
<td>Carole Jones</td>
<td>Consultant/P.E.</td>
<td>Greenland</td>
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<tr>
<td>Chris Kauffman</td>
<td>Civil Engineer</td>
<td>Nabholz</td>
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<tr>
<td>Trish Ouei</td>
<td>Stormwater Agent</td>
<td>UAEX Benton County</td>
</tr>
<tr>
<td>Amy Wilson</td>
<td>Communications Director</td>
<td>BWD</td>
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Site Selection

Locations selected were based on:

- high public visibility
- proximity or location to impaired waterway
- and willingness of landowner to maintain project for at least five years.
Pervious pavers at Hickory Creek Boat Launch, Lowell, AR

Beaver Lake Watershed 319(h) Project
The entire parking lot area is 27,420 square feet. 7,000 square feet of interlock pervious pavers were mechanically installed, along with a 1,500 square feet native plant bioswale.

Native plants used in rain garden including purple coneflower, soft rushes, spicebush, cardinal flower, and wood oats, and more.
Collects 795 cubic feet of stormwater storage under the permeable pavers

Captures the first 1/4 inch of rainfall runoff from the parking lot, which then drains through a grate and underdrain to a bio-retention basin before it’s discharged into Beaver Lake.

Designs by Crafton Tull
Installed by Steep Creek, LLC
Completed in Spring of 2021
The total green infrastructure area is 3,400 square feet, with 1,400 square feet of interlock pervious pavers that were mechanically installed. The hillside was constructed to slow down rain runoff and seeded with native plant seed mix.
Low Impact Development, or “LID” for short, uses vegetation, soils, and natural processes to manage rainwater where it falls and can help reduce nonpoint source pollution to improve water quality. Non-point sources of pollutants can include sediment (the biggest threat to water quality in Beaver Lake), excess nutrients such as phosphorus and nitrogen, oil, grease, and heavy metals. Slowing down rain runoff before it reaches a waterway not only captures non-point source pollution, but also prevents flooding. Cools the water down, helps recharge groundwater supplies and naturally filtrates the water. Using LID in our landscape can also help keep our local drinking water supplies clean and resilient.

Thanks to a generous grant through the Arkansas Department of Agriculture - Natural Resources Division, the Alliance worked with the City of Huntsville to install Low Impact Development features in the Mitchusson Park parking lot, located in Huntsville, AR. Crafton Tull provided designs for the features and the project was installed in Spring 2021 by Steep Creek, LLC. Educational signage is also installed to provide public education on the benefits of treating rainwater with low impact development features. Thank you to all the partners for helping to improve the Beaver Lake watershed.

IMPROVEMENTS AT MITCHUSSON PARK:

- Removed 1,340 square feet of existing impervious area and replaced with permeable pavers
- Collects 532 cubic feet of stormwater storage under the permeable pavers
- Captures the first 3/8 inch of rainfall runoff from the parking lot
- Designs by Crafton Tull
- Installed by Steep Creek, LLC
- Completed in Spring of 2021
Kessler Regional Park
Fayetteville, AR

Additional LID Elements

Bioretention cell collects additional 1,091 cubic feet of stormwater
Beaver Lake Watershed 319(h) Project

Educational Signage
Collects 1,330 cubic feet of stormwater storage under the permeable pavers

Collects 1,091 cubic feet in bioretention cell

Captures the first 3/4 inch of rainfall runoff from the parking lot

This is 3x the volume of a traditional sediment forebay required by the Fayetteville Drainage Manual.

Designs by Crafton Tull
Installed by Crossland Heavy Contractors and Garver Engineering

Completed in Summer of 2021
## Technology Transfer

### 82 Events; 2,932 Participants

<table>
<thead>
<tr>
<th>Number of Programs</th>
<th>Program</th>
<th>Participants</th>
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</thead>
<tbody>
<tr>
<td>6</td>
<td>Field Days; Included on-site events at each project location and video productions</td>
<td>42</td>
</tr>
<tr>
<td>30</td>
<td>Training Sessions; Included Rain Ready Workshops for Homeowners, Native Plant Walks, Invasive Species Removal events, Construction Workshops with partners, and LID Series online webinars (3)</td>
<td>553</td>
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<tr>
<td>9</td>
<td>General Events/Outreach and Education; including Beaver Lake Annual Symposium, Alliance Speaker Series</td>
<td>600</td>
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<tr>
<td>37</td>
<td>Outreach Meetings; presentations to clubs, civic groups, schools, churches, businesses, cities</td>
<td>1,737</td>
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Are you Rain Ready?

