University of Missouri

Environmental Health & Safety
180 General Services Building
Columbia, MO 65211
PHONE 573-882-7018
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April 27, 2022

Missouri Department of Natural Resources
Water Protection Program
MS4 Program Coordinator
P.O. Box 176
Jefferson City, MO 65102-0176

RE: 2021 MS4 Annual Report, Permit #MO-0136557

MS4 Program Coordinator,

Enclosed is the Annual Stormwater Management Plan Report for the Boone County/City of Columbia/University of Missouri MS4. This document covers the January 1, 2021 to December 31, 2021 reporting period.

If you have any questions, you may contact me at (573) 882-3950 or by email at haeusslert@missouri.edu.

Sincerely,

Ted Haeussler
Environmental Affairs Professional

Enclosures

cc: Todd Houts, University of Missouri
Jon White, University of Missouri
David Sorrell, City of Columbia
Lee White, City of Columbia
Maggie Jones, City of Columbia
Bill Florea, Boone County Resource Management
Nicki Rinehart, Boone County Resource Management

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) STORMWATER MANAGEMENT PLAN REPORT

FOR OFFICE USE ONLY
PROJECT ID NUMBER
DATE RECEIVED

Part A – MS4 PERMIT HOLDER INFORMATION

1. MS4 NAME	2. NPDES PERMIT NUMBER	3. MS4 UNIQUE ID NO.	
Boone County, City of Columbia, University of Missouri	MO-0136557		
4. ADDRESS	**5. CITY**	**6. STATE**	**7. ZIP CODE**
180 General Services Building	Columbia	MO	65211
8. TELEPHONE NUMBER WITH AREA CODE	**9. EMAIL**		
(573) 882-7018	environmental@missouri.edu		

10. NAME OF MS4 CONTACT PERSON

Boone County - Nicki Rinehart City of Columbia - Lee White University of Missouri - Ted Haeussler

11. Have any areas of the MS4 been added or removed from the MS4 jurisdiction due to annexation or other legal means since the most recent permit application (renewal, new, modification), or most recent MS4 stormwater management plan report?

☐ Yes ☑ No

If yes, please include a map along with a brief description as an attachment.

Part B – REPORTING PERIOD

1. Is your MS4 subject to a TMDL?

☑ Yes ☐ No

If yes, you are required to submit the MS4 report annually. Reports are due Feb. 28 each year. For the first reporting period, the beginning date will be June 13, 2016, and the ending date will be Dec. 31, 2016. All other annual reports shall cover the reporting period of Jan. 1 to Dec. 31 each year.

2. Is your MS4 new permitted (i.e., is this your first MS4 permit)?

☐ Yes ☑ No

If yes, you are required to submit the MS4 stormwater management plan report annually. Reports are due Feb. 28 each year. For the first reporting period, the beginning date will be the date of issuance of the permit and the ending date will be Dec. 31, 2016. All other annual reports shall cover the reporting period of Jan. 1 to Dec. 31 each year.

3. Is your MS4 a previously permitted MS4 and not subject to a TMDL?

☐ Yes ☑ No

If yes, you are required to submit the MS4 stormwater management plan report biennially (i.e., once every two years). Reports are due Feb. 28 every odd year. The first report will be due February 2017, and will cover the reporting period from June 13, 2016, to Dec. 31, 2016. All other reports shall cover the reporting period of Jan. 1 of the first year to Dec. 31 of the second year.

4. If you are part of a co-permitted MS4 permit, submit combined MS4 stormwater management plan reports, and one or more of the co-permitted MS4s have annual reporting based on the above criteria, then submit your MS4 stormwater management plan report annually by Feb. 28 of each year.

IF you are part of a co-permitted MS4 permit and do not submit combined MS4 stormwater management plan report, then each MS4 co-permittee will submit their MS4 stormwater management plan report based on the above criteria.

5. Reporting Period:

BEGINNING: 01-01-2021 ENDING: 12-31-2021

Part C – STORMWATER MANAGEMENT PLAN REPORT PROGRESS AND COMPLIANCE

As an attachment, please provide information for each of the items below. Provide informative data, success stories, and experiences that support the successful implementation of your stormwater management plan report.

1. Describe the status of compliance with permit conditions for the permitted MS4.
2. Provide information regarding the progress toward achieving the statutory goal of reducing the discharge of pollutants to the maximum extent practicable to the MS4.
3. If another governmental entity implements any best management practice or minimum control measure, please provide the following:
    a. Name of the government entity;
    b. Name of the primary contact for the government entity;
    c. Contact information (i.e., address, city, ZIP code, state, and phone number); and
    d. Specific best management practices or minimum control measures being implemented by the government entity.

It is the responsibility of the permittee to provide all information under this report regardless if best management practices or minimum control measures are being implemented by another governmental entity. If a complete minimum control measure is being implemented by an alternative governmental entity, then only indicate the best management practice under the minimum control measure.

4. Provide a summary of any stormwater activities and known construction activities that will be covered under the authority of the MS4 permit that are scheduled to begin during the next reporting period.
5. Provide a description of any changes to the stormwater management plan report, best management practices, measurable goals, and the iterative process that have occurred during the covered reporting period.
6. Provide a list of best management practices that were evaluated during the covered reporting period, and provide information on how the best management practice was determined effective.
    a. If any of the best management practices were determined to be ineffective, provide a summary on how the ineffective best management practice was resolved.
7. If any water samples were collected and analyzed during the covered reporting period by the permitted MS4 or on behalf of the permitted MS4, please complete Part D – Water Sample(s) Analysis.

Part D – WATER SAMPLE(S) ANALYSIS

PARAMETER OR INDICATOR	FREQUENCY	RESULT	DRY WEATHER SAMPLE?	WET WEATHER SAMPLE?
NA	NA	NA	☐ Yes ☐ No	☐ Yes ☐ No
			☐ Yes ☐ No	☐ Yes ☐ No
			☐ Yes ☐ No	☐ Yes ☐ No
			☐ Yes ☐ No	☐ Yes ☐ No
			☐ Yes ☐ No	☐ Yes ☐ No
			☐ Yes ☐ No	☐ Yes ☐ No
			☐ Yes ☐ No	☐ Yes ☐ No
			☐ Yes ☐ No	☐ Yes ☐ No

1. Are any of the parameters being sampled due to the MS4 being subject to an established or approved Total Maximum Daily Load?
☐ Yes ☑ No
If yes, please indicate the parameter/pollutant.

NA

2. Does the data support water quality attainment or support trend data toward water quality attainment?
☐ Yes ☑ No
If yes, please describe.

NA

Part E – TOTAL MAXIMUM DAILY LOAD (TMDL) ASSUMPTIONS AND REQUIREMENTS ATTAINMENT PLAN

1. Is your MS4 subject to an established or approved TMDL? If no, please indicate "No" below and do not complete any other portion of the TMDL Assumptions and Requirements Attainment Plan portion of this report.

☑ Yes ☐ No

2. Has your TMDL Assumptions and Requirements Attainment Plan been completed and submitted? If no, please provide a summary as an attachment on the progress toward submitting and implementing the TMDL Assumptions and Requirements Attainment Plan.

☐ Yes ☑ No

3. Has your TMDL Assumptions and Requirements Attainment Plan received approval from the department? If yes, please provided a summary of the status of the plan and include implementation status of identified best management practices and measurable goals along with any changes to best management practices or measurable goals (if applicable)..

☐ Yes ☑ No

4. Does the TMDL Assumptions and Requirements Attainment Plan incorporate Integrated Planning? If yes, please provide a summary of the status of the Integrated Plan.

☐ Yes ☑ No

PART F – SUBMIT REPORT TO:

Missouri Department of Natural Resources
Water Protection Program
MS4 Program Coordinator
P.O. Box 176
Jefferson City, MO 65102-0176

PART G - CERTIFICATION

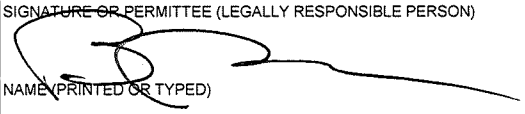
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIGNATURE OR PERMITTEE (LEGALLY RESPONSIBLE PERSON)	DATE SIGNED
NAME (PRINTED OR TYPED)	TITLE
See attached signature pages for Part G certification	

PART G - CERTIFICATION

I certify under penalty of law this document and all attachments were prepared under my direction or supervision in accordance with a system designated to ensure qualified personnel properly gather and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted, is to the best of my knowledge and belief, true, accurate and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIGNATURE OF PERMITTEE (LEGALLY RESPONSIBLE PERSON)



DATE SIGNED

4/26/22

NAME (PRINTED OR TYPED)

Bill Florea

TITLE

Director, Resource Management

MO 780-1846 (10-16)

PART G - CERTIFICATION

I certify under penalty of law this document and all attachments were prepared under my direction or supervision in accordance with a system designated to ensure qualified personnel properly gather and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted, is to the best of my knowledge and belief, true, accurate and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIGNATURE OR PERMITTEE (LEGALLY RESPONSIBLE PERSON)	DATE SIGNED
	4-25-22
NAME (PRINTED OR TYPED)	TITLE
David A. Sorrell, P.E.	Director, Utilities

MO 780-1846 (10-16)

PART G - CERTIFICATION

I certify under penalty of law this document and all attachments were prepared under my direction or supervision in accordance with a system designated to ensure qualified personnel properly gather and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted, is to the best of my knowledge and belief, true, accurate and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIGNATURE OF PERMITTEE (LEGALLY RESPONSIBLE PERSON)

Todd Houts

DATE SIGNED

4-25-2022

NAME (PRINTED OR TYPED)

Todd Houts

TITLE

Director, Environmental Health & Safety

Stormwater Annual Report
Columbia/Boone County/University of Missouri
Small MS4 Co-Permit MO-0136557
January 01, 2021 – December 31, 2021

C. SWMP Report Progress and Compliance

MCM 1: Public Education and Outreach

1. Overall compliance with permit conditions

The City of Columbia (City), Boone County (County) and the University of Missouri (MU) employ staff to provide stormwater public education and outreach programs that address the community. The co-permittees have approximately twelve staff members that work closely together to transcend jurisdictional boundaries in favor of a watershed-based approach. This demonstrates a significant commitment to stormwater education activities and the co-permittee's overall goal of educating their citizens to reduce pollutants entering receiving waters to the maximum extent practicable (MEP). The co-permittees are dedicated to preserving the water quality in the community to protect, maintain and enhance the immediate and long-term health, safety, and general welfare of their citizens.

The co-permittees have met all measurable goals associated with their ongoing BMPs for public education and outreach. The education and outreach focus for 2021 was focused on informing citizens about the watersheds they live in and how actions on the landscape can impact local streams. The co-permittees are working together to implement a public education program focused on stormwater discharges and their relative impacts on water quality, as well as informing the public of measures they can take to reduce pollutants in stormwater runoff. The target audiences continue to be students in each sector (elementary, high school and university), contractors, developers, engineers, inspectors, residents, and the public.

Raising citizens' understanding and awareness of stormwater impacts and issues is the primary goal of MCM 1 and the permittee's level of commitment to education and outreach programs is significant. Many citizens had some type of direct contact with the Stormwater Outreach program during 2021. Many more people had contact through social or traditional media outlets.

2. Progress toward achieving the statutory goal of reducing the discharge of pollutants to the MEP

For this reporting period, the co-permittees implemented/conducted/continued the following:

The City continued to work with a wide variety of groups to create a holistic stormwater education program that educates about the benefits of improved stormwater quality and provides specific techniques to improve stormwater quality while raising overall awareness of stormwater quality issues. Educational information provided to the community included:

- All City employees received pollution prevention educational training upon hire during new employee orientation. This pollution prevention education is also included in the employee handbook.
- The City continued its employee stormwater training which requires all employees attend on a bi-yearly (two-year rotation) basis. This year employee training was administered virtually through various YouTube videos made available to all staff. An all-employee email was distributed that contained links to the online training videos as well as good housekeeping tips that could be reviewed at staff meetings.
- City staff used city social media sites such as Facebook, YouTube, City Source articles, and press releases to inform the public about events, activities, and helpful BMP tips.
- City staff also participated in interviews regarding watersheds with reporters for a local newspaper.
- The City Storm Water Utility Website was kept up to date with new resources and/or updated information.

Outreach activities for the City of Columbia included:

- Continued partnership with River Relief summer camp program.
- Continued presentations to local groups, businesses, and organizations on stormwater protection and BMPs around the community.
- Partnered with Columbia Public Schools on the rollout of a Composting Program.
- Presented the classroom activity “Streams in the Classroom”.
- Tours of the City’s 3M Hinkson/Flat Branch Wetland outdoor classroom with local schools, community groups and organizations.
- Facilitated stream and roadside litter pickups throughout the community.
- Implemented a storm drain marker program that mailed markers to participants’ homes for use on storm drains in their local neighborhoods.

Boone County stormwater presentations were provided to local school districts:

- **Southern Boone Second Grade:** The Stormwater Educator created a video presentation about watersheds and stormwater pollution. After watching the video, students participated in an interactive activity showing how humans affect waterways and what can be done to improve water quality. The students created solutions for the pollution sources. One hundred-eighty students took part.
- **Centralia Intermediate Fifth Grade:** The Stormwater Educator created a video presentation about watersheds and stormwater pollution. The students had to develop a solution for the pollution. The students also participated in an interactive activity to show how humans affect waterways and what can be done to improve water quality. Eighty-two and 103 students took part in the two events.

- **Benton Elementary 4th Grade "Streams in the Classroom" Presentation:** The Stormwater Educator used the Enviroscape to show different sources of pollution and how rain can carry pollutants into the waterways, showing and discussing what actions can be taken to prevent the pollution. There were approx. 42 students in attendance.
- **Benton Elementary 5th Grade "Who Polluted Hinkson Creek":** Boone County Stormwater presented on stormwater and watersheds. The attendees completed the "Who Polluted the Stream" activity. The audience discussed what they could do to prevent stormwater pollution and designed a piece of property to have the lowest number of impervious surfaces. There were approx. 42 students in attendance.
- **Windsor Street Montessori School:** The Stormwater Educator used the Enviroscape to demonstrate different sources of pollution and how rain carries them to waterways and showed what actions can be taken to prevent pollution. Students were given the opportunity to become stormwater champions. They went on a watershed walk to see where the water flows and marked storm drains, educating future passersby. Seventeen students participated.
- **Grant Elementary:** The Stormwater Educator used the Enviroscape to demonstrate different sources of pollution and how rain carries them to waterways and showed what actions can be taken to prevent pollution. Students were given the opportunity to become stormwater champions. They went on a watershed walk to see where the water flows and marked storm drains, educating future passersby. Nineteen students participated.
- **Cosmo-Bethel Park "Day at The Park":** Missouri Department of Conservation, Missouri Stream Teams, and Show-Me Stormwater Management partnered together to have a day at the pond for the Columbia Public School summer school program. Two hundred middle school children attended to study stream patterns at the stream table, fish at the pond, and collect macroinvertebrates.
- **MU Methods in Aquatic Ecology - Class Panel Discussion:** The Urban Hydrologist was invited to participate in a panel discussion the Methods in Aquatic Ecology class held at the University of Missouri.

Boone County stormwater presentations were provided to the public:

- **Greater Bonne Femme Watershed "Kiss the Ground" Virtual Film Event:** The County hosted a virtual film showing of "Kiss the Ground". The film highlights regenerative agriculture. There were 128 people registered to watch the film.
- **Greater Bonne Femme Watershed Interactive Panel Discussion: Regenerative Agriculture - A Win-Win for Productivity and Water Quality:** This panel discussion focused on regenerative agriculture, building off knowledge shared in the film "Kiss the Ground." Discussion included the feasibility of regenerative agriculture to rebuild soil organic matter and restore degraded soil biodiversity – resulting in both carbon drawdown and improving the water cycle. Forty people attended the live panel and 168 people have watched the recording.
- **Hinkson Creek Collaborative Adaptive Management All Team Virtual Meetings**-The CAM Stakeholder, Action and Science Teams hosted four virtual public meetings that have been posted on the website. Between 20 to 30 people attended the meeting, and more viewings of the recordings have occurred.
    - **Forum Nature Area Level Spreader Monitoring Final Report** by Laura Wiseman- The level spreader was designed to divert peak stormwater flows from a small tributary and increase stormwater infiltration into the Hinkson Creek floodplain. This study evaluated the effectiveness of the Forum Nature Area level spreader as a stormwater

management practice for attenuating peak flows in the small tributary and increasing flow through other processes into the environment, using the results to develop a method for selecting sites of future level spreaders. A water balance was modeled using data from the site to determine if and how this system accomplishes its design goals. A GIS suitability analysis approach was used with site selection criteria from literature and the Forum Nature Area site to find new locations where level spreaders may be effective as a stormwater management practice.

- **Hinkson Creek Macroinvertebrate Data Mining Project Summary** by Cody Luebbering Geosyntec- This presentation provided an overview of publicly available water quality data and the procedures used to evaluate these data sets in determining what pollutant(s) and stressor(s) are likely contributing to the Hinkson Creek aquatic life impairment.
- **Chlorides** by Dan Obrecht, Science Team - This presentation provided an overview of chloride data from studies and data collection efforts since Hinkson Creek was listed on the 303(d) list of impaired waters, as well as a discussion on what we know and don't know about chlorides, including the potential effects of chlorides to Hinkson Creek.
- **Science Strategy** by Dr. Robb Jacobson, Science Team- Dr. Jacobson provided a summary of the current state of knowledge of Hinkson Creek science and a discussion of some of the major scientific questions yet to be resolved, along with challenges in addressing those uncertainties. A road map for developing the information needed to support the Hinkson Creek Stakeholder Committees' decision processes was presented.

- **Sustainable Living Fair – Virtual Update on the Greater Bonne Femme Watershed Project:** The Stormwater Educator and Urban Hydrologist gave a virtual update on the Greater Bonne Femme Watershed Project, providing a snapshot of water quality conditions in the watershed. The presentation also included information on the draft watershed-based plan and ongoing outreach and education efforts. Thirty-four people viewed the presentation.
- **Sustainable Living Fair - Virtual Introduction to Rain Barrels & Stormwater Stewardship:** The Stormwater Educator gave a virtual presentation explaining how rain barrels can positively impact our waterways. Seventy-two people viewed the presentation.
- **Virtual Missouri River Tour & Panel Discussion:** Missouri River Relief (MRR), Missouri River Bird Observatory (MRBO), and Show-Me Stormwater Management hosted a virtual presentation about human connection to the Missouri River and other waterways. The events were hosted for The Arbors, Colony Pointe, and Tiger Place. Fifty-three people attended the events.
- **Virtual Missouri River Tour & Environmental Career Discussion:** Missouri River Relief (MRR), Missouri River Bird Observatory (MRBO), and Show-Me Stormwater Management hosted a virtual presentation about human connections to the Missouri River and careers in natural resources for the Service for Independent Living. Twelve people were in attendance.
- **Caring for Columbia- Invasive Species Removal:** Sixteen Mizzou students, along with County stormwater employees and park staff, removed hundreds of bush honeysuckle plants from Rock Bridge Memorial State Park.
- **I-70 Motorist Anti-Litter Campaign Committee:** City of Columbia and Boone County stormwater educators presented to the 1-70 Anti-litter Campaign Committee, consisting of EPA members and MoDOT, about watershed signs in the City of Columbia and Greater Bonne Femme Watershed, and how they connect people to the watersheds. Six people were in attendance.
- **MEEA-KACEE Environmental Educators Conference:** The Boone County Stormwater Educator assisted in planning the virtual Missouri Environmental Educators Conference. Over 100

educators attended from Missouri and Kanas. Topics included Environmental Education in the Classroom, Green Schools, Justice/Equity/Diversity/Inclusion in Environmental Education, Environmental Education in the Community, and Early Childhood Environmental Education.

- **The Art of Streams and Litter Event:** Twelve middle school students learned about local waterways, participated in a stream cleanup, and redesigned litter into art, turning trash into treasure.
- **Stream Scientists Event:** Eight middle school students performed chemical analyses on a stream to see if the water had been polluted and learned about animals that call the stream home.
- **Build a Park Event:** The City of Columbia and Boone County stormwater educators hosted a summer event for 8 elementary students focused on connecting them to open spaces and their environment.
- **Jabberwocky 3M Wetland Tour:** Boone County hosted a STEM presentation for the Jabberwocky organization. City of Columbia engineers discussed the design and building of the 3M Wetlands. The stormwater educator talked about managing stormwater runoff and improving water quality for our local streams. Students learned how wetlands are created and function. Three members were in attendance.
- **STEMette Summer Program**
    - **"The Art of Streams":** Six middle school students learned about local waterways, participated in a stream cleanup, and redesigned litter into art.
    - **"Litter and Stream Scientists":** Seven middle school students performed chemical analyses on the stream to see if the water had been polluted and learned about the animals that call the stream home.
- **Lunch and Learn: "Land Disturbance in a Common Plan of Development":** The Boone County Stormwater Coordinator and State of Missouri MS4 & Land Disturbance Permitting Coordinator presented about rules for building in a common plan of development and procedures for obtaining County and State land disturbance permits. Nine people attended the live presentation, and 19 additional people viewed the recording.
- **Hallsville 4-H:** Eleven members of the Hallsville 4-H attended a watershed walk at Wildwood Bird Observatory focusing on erosion and how streams form.
- **Meyer Industrial Drive Bioretention Basins Dedication:** A dedication ceremony was hosted at the County bioretention basins on Meyer Industrial Drive, which were rehabbed as part of the Greater Bonne Femme Watershed Project. Six people attended.
- **Southern Boone Area YMCA:** Boone County Stormwater partnered with the YMCA to offer an after-school program series. This three-part series began with introducing watersheds, using the Enviroscape and stream table. During the second part, students performed simulated steam monitoring, and finally, students created an animal that could live in different streams. Approximately 43 students took part in the series.
- **STEM Alliance Engineering Contests:** The Columbia Steam Alliance, Columbia Office of Sustainability, Columbia Public Schools, and Boone County Stormwater worked together to host multiple engineering contests.
    - **Litter Prevention Contest – Build a "Litter Catcher":** Participants were asked to create a litter collecting device using recycled items. The students designed a litter catcher to prevent various types of litter from entering the water system. The participants submitted videos of their designs. Three students took part.
    - **Water Quality Contest – Build a "Rain-garden in a bottle":** Participants were asked to design a filtration system to prevent various types of pollutants from entering the water

system after precipitation events. Eighty students participated.

- **STEM Alliance Art Contest:** The Columbia Steam Alliance, Columbia Office of Sustainability, Columbia Public Schools, and Boone County Stormwater worked together to host multiple art contests.
    - **Art Contest: Litter:** The Litter Art and Essay Contest invited students to create a piece of artwork that represented litter or litter prevention. In addition to the artwork, participants were asked to submit a short description or essay separate from the artwork that explained how their artwork connected to the theme of litter. Twenty-six entries were made.
    - **The Water Cycle: Our Local Waters:** Water Cycle Art Contest invited students to create a piece of artwork that represented one or more aspects of the water cycle. In addition to the artwork, participants were asked to submit a short description or essay separate from the artwork that explained how their artwork connected to the water cycle.
- **Rock Bridge Memorial State Park Water Festival:** Boone County Stormwater staff took part in the 7th annual Water Festival at Rock Bridge Memorial State Park. This program served approximately 250 adults and children.