A workshop on small-scale solutions for homes and businesses in NWA to reduce flooding, erosion, create habitat, protect the Beaver Lake watershed, and more!

Please join us Saturday, April 14th to explore how to manage rain on your property and be Rain Ready!

Watershed professionals and area experts will present on:

> Low Impact Development features you can do at home such as rain gardens, bioswales, rain barrels, cisterns, green roofs and porous paving

> Native plant gardening for water and wildlife improvement

> Lawn Aeration and Soil Health

> Funding to assist you for installing features

Workshop Details

When: Saturday, April 14, 2018 @ 9 am - 12 pm

Where: West Fork Library Hall, 198 W. Main St. West Fork, AR (next to WF Library)

RSVP: info@beaverwatershedalliance.org or call 479-750-8007.

LOW IMPACT DEVELOPMENT

ONLINE SERIES

May 13
Wednesday
10:00 am - 11:30 am (CST)

FREE ONLINE TRAINING COURSE
[ZOOM WEBINAR]

TOPIC:
Multi-Functional Stormwater Design with Vegetated Systems and Native Plants that Work

Vegetated systems used for stormwater management are an important tool in Low Impact Development. This presentation will review how these systems are designed, built and installed; with a focus on designing with maintenance in mind. This presentation will also cover how to select the optimal native plant species selection for your next LID project.

This free presentation is available for contractors, home builders, developers, landscapers/landscape maintenance crews, Government public works crews, property owners, municipal and county personnel, professionals with licensure, and is open to the general public.

PRESENTED BY:
Anthony Kendrick, Project Manager, Construction EcoServices
Eric Fuselier, PWS, Environmental Project Manager, Crafton Tull

REGISTER FOR WEBINAR
https://us02web.zoom.us/webinar/register/WN_1CYMjx34T769Wf-HFwWqg

The Beaver Watershed Alliance mission is to proactively protect, enhance and sustain water quality in Beaver Lake and the integrity of its watershed.

Beaver Lake Watershed 319(h) Project
Technology Transfer – 5 Fact Sheets Developed

PLANT MANAGEMENT

Native plants provide little needling to and tolerate the conditions of a site without additional watering, fertilizers or post-treatment, once established, which can take up to five years. It is possible to significantly reduce maintenance by assessing the conditions of the site and creating a plan to minimize soddy during the design phase of the project.

Consider, for example:
- Large spaces in between plants are prone to weeds. Consider laying your landscape with groundcovers, perennials, grasses and shrubs to out-compete weeds and have a fuller landscape.
- Apply a 2" layer of mulch in the spring and fall during the first two years of establishment. Natural, low-nitrogen mulch is recommended.
- Tint your planting with natural patterns, spring and fall are ideal for plant establishment and can reduce watering and weeding.
- When moving, blow grass clippings away from the landscape feature, as they will seed and produce weeds throughout the landscape.
- Avoiding pesticides, fungicides and fertilizers, as these can negatively impact the microbial processes in the soil that filter pollutants from storm water runoff.

Resources for Native Plants
- Low maintenance and low vitality are shifting more towards supplying more native plants. The best way to increase supply is to increase demand! Request native plants at your local retailer.
- To find out more about native plants: online, visit.

Non-Natives
- Ozark Native Plants
- Rain Gardens
- No Mow Zones
- LID Vendors
- Native Plant Vendors
- LID Project Site Fact Sheets

Natural Infrastructure Design

Ozark Native Plants

FACT SHEET

Putting ecology back into the landscape

Selecting the right plant for the right place can ensure that your landscape thrives. Why native plants? Plants that are adapted to our region are more resilient to our climate and can withstand the drought and heat patterns we are more resistant to disease, are beneficial to wildlife by providing food, cover and habitat, can save money and management time, as well as protect our most precious natural resource: water, by providing ecosystem services.

Low Impact Development:

The term low impact development (LID) means the incorporation of management practices that are designed to prevent or mitigate the effects of urbanization on the natural processes.
Lessons Learned/Opportunities

• Cost-benefit analysis are needed for cities, developers, etc – more incentives are needed to continue this work; education on funding frameworks

• Maintenance of pervious pavers/LID is still new... training guides, manuals, etc are needed; workforce development opportunities (need more skilled labor)

• Great need to study basin stormwater hydrology and help communities prioritize areas to target (larger cities could help smaller cities)

• To get ahead of the “water curve” in terms of costs, cities need financial support to dedicate to LID and green infrastructure now, before it is too late. Once our communities reach a certain imperviousness level, the effects are nearly irreversible to watershed health.
Great Partners = Clean Water
Thank you!

Contact Alliance
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