Boone County developed, maintained, and/or distributed the following educational materials:

- Maintained the Boone County Stormwater Website: www.showmeboone.com/stormwater
- Maintained the Bonne Femme Watershed Website: www.cavewatershed.org
- Developed and distributed stormwater newsletters to County employees: https://www.showmeboone.com/stormwater/education/newsletters.asp
- Maintained the Hinkson Creek Collaborative Adaptive Management Website: www.helpthehinkson.org
- Maintained the Boone County Stormwater Facebook Page: https://www.facebook.com/boonecountymostormwater
- Maintained the Boone County Stormwater YouTube Channel: https://www.youtube.com/channel/UCrd_RaCJ73N442kfWGfa1FA
- Developed and installed watershed signs in the Greater Bonne Femme Watershed
- Developed and distributed stormwater stewardship fact sheets to the County's Facilities Maintenance and Road and Bridge departments
- Developed and distributed traveling "Who Polluted the Stream" kits for classroom use
- Developed and distributed traveling "Macroinvertebrate Stream Monitoring" kits for classroom use
- Developed and installed educational signage at the Meyer Industrial Drive Bioretention Basins

The City of Columbia and Boone County worked together to develop the following websites, which are hosted by the City of Columbia:

- Litter Prevention Website: https://sites.google.com/como.gov/sustain-edu-litter-stem/litter-prevention
- The Water Cycle Website: https://sites.google.com/como.gov/sustain-edu-water-cycle-stem/home

Each semester, the University of Missouri conducts courses as part of its curriculum in a number of disciplines that concentrate on, or touch upon, issues of water quality and/or environmental management practices. This continued for both the winter and fall semester of 2021. Each course instructs between five and 300 students. Following is a list of those courses:

AG SM 4420	Surface Water Management
BIOL EN 4150	Soil and Water Conservation Engineering
BIOL EN 4250	Irrigation and Drainage Engineering
BIOL EN 4350	Watershed Modeling Using GIS
CHEM 4280	Environmental Chemistry
CH ENG 4220	Hazardous Waste Management
CH ENG 4285	Pollution Prevention
CV ENG 3200	Fundamentals of Environmental Engineering
CV ENG 3400	Fundamentals of Geotechnical Engineering
CV ENG 3702	Fundamentals of Water Resource engineering
CV ENG 4420	Hazardous Waste management
CV ENG 4230	Introduction to Water Quality
CV ENG 4240	Water Quality Analysis
CV ENG 4245	Environmental Chemistry for Engineers
CV ENG 4250	Environmental Regulatory Compliance
CV ENG 4260	Environmental Public Policy
CV ENG 4286	Environmental Sustainability
CV ENG 4730	Hydraulic Design
CV ENG 4980	Civil Engineering Systems Design
CV ENG 4990	Undergraduate Research in Civil and Environmental Engineering
ENV SC 1100	Introduction to Environmental Science
ENV SC 2001	Topics in Environmental Science
ENV SC 2600	Sustainability Foundations: An Introduction to Sustainability
ENV SC 3085	Problems in Environmental Science
ENV SC 3250	Pollutant Fate and Transport
ENV SC 3290	Soils and the Environment
ENV SC 3330	Environmental Land Use Management
ENV SC 4200	Stream Ecology and Hydrology
ENV SC 4305	Environmental Soil Physics
ENV SC 4306	Environmental Soil Physics Laboratory
ENV SC 4318	Environmental Soil Chemistry
ENV SC 4320	Hydrologic and Water Quality Modeling
ENV SC 4396	Agroforestry for Watershed Restoration
ENV SC 4400W	Environmental Law, Policy, and Justice
ENV SC 4600	Sustainability Science Problem Solving
ENV SC 4940	Environmental Science Internship
Forest 4320	Forest Ecology
Forest 4390	Watershed Management and Water Quality
GEOG 2660	Environmental Geography
GEOG 4630	River and Stream dynamics
GEOL 1200	Environmental Geology with Laboratory
GEOL 2400	Surficial Earth Processes and Products with Laboratory
GEOL 4100	Groundwater Hydrology
LAW 5700	Land Use Controls
NAT R 3400	Water Quality and Natural Resource Management
NAT R 4024	Foundations of Environmental Education

PLNT S 4720	Aquatic Entomology
PRST 4250	Parks, Health and Wellness
SOIL 2100	Introduction to Soils
SOIL 2106	Soil Science Laboratory

MU Extension conducted the *Healthy Yards for Clear Streams* course in the Spring of 2021. The eight-week course is designed to help residents be more environmentally friendly by taking them through a series of best management practices to reduce chemical usage around the yard and slow the flow of stormwater runoff. The course also offers each participating homeowner information to share with their neighbors to improve practices for beautiful lawns and healthier waterways.

MU's Campus Facilities department continued their periodic update of the MU Campus Stormwater Master Plan. The periodic updates allow for more flexibility to better address the needs of an ever-changing campus. The plan provides an adaptable framework that enables the campus to improve stormwater quality, maintain regulatory compliance, and sustain water resource stewardship. The MU Stormwater Master Plan which was completed in 2012 and publicly released in 2013.

Social media continued to be a tool to involve and engage the public with information, events and activities related to stormwater. Boone County (www.showmeboone.com), the City (www.como.gov), and MU (www.missouri.edu) maintained dedicated stormwater resource websites, and the co-permittees linked to each other's sites. The websites educated the community about the impacts of stormwater runoff, permits and inspection requirements, and general watershed information. The Hinkson Creek Watershed Restoration website (www.helpthehinkson.org) was also maintained with Hinkson Creek Collaborative Adaptive Management (CAM) updates on a regular basis. The Greater Bonne Femme Watershed Project website (www.cavewatershed.org) was maintained by Boone County on a regular basis.

As part of its Good Housekeeping, the permittees conducted numerous stormwater pollution prevention trainings for employees. These trainings provided for increased cooperation and education of field personnel on sediment control practices in the local area.

The annual area-wide household hazardous waste (HHW) collection event that has historically been hosted by the co-permittees was canceled in 2021 due to the Covid-19 pandemic. The co-permittees are collaborating with the Mid-Missouri Solid Waste District to host a Boone County Recycling Collection event scheduled for May 7, 2022.

3. BMPs implemented by government entity

No BMPs or MCMs were implemented by governmental entities other than those who are a party to this MS4 permit during the reporting period.

4. Summary of stormwater activities planned for the next reporting cycle (include implementation schedule)

The City of Columbia's Office of Sustainability and Boone County Resource Management have partnered with Columbia Public Schools, The Columbia STEM Alliance, and Boone County schools to provide a holistic approach to community-based educational programming with a focus on sustainability-themed topics to all citizens within Boone County. Each monthly topic interconnects with each preceding month's topic with an overall goal of understanding as to how each sustainable monthly theme interconnects with the other and how one choice... one step... serves the great goal of protecting our resources, our environment, and our community as a whole. Staff will continue to support ongoing and recurring annual activities such as litter pickups, educational videos, public engagement events, Household Hazardous Waste drop-off, etc.
This partnership will continue during the next reporting cycle.

Boone County will continue to host contractor training in the fall and winter. These workshops will focus on BMP installation, construction site inspections, good housekeeping, and stormwater and water conservation.

MU's Campus Facilities department will continue to update and maintain the master planning portion of their website that includes the Stormwater Master Plan. This will facilitate the continued distribution of information on stormwater related projects to a broad faculty, staff, and student audience.

The University of Missouri will continue to conduct courses as part of its curriculum in a number of disciplines that concentrate on, or touch upon, issues of water quality and/or environmental management practices (see list of courses in section 2 of this MCM). This will continue for both the winter and fall semester of 2022.

MU Extension will conduct the *Healthy Yards for Clear Streams* course again in the Spring of 2022. The eight-week course is designed to help residents be more environmentally friendly by taking them through a series of best management practices to reduce chemical usage around the yard and slow the flow of stormwater runoff. The course also offers each participating homeowner information to share with their neighbors to improve practices for beautiful lawns and healthier waterways.

The annual area-wide household hazardous waste (HHW) collection event that has historically been hosted by the co-permittees was canceled in 2021 due to the Covid-19 pandemic. The co-permittees are collaborating with the Mid-Missouri Solid Waste District to host a Boone County Recycling Collection event scheduled for May 7, 2022.

The City of Columbia continues to hold a twice-a-month collection program between and including the months of April through November.

The Boone County Sheriff's Office, in partnership with the Youth Community Coalition and law enforcement agencies throughout Boone County including Ashland, Columbia, Centralia, Hallsville, University of Missouri, and VA Hospital Police Departments, will conduct prescription drug take back events at multiple locations in April and October 2022.

In 2022, target audiences for the City of Columbia and Boone County will include municipal inspectors, contractors, developers, engineers, interest groups, general public and schools. Target audiences for MU include faculty, staff, students, contractors, and event participants.

5. Proposed changes to the program area and documented SWMP (MCM 1)

The co-permittees updated the July 2020 SWMP to reflect the requirements of their current Missouri State Operating Permit No. MO-0136557. The SWMP was approved by the Department of Natural Resources' Municipal Separate Storm Sewer System (MS4) Program on April 8, 2022, and will be reviewed again in 2025, in preparation for the upcoming permit renewal, and as needed.

6. Effective BMPs evaluated during the reporting period

BMP 1: Maintain an education and outreach program to educate strategically targeted audiences about annually selected topics that are pertinent and timely to local water quality issues.

The City of Columbia, Boone County, and MU maintain a list of all education and outreach programs conducted throughout the year (see list of programs in MCM 1.2), along with a participation roster and dates for each activity.

BMP 2: Develop and distribute education and outreach materials.

Each co-permittee developed and distributed educational materials as necessary (see MCM 1.2 list of education and outreach materials).

BMP 3: Conduct educational and outreach activities.

Each co-permittee staffed/presented at least two community events, citizen's groups, and/or schools and industry (see list of events in MCM 1.2).

BMP 4: Maintain Hinkson Creek GIS Habitat Viewer.

The Hinkson Creek GIS Habitat Viewer was reviewed by the permittees during calendar year 2021.

BMP 5: Provide and maintain dedicated stormwater resource websites.

The City of Columbia, Boone County, and MU maintained the following stormwater resource websites by reviewing and updating as necessary:

https://www.como.gov/utilities/stormwater/
https://www.como.gov/watershed
www.showmeboone.com/stormwater
https://ehs.missouri.edu/ehs/env/stormwater
www.helpthehinkson.org
www.cavewatershed.org

https://sites.google.com/como.gov/sustain-edu-water-cycle-stem/homehttps://www.facebook.com/boonecountymostormwater
https://www.youtube.com/channel/UCrd_RaCJ73N442kfWGfa1FA

BMP 6: Provide the public with proper, publicly announced, disposal opportunities to minimize the presence of household hazardous waste in local waterways.

The annual area-wide household hazardous waste (HHW) collection event that has historically been hosted by the co-permittees was canceled in 2021 due to Covid-19 pandemic. The co-permittees are collaborating with the Mid-Missouri Solid Waste District to host a Boone County Recycling Collection event scheduled for May 7, 2022.

The City of Columbia continued to hold a twice-a-month collection program between and including the months of April through November.

The Boone County Sheriff's Office, in partnership with the Youth Community Coalition and law enforcement agencies throughout Boone County including Ashland, Columbia, Centralia, Hallsville, University of Missouri, and VA Hospital Police Departments, conducted Prescription Drug Take Back events at multiple locations in April and October 2021. These events coincided with the National Drug Take Back events sponsored by the Drug Enforcement Agency. Over 1,000 pounds of prescription drugs were collected from Boone County residents in 2021.

MCM 2: Public Involvement and Participation

1. Overall compliance with permit conditions and SWMP

Providing opportunity for citizen input and participation in stormwater matters is the primary goal of MCM 2. The City's, County's, and MU's commitment to public involvement and public participation programs was tailored to provide ample opportunity for public involvement and participation and to increase the understanding of stormwater-related impacts and issues.

The BMPs are appropriate and have met the goals of public notice/involvement as the co-permittees have established processes for public involvement in political decision making. Notice is given in a manner consistent with state and local regulations. The various practices incorporated into the MS4 education programs encourage a variety of public participation and involvement. Other programs train volunteer educators and encourage a wide range of community groups to participate in a variety of stormwater improvement activities such as tree planting, community gardens, litter pickups and proper hazardous waste disposal. Social media outlets have provided a new means to engage and involve the public and are appropriate for the significant college student population in our MS4.

The co-permittees each have their own public process for approving construction projects. The City's public process includes interested parties' meetings, public hearings before City Council, and direct contact with City staff. Similarly, the County Commission meetings are open to the public and County staff is available to meet directly with the public. MU, not fitting the traditional municipality model, involves the campus "public" through its master planning process.

The Collaborative Adaptive Management (CAM) process has demonstrated heightened awareness of stormwater and water quality issues within the community and continues to do so through the public education and public involvement MCMs. The CAM Stakeholder, Action Team, and Science Teams each meet multiple times per year for approximately 1.5 - 2 hours per meeting with up to 15 people at any given meeting. The success of the CAM process continued throughout 2021, as demonstrated by sustained participation of team members at meetings and events. As Covid-19 pandemic cases continued to drop in 2021, each of the three CAM teams were able to return to the number of meetings held pre-COVID. However, the Stakeholder Committee and Science Team continued to hold meetings in virtual forums.

The CAM process for the Hinkson Total Maximum Daily Load (TMDL) adheres to all "Sunshine Law" regulations for notification of public meetings and has increased stormwater-related communication between the involved individuals and the organizations they represent. It addresses the Hinkson watershed, the largest watershed in the MS4 area, which is appropriate to this measure. It provides a near monthly opportunity for the public and local policy makers to engage in stormwater issues within our MS4.

All reports presented to the CAM Stakeholders can be found at
http://www.helpthehinkson.org/CAMInformation.htm.
Reports and data will be used by the MS4 partners to guide future decisions to reduce impairments in Hinkson Creek.

2. Progress toward achieving the statutory goal of reducing the discharge of pollutants to the MEP

Together, the co-permittees have met all measurable goals associated with their ongoing BMPs for public involvement and participation. Staff from the University of Missouri, City of Columbia, and Boone County met ten times in 2021 to coordinate and work on stormwater activities. These included joint clean-up events, public service announcements, Hinkson Creek TMDL CAM, social media, volunteer activities and annual reporting to MDNR.

In 2007, the Boone County Commission approved the Bonne Femme Watershed Management Plan, which was developed in response to mounting concern for the protection of the natural resources in the Greater Bonne Femme Watershed, which include Rock Bridge Memorial State Park and Three Creeks Conservation Area, as development moves south from the City of Columbia.

Although many of the plan recommendations were incorporated into Boone County ordinances and planning and development criteria, expansion of urban development into the watershed gave rise to renewed concern about the protection of the natural resources in the watershed. In addition, five streams in the Greater Bonne Femme Watershed are on the Clean Water Act 303(d) List of Impaired Waters for exceedance of bacteria (*E. coli*) criteria.

Boone County assembled a Technical Advisory Team in early 2016, consisting of members from local government and conservation agencies. During 2021 the team met eight times.

A Steering Committee was established in 2019, comprised of local government representatives. This committee met three times in 2021.

Several subcommittees have been formed to address collection of scientific data in the watershed, outreach and education, and creation of a 9-point plan to enable funding from sources such as EPA and MDNR. Boone County has been working with Rock Bridge Memorial State Park and other partners to increase awareness of water quality in the Greater Bonne Femme Watershed.

Dr. Bob Lerch, a soil scientist with USDA/ARS resumed quarterly stormwater sampling at ten sites in the watershed in 2016. This water quality sampling included monitoring *E. coli* in several streams. E. coli testing was completed in 2020. Quarterly stormwater sampling ended in 2021. The County continued to monitor three gauging stations running in the watershed. These stations monitor stage (depth) and temperature of Turkey Creek, Bonne Femme Creek, and Little Bonne Femme Creek.

The Devil's Icebox Spring Branch Cooperative Stream Investigation (CSI) project began in 2017 as a partnership between the Missouri Department of Natural Resources Water Protection Program, Boone County's Stream Team #4794, and Boone County Regional Sewer District. This CSI project was planned as a 1-year E. coli monitoring project from November 2017-October 2018. This project was completed in 2018 and a final report was issued from the Missouri Department of Natural Resources in 2019.

Boone County owns two bioretention basins along Meyer Industrial Blvd. As part of the GBFWP, these basins were rehabbed and mulched in the fall of 2019 for a demonstration project. In June of 2020, volunteers helped replant the basins with native grasses and other deep-rooted vegetation. More

grasses were planted in October 2020. In 2021, an educational sign was installed at the basins and a dedication ceremony was held.

The natural resources in the Greater Bonne Femme Watershed are a part of our Boone County heritage. Plans for 2022 include completion of a 9-element watershed management plan partially funded by the Environmental Protection Agency through the Missouri Department of Natural Resources Chapter 319 Unit.

The CAM process for the Hinkson Creek TMDL continued through 2021. CAM is a science-driven, stakeholder-based process for decision-making while dealing with the scientific unknowns inherent in many physical and biological systems. It uses a continuing process to make changes and then to determine the effect of those changes. Three diverse groups are synthesizing complex ecological, technical, political, and economic variables to affect significant water quality improvements to Hinkson Creek. Successful actions from this process will likely be able to be repeated throughout the MS4 area. Three groups have been formed to support the CAM process.

- The 15-member Stakeholder Committee is comprised of elected officials representing the MS4 partners, individuals representing residential landowners, commercial interests, construction industry and environmental groups. They are responsible for suggesting actions to the City, County and MU for implementation and suggesting recommendations for monitoring.
- The Action Team is responsible for putting together proposals for actions to improve water quality for consideration by the stakeholders. This group is comprised of County, City, MU, Boone County Regional Sewer District and MoDOT staff.
- The Science Team includes science professionals from EPA, MDC, MDNR, USGS, MU and a local engineering firm. This group proposes monitoring and modeling necessary to assess the health of the creek, determine what causes may be contributing to water quality problems, and determine the effectiveness of actions taken to improve water quality.

Spatial analysis of the Habitat Assessment was finished in 2019. Data analysis is pending.

Dr. Argerich continued her synoptic sampling in 2021, with five sampling events. She and 17 students sampled 30 sites along Hinkson Creek and 10 sites along its tributaries. Two sampling events will be done in 2022 to satisfy the contract requirements.

The Hinkson Creek Aquatic Macroinvertebrate Data Mining Project was completed in August 2020. The objective of this study was to assist the CAM in the analyses and interpretation of existing macroinvertebrate and water quality and physical data from Hinkson Creek and relevant EDU Reference and Control streams to diagnose stressors causing the Hinkson Creek aquatic life impairment. An additional objective of the project is to determine “best” indicator metrics for stressor identification and for assembling multi-metric indices for diagnosing causes for aquatic life impairment in Hinkson Creek. Findings of the study were presented at the CAM All-Team virtual meeting on April 15, 2021. The study can be found at:
https://www.helpthehinkson.org/documents/Hinkson%20Macroinvertebrate%20Data%20Mining%20Report.pdf

Boone County GIS completed an initial LiDAR analysis of the stream corridor in 2021 at the request of the Science Team, which showed amounts of sediment erosion and deposition. The Science Team is studying the results to determine if there are any "hot spots" along the corridor that need attention or additional monitoring.

The USGS Comprehensive Chemical Sampling project was postponed for approval in 2020 due to the COVID-19 pandemic and funding shortage. In 2021, the project was approved for funding and is set to begin in Spring 2022. The CAM partners are partnering with USGS Columbia Environmental Research Center to collect water and sediment samples from Hinkson Creek to analyze organic and inorganic contaminates. Proposed chemicals to be investigated include heavy metals, current use pesticides related to agriculture, wastewater indicators, polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides, polychlorinated biphenyls (total PCBs), and polybrominated diphenyl ether (PBDE) flame retardants, analytes, *in vitro* yeast estrogen screen (YES assay), and per and polyfluorinated surfactants (PFAS) in passive samplers. This project will take place over two sampling events in the spring and fall at five sites along Hinkson Creek.

Dr. Shaun Zeiger, Lincoln University, installed stage samplers at Dr. Jason Hubbart's old gauging sites along Hinkson Creek in 2021. Dr. Zeiger intends to add additional sensors for conductivity as funding allows.

MU students also engaged in stormwater related activities in 2021 through groups such as:
Greeks Go Green
Journal of Environmental and Sustainability Law
Missouri Chapter of the Fisheries and Aquatic Society
Missouri Water Environment Association
Mizzou Limnology Club
Mizzou Tigers Stream Team
Mizzou Water and Environmental Technologists
Mizzou Student Group of US Green Building Council
MU Agricultural Systems Management Club
MU Agroforestry and Forestry Graduate Student Association
MU Environmental Law Society
MU Environmental Leadership Office
MU Environmental Science Club
MU Forestry Club
MU Geology Club
MU Geological Graduate Society
MU Horticulture Club
MU Student Chapter of the Soil and Water Conservation Society
MU Sustainability Office
Science, Health and Environmental Journalism at Mizzou
Student Environmental Design Association
Sustain Mizzou
University of Missouri Agronomy Club

In 2019, the Missouri Department of Natural Resources acknowledged the City of Columbia's Wastewater and Stormwater Integrated Management Plan (IMP). The goal of the IMP is to develop adaptable and affordable long-term recommendations that meet Columbia's wastewater and stormwater management needs and address Clean Water Act obligations to protect and improve our community waterways. As the City begins implementing the IMP, public input and participation will be key as this is a community-driven process.

In 2021, the City completed the following MS4 Program Enhancement actions as identified in the IMP 5-year Action Plan.

- Published a stormwater article in the City Source newsletter in March 2021, April 2021, August 2021 and December 2021.
- Inspected 201,645 feet of existing sewer line for damage.
- Completed 18 illicit discharge investigations: and
- Completed 514 outfall inspections

On June 17, 2017, Columbia City council passed Resolution R-83-17A, reaffirming the commitment of the City of Columbia to take action to reduce climate pollution and authorized participation in the Global Covenant of Mayors for Climate & Energy. In February 2018, the Mayor appointed 15 community members to the Mayor's Task Force on Climate Action and Adaptation Planning. The Mayor's Task Force along with City staff was tasked with developing the goals and objectives to be included in the City's Climate Action & Adaptation Plan (CAAP). Two of the goals identified in the plan are to improve stormwater management and minimize risks to flood-prone areas, which both align with the goals of the permitted MS4. The CAAP was adopted by the City Council on June 17, 2019.

City Council received a report at their October 7, 2019 meeting for the planned strategic priority issues of the CAAP. At the same meeting, City Council approved the creation of a Climate & Environment Commission. The purpose of the Commission is to advise City staff on reporting to City Council the implementation activities of the CAAP, act as a primary liaison for outreach and awareness on the CAAP throughout the community, provide input on evaluating additional opportunities for mitigation and resilience actions in Columbia, and advise City Council on environmental issues, as directs. The commission is comprised of 15 members appointed by City Council.

The City of Columbia engages in multiple planning processes in the normal course of business. Concurrent to the Climate Action & Adaptation Plan process, community input was and will continue to be reviewed from the following efforts:

- City of Columbia Strategic Plan
- City of Columbia Vision Zero Plan
- Community Development Consolidated Plan
- Columbia Utilities Our Columbia Waters Integrated Management Plan
- Columbia Utilities Integrated Water Resources Plan
- Columbia Utilities Integrated Electric Resource and Master Plan
- CATSO Long Range Transportation Plan
- Columbia / Boone County Public Health & Human Services Community Health Improvement Plan

In 2020, the City worked in cooperation with the USGS Missouri Water Science Center to provide funding for the Hinkson Creek stream gauge located at South Providence Road in Columbia, Missouri.

The stream gauge provides daily streamflow data that is available publicly on the USGS Water Resources website: https://waterdata.usgs.gov/nwis/uv?site_no=06910230

The City continues to garner volunteer participation and involvement of diverse groups through programs like TreeKeepers, composting workshops, Household Hazardous Waste Program, Adopt-A-Spot, and a variety of formal and informal cleanup events. Citizens volunteered more than 129 hours as participants in the Adopt-A-Rain Garden Program to maintain the rain gardens in public rights of way and involve the community in stormwater retrofits to improve water quality. The City website has information about these volunteer opportunities which are available to all residents including those at MU and the County.

The City continues to utilize volunteers to organize and host a monthly stream clean up within the watersheds. This group of volunteers, previously known as the Columbia Crawdads, renamed to Litter Team, acts as volunteer educators and volunteered more than 582 hours in 2021.

Social networks such as Facebook and YouTube are used to distribute educational information about current stormwater projects, share photos of volunteers/events, provide access to stormwater materials, and involve the public by encouraging participation.

The City continued to engage participation and public involvement by the following:

- Total trash pickup efforts totaled 8,929.5 hours from 3,851 individuals with 6,622 bags of litter collected.
- Regularly scheduled monthly stream cleanup activities.
- Maintain 4 active rain garden locations through an effort called the Adopt-A-Rain Garden Program. 67 people volunteered 129 hours of service picking up 40 bags of trash in this program.
- 137 people attended a compost class, and 62 compost bins were sold/given out/distributed collectively over 12 workshops.
- Boone County engaged participation and public involvement by the following:2 - Rock Bridge Memorial State Park Water Quality Monitoring Events
- Storm drain marking campaign
- Basin Dedication

Boone County continued to participate in the Lakes of Missouri Volunteer Program (LMVP). The LMVP started in 1992 as an effort to get citizens involved in the lake water quality monitoring. The goals of the LMVP are 1. Determine the current water quality based on productivity of Missouri's lakes, 2. Monitor for changes in water quality over time, and 3. Educate the public about the lake ecology and water quality issues. Staff at Boone County continued sampling at Stephens Lake, Tri City Lake, and Lick Creek Lake this season. Staff collected three (3) samples between June and September. By participating in this effort, Boone County receives free sampling equipment and information on the status of the lakes in Boone County.

The Boone County Stream Team hosted two water quality monitoring blitzes at Rock Bridge Memorial State Park in the Spring and Fall of 2021. Despite the pandemic and related restrictions, the County was able to hold these outdoor events and collect data from streams in and around the park. Continuing to

collect the water quality data at these sites over time helps to inform our understanding of water quality changes in the Greater Bonne Femme Watershed. These semi-annual blitz events have provided an opportunity for field training for Missouri Stream Team water quality volunteers.

3. BMPs implemented by government entity

No BMPs or MCMs were implemented by governmental entities other than those who are a party to this MS4 permit during the reporting period.

4. Summary of stormwater activities planned for the next reporting cycle (include implementation schedule)

All co-permittees will continue to implement ongoing BMPs as identified in the Joint Stormwater Management Program.

The CAM process will continue through 2022. Actions will continue to be implemented, evaluated, and monitored. CAM meetings are open to the public and will provide opportunities for the public to provide input. Data analysis for the fine sediment mapping, spatial analysis of the habitat assessment, Dr. Argerich's synoptic sampling, LiDAR analysis, and chemical sampling will continue.

The City Council and Planning and Zoning Commission will continue to meet at their regularly scheduled times. Meetings are open to the public and development and redevelopment plans are discussed.

Boone County Planning and Zoning meetings will continue to meet on the 3rd Thursday of the month. The P & Z Commission acts as an advisory commission to the County Commission on matters of land use. These meetings are open to the public.

Boone County's website will continue to be updated regularly to keep the public informed of stormwater issues.

The City will continue with the Columbia Wastewater and Stormwater Integrated Management Plan process in 2022 by continuing the implementation of the Five-Year Action plan to address the prioritized investments for the Sewer and Storm Water Utilities. These items include enhancements to the MS4 Program.

In 2022, the City will continue implementing the Climate Action & Adaptation Plan through internal CAAP Action Groups and the Citizen Climate Commission.

MU's master planning process continues to be an open, transparent process allowing participation of the campus "public". Begun more than 30 years ago, MU's master planning effort addresses current and future needs while remaining mindful of MU's commitment to environmental stewardship.

The co-permittees will continue to involve a variety of volunteers in cleanups, tree planting, aquatic plant installations and household hazardous waste pickups.

5. Proposed changes to the program area and documented SWMP (MCM 2)

The co-permittees updated the February 2020 SWMP to reflect the requirements of their current Missouri State Operating Permit No. MO-0136557. The SWMP was approved by the Department of Natural Resources' Municipal Separate Storm Sewer System (MS4) Program on April 8, 2022, and will be reviewed again in 2025, in preparation for the upcoming permit renewal, and as needed.

6. Effective BMPs evaluated during the reporting period

BMP 1: Implement an effective public involvement/participation program.

Boone County and the City of Columbia continued to hold public hearings/stakeholder meetings when properties were annexed or requested a change in zoning, during the platting process, and throughout the project design phase.

MU publicized and presented the Campus Master Plan, which identified planning principles and included current and proposed construction activities.

BMP 2: Select a targeted topic for each calendar year.

The targeted topic for 2021 was focused on informing citizens about the watersheds they live in and how actions on the landscape can impact local streams.

BMP 3: Implement and maintain public involvement/participation activities to engage citizens.

The City of Columbia, Boone County, and MU continued to promote Adopt-A-Spot/Adopt-A-Road programs, TreeKeepers, public service announcements, and community clean-up events.

The City of Columbia, Boone County, and MU continued to maintain social media and websites for promotion of public involvement and participation to facilitate conversation of pertinent topics.

BMP 4: Provide the public with proper, publicly announced, disposal opportunities to minimize the presence of household hazardous waste in local waterways.

The annual area-wide household hazardous waste (HHW) collection event that has historically been hosted by the co-permittees was canceled in 2021 due to the Covid-19 pandemic. The co-permittees are collaborating with the Mid-Missouri Solid Waste District to host a Boone County Recycling Collection event scheduled for May 7, 2022.

The City of Columbia continues to hold a twice-a-month collection program between and including the months of April through November.

The Boone County Sheriff's Office, in partnership with the Youth Community Coalition and law enforcement agencies throughout Boone County including Ashland, Columbia, Centralia, Hallsville, University of Missouri, and VA Hospital Police Departments, will conduct prescription drug take back events at multiple locations in April and October 2022.

MCM 3: Illicit Discharge Detection and Elimination (IDDE)

1. Overall compliance with permit conditions and SWMP

The co-permittees believe that the chosen BMPs are appropriate and have furthered the goals of reducing the discharge of pollutants to the maximum extent practicable. They allow for proper identification, categorization, and inspection of the storm sewer system along with immediate and effective response to discharges and spills. IDDE reports are thoroughly investigated and resolved in accordance with the MS4 permit.

The City and County's Illicit Discharge Detection and Elimination Ordinances, coupled with education and outreach efforts, have proven particularly successful in the reporting of illegal discharges or dumping into the storm drainage system. Community illicit discharge hotlines continue to be monitored and are referenced both on the co-permittee's web sites and by a telephone number on the storm drain labels.

MU's Department of Environmental Health and Safety (EHS) creates policies, programs, and guidance to assist the campus in complying with regulations. A number of overlapping mechanisms effectively monitor and control discharges on the MU campus, including the Stormwater Management Plan, Stormwater Pollution Prevention Plans for land disturbance sites, the Spill Prevention Countermeasures and Control Plans, and stormwater discharge NPDES permits. Construction and demolition projects receive the daily oversight of a MU Construction Project Manager or Construction Engineer, in addition to receiving MU building permit inspections. MU Employees are provided training and have mechanisms to report discharges, including discharges to the stormwater system, to EHS. The awareness of the campus community has been heightened, as evidenced by feedback from the annual training and inspection activities throughout the year.

The co-permittees continued to identify high priority areas based on the following criteria: stormwater runoff that is creating a threat to the public; causing deterioration to infrastructure; infrastructure that has exceeded life expectancy or shows evidence of failure; or is the source of numerous complaints. Projects that address the above are all subjected to an economic analysis and appropriation availability. The City maintains and updates as necessary its storm drainage map showing the location of all known outfalls and the names and location of all receiving waters of the state that receive discharges from those outfalls.

The City performs frequent inspections to detect and address non-stormwater discharges in areas where reports have occurred historically, such as below the downtown area. All stormwater employees inspect stormwater systems citywide when in the field for other responses. The City has incorporated IDDE training with all its Good Housekeeping training for all City employees. This work is on-going. The City has an ongoing program to inspect sanitary sewers and stormwater infrastructure utilizing CCTV equipment. Part of the CCTV inspection is to ensure that there are no cross connections between the sanitary sewer and stormwater system.

As failures in the sanitary sewer system can ultimately infiltrate the storm sewer system, actively examining the sanitary system prevents incidental non-stormwater discharges. The City sanitary system has been divided into multiple priority areas based on inflow and infiltration (I&I). Methods to evaluate integrity include smoke testing, building inspections, CCTV inspections and dye water testing. Removing stormwater from the sanitary sewer system prevents overflows which cause raw sewage to enter the waterways.

Boone County Resource Management supports a web-based reporting system to log citizen complaints. Most of these complaints are due to yard or street flooding. Others report potential dump sites, discharge, or erosion problems.

Boone County Resource Management will not finalize building occupancy permits until the septic system has been inspected and approved by the Columbia/Boone County Health Department. This ensures that there are no cross connections or systems that discharge to surface waters.

MU continues to review and update as needed a storm sewer map showing the entire MU MS4 system. MU Campus Facilities divided their sanitary sewer system into five zones, A-E. One of the five zones is inspected each year, completing an inspection of the entire system every five years. The inspection program includes camera verification and inspections for defects and infiltration. In 2021, Campus Facilities completed visual inspection of Rotation A.

The co-permittees have not identified any of the listed non-stormwater discharges as significant contributors to the regulated MS4.

2. Progress toward achieving the statutory goal of reducing the discharge of pollutants to the MEP

The co-permittees continue to maintain, implement, and enforce measures to detect and eliminate illicit connections and discharges to the MS4. The co-permittees have the legal authority to carry out all inspections, surveillance, testing, and monitoring necessary to ensure compliance within their respective jurisdictions. MU exercises enforcement through campus policy and administrative actions. Each co-permittee has implemented a plan to detect and address non-stormwater discharges which may include on-site visual inspections, smoke and dye testing, closed circuit television (CCTV) inspections, as well as public watch and reporting programs. The City maintains a 24-hour response telephone number for illicit discharge reports. MU's 24-hour emergency response process also includes reporting of illicit discharge events.

While the process is different among the co-permittees, new buildings are 100% inspected for illicit connections and there are building code requirements and on-site sewage treatment regulations (if applicable) in place for new construction. These mechanisms prevent creation of new illicit discharges and help bring existing discharge systems into compliance. Each new building, whether residential, office or commercial in Columbia or Boone County, is inspected by City, County or MU staff including a plumbing inspection prior to pouring of the lower level floor. This plumbing inspection occurs on each new building constructed in Columbia, as well as on any remodeling work. The County permitting process also includes verification of connection to an approved wastewater system with inspections by

City/County Health Department staff or Boone County Regional Sewer District staff. A storm sewer map with outfalls is maintained by all permittees.

Timely call-ins to the co-permittees indicate a heightened awareness of stormwater and illegal dumping activities in Columbia. All complaints were thoroughly investigated and resolved in accordance with the MS4 permit.

The co-permittees continue to inspect approximately 20% of the storm drainage infrastructure priority areas per year.

The annual area-wide household hazardous waste (HHW) collection event that has historically been hosted by the co-permittees was canceled in 2021 due to the Covid-19 pandemic. The co-permittees are collaborating with the Mid-Missouri Solid Waste District to host a Boone County Recycling Collection event scheduled for May 7, 2022.

In 2021, the City completed over 226,900 feet of CCTV inspection for new and existing sewer main. Additionally, the City completed over 26,730 feet of CCTV inspection for new and existing stormwater main. In 2021, the City replaced 419 feet of failing storm pipe and 10 storm structures.

Through the City's Annual Sanitary Sewer Main and Manhole Rehabilitation projects, thousands of feet of sanitary sewer pipe have been lined eliminating the potential for exfiltration of sewage. Additionally, hundreds of lateral connections have been repaired in lower lying areas, also reducing the potential for exfiltration of sewage to drainage pathways. The FY 2018 Sewer Main and Manhole Rehabilitation project was completed in 2020. This project included the rehabilitation of approximately 55,000 linear feet of sewer line, 275 manholes, and 300 lateral connections. Upon completion of project construction, approximately 15,000 feet of sewer was rehabilitated specifically for inflow and infiltration reduction in the Flat Branch basin. Approximately 40,000 linear feet of sewer main throughout the City was rehabilitated due to both structural deficiencies and inflow and infiltration reduction.

In 2020, the City developed new technical specifications for a multi-year contract for Sewer and Stormwater Rehabilitation and Cleaning Services. A request for proposal was issued in 2020, and the contract has been awarded.

The City also completed construction of three Private Common Collector Elimination projects in 2021: PCCE #8 Thilly Lathrop Phase 4, PCCE #3 Stewart Medavista Phase 2, and PCCE #16 Bingham Ridgeley Phase 3. The goal of these projects is to install new public sanitary sewer mains to replace the existing private collection systems that are failing and are a potential source of exfiltration to local waterways.

Both the City Stormwater Utility and Community Development department receive citizen complaints via phone, email, and website for Stormwater discharge and construction discharge. Complaints are addressed in a timely manner. Storm Water Utility received 18 illicit discharge calls in 2021 and completed those illicit discharge investigations.

The City continues its grease trap inspection program to ensure restaurant grease traps are properly cleaned, maintained, and inspected on a regular basis. This activity will reduce the potential of sanitary

sewer overflows (SSO) into streams and their tributaries. In 2021, 756 inspections were performed with 1 letter of warning or notices of violation issued and plans for 68 new grease traps were reviewed.

In 2019, the City hired an MS4 Technician to support the MS4 program with a focus on IDDE and to conduct stream walks and outfall inspections in all City streams within the next 5 years. This was an identified action in the Five-Year Action Plan of the Columbia Wastewater and Stormwater Integrated Management Plan. The MS4 Technician worked with other City Staff to develop an ArcGIS application to aid in the completion of dry weather inspections of outfalls. In 2021, the City revised its outfall map as part of the permit renewal process. Using the updated map, the City completed 514 outfall inspections in 2021.

The County's system consists mostly of open swales and as such the traditional model of using a camera to inspect line integrity is not appropriate. Therefore, the County relies mainly on on-site visual inspection and citizen notification as mentioned in the previous section.

The County utilizes a web-based public comment submission platform to report illicit discharges and other stormwater-related issues. This is located on the County's stormwater web page www.showmeboone.com/stormwater. Any calls, letters, or email the County receives reporting stormwater concerns is input into the web-based platform for tracking purposes. The County monitors the submission platform daily and responds to all comments/concerns within 24-business hours. Depending on the location and nature of the concern, the County will either respond to the issue or coordinate the response effort with the relevant co-permittee or agency having jurisdiction.

MU continues to update its storm and sanitary sewer maps and continues to be available to investigate illicit discharge complaints 24/7. Both stormwater and non-stormwater discharges are readily recognized by the campus and local community due to a strong awareness program, as well as active monitoring by campus staff. Stormwater released from petroleum storage tank secondary containment is inspected prior to release in accordance with the Spill Prevention Control and Countermeasures Plan.

MU maintains Spill Prevention Control and Countermeasure (SPCC) plans for their facilities in the MS4 area for which a plan is required. The plans are intended to minimize the potential for the facility to adversely impact its environment and for the facility to attain and maintain compliance with EPA standards for oil pollution prevention and response. The plans outline the procedures, methods, and equipment used at the facility to comply with EPA oil spill prevention control and countermeasures standards and inspection, training, and record-keeping requirements.

MU has divided its sanitary sewer system into five zones, A-E. One Zone is inspected annually including camera verification and inspections for defects and infiltration. The process has been expanded to verify the connections of internal floor drains over a five-year period. In 2021, MU Campus Facilities completed visual inspection of Rotation A. Facility Operations had 436 hours of camera verification time involved with the Rotation A inspection. This included inspection of 510 feet of sanitary sewer pipe and 7,160 feet of storm drain pipe. Any debris in the system that was encountered was water-jetted to the nearest manhole and removed. A total of 57,860 feet of pipe (45,370 feet of sanitary pipe and 12,490 feet of storm pipe) was jetted during this rotation. Following is a description of replacements, repairs, and assignments completed in 2021:

- A total of 92 feet of new storm pipe and 316 feet of sanitary pipe was added to the system due to repairs, upgrades, or new construction.

The co-permittees received and followed up on all reports of non-stormwater discharges.

3. BMPs implemented by government entity

No BMPs or MCMs were implemented by governmental entities other than those who are a party to this MS4 permit during the reporting period.

4. Summary of stormwater activities planned for the next reporting cycle (include implementation schedule)

All co-permittees will continue to implement ongoing BMPs as identified in the Joint Stormwater Management Program.

The electronic mapping of the City/County/MU storm sewer system will continue to be updated as necessary.

The annual area-wide household hazardous waste (HHW) collection event that has historically been hosted by the co-permittees was canceled in 2021 due to Covid-19 pandemic. The co-permittees are collaborating with the Mid-Missouri Solid Waste District to host a Boone County Recycling Collection event scheduled for May 7, 2022.

The Boone County Sheriff's Office, in partnership with the Youth Community Coalition and law enforcement agencies throughout Boone County including Ashland, Columbia, Centralia, Hallsville, University of Missouri, and VA Hospital Police Departments, will conduct prescription drug take back events at multiple locations in April and October 2022.

The City will continue to train employees on IDDE and develop better procedures for response. The City will also evaluate Spill Prevention Control and Countermeasure (SPCC) plans for various facilities in an effort to establish good housekeeping practices for all City facilities.

The City will continue implementing the MS4 Program Enhancements as identified in the Five-Year Action Plan. As part of this effort, the MS4 Technician will continue conducting stream walks and outfall inspections in an effort to meet the 5-year goal.

Boone County will continue to implement and enforce the IDDE ordinance and regulatory mechanisms. The County will be revising their IDDE protocols and implementing a new inspection program in 2022. Citizens can report illicit discharges through both the Stormwater and Road & Bridge pages on the County's website. The County uses a GIS tracking system and database for stormwater projects and BMPs.

In 2022, MU Campus Facilities will carry out Rotation B inspections of the sanitary sewer system which will include camera verification and inspections for defects and infiltration.

In 2022, MU will continue to evaluate all outside storm drains on the MU campus for proper marking with storm drain disks. All storm drains missing disks will be marked and all damaged disks will be replaced. Maps indicating the location of all marked drains will be updated.

5. Proposed changes to the program area and documented SWMP (MCM 2)

The co-permittees updated the July 2020 SWMP to reflect the requirements of their current Missouri State Operating Permit No. MO-0136557. The SWMP was approved by the Department of Natural Resources' Municipal Separate Storm Sewer System (MS4) Program on April 8, 2022, and will be reviewed again in 2025, in preparation for the upcoming permit renewal, and as needed.

6. Effective BMPs evaluated during the reporting period

BMP 1: Continue to maintain stormwater drainage system maps with outfalls, pipes, inlets, and associated attributes by reviewing and updating.

All co-permittees reviewed and updated their outfall maps as part of the permit renewal process.

Boone County continued to review and update their storm sewer map for the County MS4 system.

The City continued to update their storm sewer map to include newly constructed infrastructure as well as revise existing data as needed.

MU continued to review and update as needed a storm sewer map showing the entire MU MS4 system. MU Campus Facilities divided their storm sewer system into five zones, A-E. One of the five zones is inspected each year, completing an inspection of the entire system every five years. In 2021, Campus Facilities completed visual inspection of Rotation A.

BMP 2: Effectively prohibit, through IDDE ordinance, or other IDDE regulatory mechanisms, non-stormwater discharges into the stormwater drainage system and implement appropriate enforcement procedures and actions.

The co-permittees documented and tracked IDDE Ordinance/Regulatory Mechanism enforcements and documented illicit discharges and illegal dumping enforcement actions taken.

The co-permittees reviewed the IDDE Ordinances/Regulatory Mechanisms and updated as needed.

BMP 3: Evaluate certain non-stormwater discharges for flows or certain categories of non-stormwater discharges or flows to determine if they are significant contributors of pollutants.

The co-permittees addressed the occasional incidental non-stormwater discharges on a case-by-case basis to determine whether the discharges may appropriately be directed to the storm sewer system. The co-permittees have not identified any of the listed non-stormwater discharges as significant contributors to the regulated MS4.

BMP 4: Maintain an implementation schedule to detect and address incidental non-stormwater discharges including discharges from illegal dumping and spills to the MS4.

MU has divided its sanitary sewer system into five zones, A-E. One zone is inspected annually including camera verification and inspections for defects and infiltration.

In 2021, the City completed over 226,900 feet of CCTV inspection for new and existing sanitary sewer main. In 2021, the City completed over 26,730 feet of CCTV inspection for new and existing stormwater main. The City also completed 514 outfall inspections.

The County did not inspect any outfalls in 2021.

BMP 5: Inform public employees, businesses, and the public of the hazards associated with illegal discharges and improper disposal of waste.

The co-permittees included this information as an element in the outreach, education, and municipal training programs.

MCM 4: Construction Site Stormwater Runoff Control

1. Overall compliance with permit conditions and SWMP

The co-permittees believe that the chosen BMPs are appropriate and have furthered the goals of reducing the discharge of pollutants to the maximum extent practicable. Due to the ongoing growth in Columbia with vacant land and farms being converted into residential, office and commercial developments, the need for a program to control construction site stormwater runoff is essential. All co-permittees have programs that provide for a thorough plan review of all proposed land disturbance activities. All disturbed sites are inspected often, and progress continues to be made with the development community.

The result of growth policies implemented by Columbia and Boone County is that most of the urban development in the area occurs within the city limits of Columbia. Much of the development that occurs in the County is rural in nature. The BMPs identified are very appropriate and essential to protect downstream areas as development and construction continue to expand into the unincorporated areas of the County. Boone County Public Works has a Road Regulation Manual which requires all land disturbance related to road building to follow practices necessary to prevent erosion and sediment loss from leaving the site.

MU EHS works closely with Campus Facilities - Planning Design and Construction (CF-PDC) department, providing guidance on stormwater management to architects and engineers. Any specific requirements are included in the bid and contract documents. Waterways and stormwater inlets are aggressively protected from the release of sediment, debris, or petroleum products. During each construction project, the MU Project Manager and/or Construction Inspector inspects the site both weekly and after precipitation events to make sure stormwater controls are in place and working as designed. In addition, EHS and Campus Facilities conduct a comprehensive joint audit of all permitted construction sites once a year.

2. Progress toward achieving the statutory goal of reducing the discharge of pollutants to the MEP

The co-permittees have met all measurable goals associated with their ongoing BMPs for construction site stormwater runoff control.

The co-permittees' land disturbance ordinances, design manuals and master plan have been very successful in controlling the generation of nonpoint source pollution from construction sites from improper handling and usage of nutrients and toxic substances as well as preventing the movement of toxic substances from construction sites.

The co-permittees require submittal of Stormwater Pollution Prevention Plans (SWPPPs)/soil erosion control plans for all construction projects. All SWPPPs/soil erosion control plans are reviewed for conformance with regulatory requirements and required design policies, practices, and procedures. This is an ongoing goal.

The co-permittees continue to administer a program to inspect construction sites and effectively implement required erosion control practices on a routine and post-rainfall basis. The co-permittees also continue to administer a program to enforce construction site Erosion and Sediment Control (ESC) measures on permitted construction projects to remain in compliance with regulatory requirements. These are ongoing requirements.

The City Community Development Department performs inspections of active private sites at least weekly, and notices of violation are issued as necessary. The Storm Water Utility responds to storm drainage complaints. Public improvement projects are inspected by their respective departments regularly and weekly at a minimum. Monthly averages of 27 commercial and development sites were inspected at least weekly or greater. A total of zero 1st Notice of Violation was issued, zero 2nd Notice of Violation was issued, and zero 3rd Notice of Violation was issued for 2021.

A link on the City's website provides citizens the opportunity to report a stormwater concern. Depending on the concern received, responses are provided from the City's Community Development Department, City Storm Water Utility or one of the other co-permittees, depending on the issue and appropriate jurisdiction.

All information regarding ordinances, regulations, enforcement, site plan review, inspection, policies, and procedures with regard to construction site runoff control for private development in the City can be found on the City's website. City regulations require soil erosion control plans for all land disturbance activities greater than an acre. City regulation requires erosion and sediment control for all disturbed sites, including those less than one acre. The Community Development Department tracks plan reviews and site inspections for private construction and development sites.

For City public improvement projects, there is a rigorous public involvement process. As part of the Citywide SWPPP, for larger improvement projects, an individual SWPPP is prepared and included in the construction documents for improvements that disturb more than an acre. All City improvement projects are inspected by City personnel. For maintenance and operations work, employees are being educated on proper erosion and sediment control to meet the City's general SWPPP permit.

Boone County continues to implement and enforce the Stormwater Ordinance.
To ensure construction sites are managed properly within the County, the County implements plan review, permitting, inspection, and complaint response. Owners/Developers/Contractors follow general requirements laid out in Section 28.5 of the Boone County Zoning Regulations. Private entities are required to submit a Boone County Land Disturbance Permit, Stormwater Pollution Prevention Plan (SWPPP), erosion and sediment control plans, erosion and sediment control cost analysis for security deposit determination, and a Missouri Department of Natural Resources State Operating Permit for review and approval by County staff before construction may begin. Once the project is approved, a preconstruction meeting is held at the construction site with the owner, design professional, contractor, and site inspectors to discuss any special site features such as environmentally sensitive areas, steep slopes, stream buffer, etc., erosion and sediment control requirements, good housekeeping, and inspection procedures. The same guideline is followed for public land disturbance activities conducted by the County.
The County continues to work with its inspections staff to improve procedures for the pre-construction meetings and final inspections, as well as administer a program to inspect construction sites and

effectively implement required erosion and sediment control practices on a routine and post-rainfall basis. Annual training for inspection staff on enforcement procedures and follow-up documentation is conducted. Additionally, the County will continue to administer a program to enforce construction site erosion and sediment control measures on permitted construction projects in compliance with regulatory requirements.

Boone County also requires installation and maintenance of erosion control measures on all publicly funded projects. Staff inspected these sites on at least a weekly basis while the permit was active. Notices were given to contractors if re-installation and/or maintenance of erosion control measures were required.

The County utilizes an electronic submission system for the public to submit concerns, complaints, or comments on any construction projects. The electronic submission system is located on the County's stormwater webpage in the sidebar of the home page with a link to *"Report Storm Drainage Problems."* The County reviews all environmental concerns, complaints, or comments received by the public within 24 business hours of receipt, and provides an investigative response to submission, if deemed necessary, within 48 hours of submission (72 hours if submission occurred over a weekend or holiday). The County supplies a follow up response to the submitter to let them know that the complaint/concern was received within 24 hours, and if requested, a follow up once the review/investigation has been completed. The public may also contact the Resource Management Department by phone to report a stormwater complaint/concern. If complaints are phoned in, all information is entered into the online reporting system by staff for tracking purposes.

At MU, all construction projects are designed and reviewed by the MU's CF-PDC department using the PDC "Sustainable Design Policy." This policy incorporates sustainability principles and concepts in the design of all facilities and infrastructure projects to the fullest extent possible, while being consistent with budget constraints, appropriate life cycle cost analysis, and customer priorities. The policy directs MU to meet or exceed MDNR best management practices for erosion and sedimentation control standards and implement innovative stormwater management. The Consultant Procedures and Design Guidelines is available on the University of Missouri Facility Planning and Development Website and contains a collection of information that is updated quarterly as necessary.

In addition to prescribed weekly/post-rain event inspections, internal audits were conducted by MU EHS environmental compliance staff and the campus construction inspector. It was determined that the requirements of the land disturbance permit were successfully implemented and the sites well-managed. Trained and experienced personnel manage the documentation, conduct weekly inspections, and implement the conditions of the permit in the field. There is excellent coordination between the personnel of Planning, Design & Construction, Landscape Services and EHS. BMPs were found to meet the objective of protecting water quality to the maximum extent practicable. These results demonstrate a solid commitment to erosion control, good cooperation, and expedient corrective action for deficiencies.

MU delegates authority to Environmental Health and Safety to implement compliance with the requirements of MCM4. This delegation of authority is found in Section 7:001 (Delegation of Responsibility) of the University of Missouri Business Policy and Procedures manual. This policy was last updated on 12/20/2021.

3. *BMPs implemented by government entity*

No BMPs or MCMs were implemented by governmental entities other than those who are a party to this MS4 permit during the reporting period.

4. *Summary of stormwater activities planned for the next reporting cycle (include implementation schedule)*

All co-permittees will continue to implement ongoing BMPs as identified in the Joint Stormwater Management Program.

The City will continue to conduct site inspections and require and review soil erosion control plans. City Staff will continue to evaluate erosion and sediment control ordinances and inspection operations to determine if there are more effective methods to achieve compliance. The City is scheduled to make recommendations and updates for an Erosion and Sediment Control Manual in 2022 to be implemented in 2023.

In 2022, the County plans to start the revision process for the stormwater ordinance. This is expected to be a multi-year process. As part of that process, the County will also be revising their land disturbance program. Additional activities will include the development of a GIS layer for open County land disturbance permits in the permit tracking database.

The County will continue to concentrate on technical training for engineers and contractors as well as community outreach. This specialized instruction will continue during the next reporting cycle. Contractor training will be held in the fall and winter. These workshops will focus on BMP installation, good housekeeping, spill prevention, stormwater, and water conservation practices. Presentations on the stream buffer and stormwater ordinance will continue as needed.

EHS and MU Planning, Design and Construction (PD&C) will continue to jointly develop new policies to further execute MCM 4. These policies recognize that urban stormwater quality is preserved by preventing erosion and sediment runoff from construction projects. Additionally, Campus Facilities continues to require all aspects of design and construction, including interaction with non-MU contractors to work through shared project management and collaboration software, which includes environmental policies and guidance. MUs stormwater guidelines and Stormwater Master Plan were completed in late 2012 (and presented publicly in 2013 and 2015). These items can be found on the MU Campus Facilities website.

5. *Proposed changes to the program area and documented SWMP (MCM 2)*

The co-permittees updated the July 2020 SWMP to reflect the requirements of their current Missouri State Operating Permit No. MO-0136557. The SWMP was approved by the Department of Natural Resources' Municipal Separate Storm Sewer System (MS4) Program on April 8, 2022, and will be reviewed again in 2025, in preparation for the upcoming permit renewal, and as needed.

6. Effective BMPs evaluated during the reporting period

BMP 1: Require an MDNR land disturbance permit for sites that will disturb one acre or greater.

Boone County approved and issued 33 land disturbance permits for projects within the County's MS4 system. The County also requires Missouri State Operating Permits be obtained for projects that are part of a common plan of development or sale. Boone County did not issue any land disturbance permits under Missouri State Operating Permit MOR100049 for projects completed by the County. The County provides a quarterly report to MDNR on County projects requiring a land disturbance permit.

MU issued four land disturbance permits (LDPs) in 2021 under Missouri State Operating Permit MOR100039 for projects that required a Missouri Department of Natural Resources LDP. The projects that required an LDP included the MU Healthcare – Children's Hospital Facility, the MU south Farm Swine Research Facility, the MU Middlebush Farm NextGen Center of Excellence for Influenza Research, and the MU Athletics Indoor Practice Facility.

In 2021, the City approved and issued 51 land disturbance permits for projects within the City of Columbia. The City submits a quarterly report to MDNR on City projects disturbing more than one acre, under contract through the City or performed by City crews under Missouri State Operating Permit MO-R100032.

BMP 2: Enforce ESC/land disturbance ordinance/regulatory mechanism.

Boone County performed 99 site inspections and issued 12 Notices of Violation.

The City inspected 236 sites and performed 1,296 erosion control inspections.

MU conducted 401 weekly and post-rain event inspections in 2021.

BMP 3: Maintain land disturbance regulatory mechanism

Section 28 of the Boone County Zoning Regulations serves as the County's land disturbance regulatory mechanism.

Chapter 12A Article II serves as the City's land disturbance regulatory mechanism.

At MU, EHS and Campus Facilities conducted independent comprehensive audits of all permitted construction sites. The EHS audit was conducted on 06/02/2021 and the Campus Facilities audit was conducted on 04/04/2021.

BMP 4: Maintain stormwater design manuals.

Boone County continued to maintain its Stormwater Design Manual.

The City continued to maintain the Stormwater Management and Water Quality Manual. The City Storm Water Utility reviewed all variance requests from the manual and determined if a revision is required.

At MU, all construction projects are designed and reviewed by the MU's Campus Facilities – Planning Design and Construction (CF-PDC) department using the PDC "Sustainable Design Policy." The Consultant Procedures and Design Guidelines referenced in the SWMP is available on the University of Missouri Facility Planning and Development Website and contains a collection of information that is updated quarterly as necessary.

BMP 5: Require construction site operators to control waste and erosion on construction sites by requiring SWPPPs and ESC plans.

Boone County approved 15 SWPPPs and 33 Erosion and Sediment Control plans.

The City requires a soil erosion control plan be submitted with all land disturbance applications. The purpose of the plan is to clearly establish what measures will be taken to prevent erosion and off-site sedimentation during construction. In 2021, the City approved and issued 51 land disturbance permits.

MU approved four Stormwater Pollution Prevention Plans (SWPPPs) in 2021 for projects that required a SWPPP under Missouri State Operating Permit MOR100039. The projects that required a SWPPP included the MU Healthcare – Children's Hospital Facility, the MU south Farm Swine Research Facility, the MU Middlebush Farm NextGen Center of Excellence for Influenza Research, and the MU Athletics Indoor Practice Facility.

BMP 6: Maintain procedures for receipt and consideration of information submitted by the public. Maintain websites and hotline phone numbers.

The co-permittees maintained the required procedures for receipt and consideration of information submitted by the public.

The co-permittees continued to maintain their websites and hotline phone numbers in 2021.

BMP 7: Conduct site inspections to ensure construction site operators implement appropriate erosion and sediment control BMPs.

Boone County performed 99 site inspections in 2021.

The City inspected 236 sites and performed 1,296 erosion control inspections in 2021.

MU conducted 401 weekly and post-rain event inspections in 2021.

MCM 5: Post-Construction Stormwater Management in New Development and Redevelopment

1. Overall compliance with permit conditions and SWMP

The co-permittees believe that the chosen BMPs are appropriate and have furthered the goals of reducing the discharge of pollutants to the maximum extent practicable. Each of the co-permittees has very different issues to address. The City is largely developed, but significant residential and commercial development is occurring on the fringes. The County is largely undeveloped, but there are widely scattered pockets of residential development. MU is largely developed. While there is occasionally new construction on previously undeveloped property, redevelopment or reconstruction of existing historical buildings is more common.

The co-permittees continue to maintain ordinances and other applicable controls to address stormwater runoff from new development and redevelopment areas. These mechanisms are reviewed regularly for effectiveness and updated as necessary.

The Boone County and the City of Columbia continue to implement stream buffer ordinances to protect sensitive waterways from stormwater runoff. The ongoing goal of implementation is being met.

The co-permittees continue to identify structural and non-structural strategies to improve the quality of stormwater runoff from new development and redevelopment. This is an ongoing process for all permittees.

The City of Columbia Stormwater Management and Water Quality Manual that was adopted in March 2007 provides sufficient flexibility to allow stormwater management plans to be tailored to specific conditions in various Columbia watersheds for both development and redevelopment projects. The manual will continue to be reviewed and updated as necessary. The City's Community Development Department enforces the City's Stream Buffer Ordinance and stormwater quality management for new developments. The Community Development Department also has covenants and maintenance agreements for post-construction BMPs recorded. The City's Stormwater Utility receives and tracks annual inspection information for the post-construction BMPs.

The County's Stormwater Ordinance has provisions in place to protect environmentally sensitive areas, minimize the creation of stormwater pollution, utilize best management practices that effectively remove stormwater pollution, and attempt to maintain pre-development runoff conditions. The ordinance requires a Stormwater Maintenance Agreement (and stormwater easement for off-site facilities) be recorded with all projects requiring a Stormwater Management Plan. The maintenance agreement describes the property owner's maintenance and inspection procedures for all permanent stormwater BMPs and follows the project in perpetuity. Boone County Stormwater Maintenance Agreements are recorded with the Boone County Recorder of Deeds. Owner/operators are required to conduct yearly self-inspections and file their report with Boone County Resource Management. The maintenance agreement also grants the County permission to inspect the BMPs, and to repair BMPs at the owner's expense, should the owner fail to maintain the BMP. These stormwater easements and maintenance agreements are required to be in place prior to the recording of the final plat. These regulations are reviewed every two years for effectiveness.

The County requires privately owned BMPs to be inspected by the responsible party named in the recorded stormwater maintenance agreement annually. The inspection report and photographs are to be submitted to the County by June 1 each year. Private owners shall retain these records for at least five (5) years. Any maintenance items are typically prompted by these annual inspections and must be addressed within thirty (30) days or other time frame mutually agreed to between the Director of Resource Management and the responsible party.

County-owned BMPs are inspected annually by staff and maintenance is performed as necessary.

Boone County's stream buffer regulations provide requirements for developing near streams to protect sensitive waterways from stormwater runoff. These regulations are reviewed every two years for effectiveness.

The County's stormwater design manual continues to address post-construction stormwater runoff and water quality management procedures. Structural and non-structural strategies are continually identified to improve the quality of stormwater runoff from new development and redevelopment. The stormwater design manual is reviewed every two years for effectiveness.

MU continues to establish and maintain an inventory of all permanent structural and non-structural BMPs for post-construction stormwater management. This includes an inspection schedule for all post-construction BMPs as identified in the BMP inventory.

MU maintains a Campus Master Plan, which includes a Stormwater Master Plan, which guides development on campus. EHS actively participates in the design process, providing recommendations on post-construction stormwater management to architects and engineers. The post-construction stormwater management design usually relies upon a combination of structural and non-structural BMPs appropriate to the MU community.

MU's Sustainability Policy dictates that master planning principles be established for development phasing, campus densities, land use, and conservation patterns that will provide a rigorous framework for determining where, when, and how to locate new facilities. The preservation of green and open spaces is a high priority achieved through the use of BMPs.

2. Progress toward achieving the statutory goal of reducing the discharge of pollutants to the MEP

The co-permittees have met all measurable goals associated with their ongoing BMPs for post construction stormwater management.

For this reporting period, the co-permittees implemented/conducted the following:

The City continues to update mapping of all public and private BMPs in a GIS database. City continues to develop an operation and maintenance schedule for City owned BMPs and partner with volunteers to leverage more education opportunities. A GIS based map and notification process to track public and

private BMP inspections continues to be refined to ensure long-term operation and maintenance of BMP's.

In 2019, the City's MS4 Technician worked with internal staff to develop an ArcGIS application to aid in the submission and tracking of private BMPs annual inspections. Currently, all inspections are handled using PDF forms. The goal of the project was to develop a system for accepting BMP inspections online and increase staff efficiency on inspections of City-owned BMP's. The application was beta tested by internal staff responsible for the inspection and maintenance of City owned BMPs in 2019, 2020, and 2021. The City plans to begin a phased implementation of the application for the private BMPs in 2022.

In 2021, the City continued its efforts to establish native plant prairie areas in City rights of way and undeveloped City property including areas owned by the Sewer Utility, Parks and Recreation, and Public Works.

The Hinkson CAM process is working to develop and implement BMP strategies that will effectively improve water quality in Hinkson Creek. These strategies will be transferable to other watersheds within the MS4. The Physical Habitat Assessment (PHA), approved by the Stakeholder committee in 2012, began in early 2013 and was completed in 2014. A final report of the field data was provided, and photographic data was incorporated into a StoryMap Tour during 2015. The tour showcases the beauty of Hinkson Creek including wildlife observed during the PHA and illustrates some of the problems in the creek. Various surrounding land use types are also compared with adjacent views in the creek. The StoryMap is available to view on www.helpthehinkson.org.

In 2016, the CAM Action Team delivered an action proposal to the CAM Stakeholders to develop a program to increase and enhance riparian areas along Hinkson Creek and its tributaries. Upon approval by the Stakeholders, the CAM Riparian Subcommittee was formed with the intent to look at opportunities to improve and enhance riparian corridors and develop a long-term riparian corridor program. The committee consists of Stakeholders and Action Team members and met six times in 2021.

The City of Columbia completed the El Chaparral Riparian Restoration project in 2017. The goal of this project was to restore the former neighborhood sewer treatment lagoon site, owned by the City and located along the south fork of the Grindstone, to a more natural riparian land cover. Vegetative maintenance on the site continued in 2021.

The Hinkson Creek Aquatic Data Mining Project is interpreting aquatic macroinvertebrate community-level indicators using the existing Missouri Department of Natural Resources data sets available for stream sites in the Hinkson Creek watershed (2001-2017). The objective of these analyses and interpretation shall be to diagnose stressors causing aquatic life impairment in Hinkson Creek. This project began in 2019 and will end in 2020. The findings of this study were presented at the CAM All Team Virtual meeting on April 15, 2021.

MU's stormwater guidelines and Stormwater Master Plan were completed in late 2012 and were presented publicly in 2013. The stormwater guidelines and Master Plan are updated regularly and are available for viewing on the MU website.

BMPs that were added to the MU campus and properties in 2021 include: 1) a new stormwater detention facility at the UM Library depository building; 2) a stormwater volume storage area at the new Next Gen Precision Health Building which prevents additional runoff but also reduces the predevelopment (pre-Next Gen) runoff; and 3) a system to capture stormwater from pavement runoff and diverts it into planting beds for use as irrigation at the reconstructed School of Nursing building.

As part of the University of Missouri's officially adopted Sustainability Policy Statement (https://sustainability.missouri.edu/about/mu-sustainability-policy), the campus observes sustainable best practices in campus construction and procurement. The University of Missouri pursues a LEED certified-level for New Construction and Major Renovations (LEED-NC) on projects that are eligible for this version of certification. For those projects that are ineligible for certification under LEED-NC, the University of Missouri's Sustainable Design Guidelines (SDG) are applied. Based on LEED-NC, the MU SDG sets goals for design and construction, providing a consistent approach to developing sustainable buildings on campus.

The University of Missouri (MU) pursues LEED certification on all new construction or major renovation eligible projects by incorporating sustainable building practices into the projects. MU currently has fourteen (14) LEED Certified-level or greater projects: The Missouri Orthopedic Institute, MU Hospital Patient Care Tower (including green roof areas and pervious pavement), Animal Resource Center (including bioretention and stormwater research), Woman's and Children's Hospital South Pavilion renovation, Gwynn Hall renovation, Swallow Hall renovation, Gateway Hall residential housing (including green roof areas and bioretention), Johnston and Wolpers Hall residential housing renovation, Mizzou Softball Stadium, Patient-Centered Care Learning Center (including stormwater detention), Stewart Hall Renovation (including bioretention), and the Bluford & Brooks Residence Halls (including pervious pavement and green-roof-ready area). Of these, five (5) buildings across MU's campus have received a LEED Platinum rating from the US Green Building Council (USGBC) (Johnston Hall, Wolpers Hall, Bluford Hall, Brooks Hall, and the Patient-Centered Care Learning Center); six buildings have received a gold LEED rating (Patient Care Tower, Gwynn Hall, Swallow Hall, Gateway Hall, Mizzou Softball Stadium, and Stewart Hall); and one has received a silver LEED rating (Women's and Children's Hospital). For projects that do not meet the project size and scope requirements for LEED, the University uses a custom set of sustainability guidelines developed specifically for the MU campus.

Monitoring is not required under this MCM. Instead, the co-permittees must assume the strategies in the International BMP Database have already been vetted for effectiveness.

3. BMPs implemented by government entity

No BMPs or MCMs were implemented by governmental entities other than those who are a party to this MS4 permit during the reporting period.

4. Summary of stormwater activities planned for the next reporting cycle (include implementation schedule)

All co-permittees will continue to implement ongoing BMPs as identified in the Joint Stormwater Management Program.

As a result of the CAM process, actions and studies will continue to be implemented in 2022.

The City maintains a list of BMP retrofit opportunities. Sometimes projects and development occur unexpectedly, and this list can be referenced to see if one of the retrofits could be implemented with the work. This work cannot be predicted, but the City is planning for it.

The City will continue to establish native plant prairie areas in public rights of way and undeveloped City property. Establishing these areas is a minimum three-year process.

The City will finish phasing in the use of the ArcGIS Survey App for private BMP inspections in 2022. This was a multi-year process. City staff will continue utilizing the application for the inspections of City-owned BMPs.

A requirement for long-term stormwater management in the County includes maintenance and inspection. As property is developed, covenants, easements and maintenance agreements are required to be in place prior to the recording of the final plat.

MU PD&C and EHS will continue to jointly develop new EHS policies to further execute the MU Post-Construction Program, which aims to incorporate sustainability principles and concepts into all new construction projects. These policies recognize that urban stormwater quality is preserved by maintaining pervious area and pre-existing hydrologic processes spanning the pre- and post-construction period.

MU continues exploring potential partnerships with the research arm of the institution to evaluate and produce quantitative data regarding the effectiveness of various BMPs. It is expected this data, if obtained, will be very valuable not only to the co-permittees but to MS4s throughout the country.

5. Proposed changes to the program area and documented SWMP (MCM 2)

The co-permittees updated the July 2020 SWMP to reflect the requirements of their current Missouri State Operating Permit No. MO-0136557. The SWMP was approved by the Department of Natural Resources' Municipal Separate Storm Sewer System (MS4) Program on April 8, 2022, and will be reviewed again in 2025, in preparation for the upcoming permit renewal, and as needed.

6. Effective BMPs evaluated during the reporting period

BMP 1: Identify and develop strategies to improve the quality of stormwater runoff

Boone County requires Stormwater Discharge Permits to be issued for projects containing private BMPs on new and redevelopment projects. Stormwater Maintenance Agreements are recorded with each property and remain in effect in perpetuity. Annual inspections are required to ensure proper function and maintenance of BMPs.

The City requires a Stormwater management plan for all development and redevelopment projects subject to Chapter 12A Article V. Maintenance of all stormwater management facilities

is ensured through the creation of formal maintenance covenants, which must be approved by the director before final plat or plan approval and subsequently be recorded by the City with the Boone County Recorder of Deeds.

As part of the University of Missouri's officially adopted Sustainability Policy Statement (https://sustainability.missouri.edu/about/mu-sustainability-policy) the campus observes sustainable best practices in campus construction and procurement.

MU strives to achieve at least an equivalent LEED equivalent certified level in the design and construction of all campus buildings. MU currently has fourteen LEED certified buildings and has applications underway for several additional projects seeking LEED certification. See sections 2 and 4 of this MCM for details on the individual projects.

BMP 2: Continue to maintain Stormwater Management/Water Quality Manual.

The County continued to maintain the Stormwater Design Manual.

The City continued to maintain the Stormwater Management and Water Quality Manual. The City Storm Water Utility reviews all variance requests from the manual and determines if a revision is required.

MU continued to maintain the Campus Master Plan, which includes a Stormwater Master Plan, which guides development on campus. The stormwater guidelines and Master Plan are updated regularly and are available for viewing on the MU website.

BMP 3: Continue to maintain Stormwater Ordinance(s) or other regulatory mechanisms to address post-construction runoff from new development and redevelopment projects.

The co-permittees maintained stormwater ordinances and reviewed regulatory mechanisms, updating as necessary during calendar year 2021.

BMP 4: Continue to maintain Stream Buffer Ordinance and MU Stormwater Master Plan

The County continued to maintain the Stream Buffer Ordinance (Chapter 26 Boone County Zoning Regulations)

The City continued to maintain the Stream Buffer Ordinance (Chapter 12A Article X of the City Code of Ordinances).

MU maintained the Campus Master Plan during 2021, which includes the Stormwater Master Plan. The stormwater guidelines and Master Plan are updated regularly and are available for viewing on the MU website.

BMP 5: Promote adequate long-term operation and maintenance of BMPs by maintaining an operation and maintenance schedule of post-construction BMP's.

Boone County maintained an inventory of all projects requiring long-term operation and maintenance of BMPs. Letters were sent for self-inspection in April. Of the 50 privately-owned BMPs the County requires owners to self-inspect; eight owners failed to submit the necessary documentation.

The City maintained an inventory of all BMPs and sent letters for self-inspection in August. Of the approximately 515 privately-owned BMPs that City requires owners to self-inspect, thirty-seven owners failed to submit the necessary documentation. The City will issue final notices of noncompliance to the remaining property owners for failure to provide inspection and maintenance records as required by Section 12A-95 of the Columbia Code of Ordinances.

BMP 6: Provide the public with proper, publicly announced, disposal opportunities to minimize the presence of household hazardous waste in local waterways.

The annual area-wide household hazardous waste (HHW) collection event that has historically been hosted by the co-permittees was canceled in 2021 due to Covid-19 pandemic. The co-permittees are collaborating with the Mid-Missouri Solid Waste District to host a Boone County Recycling Collection event scheduled for May 7, 2022.

The City of Columbia continues to hold a twice-a-month collection program between and including the months of April through November.

The Boone County Sheriff's Office, in partnership with the Youth Community Coalition and law enforcement agencies throughout Boone County including Ashland, Columbia, Centralia, Hallsville, University of Missouri, and VA Hospital Police Departments, will conduct prescription drug take back events at multiple locations in April and October 2022.

MU Environmental Health & Safety collects and manages unwanted hazardous materials on the University Campus. Campus locations where hazardous materials are used or stored are managed through the designation of Principal Investigators (PI) and Supervisors. They are responsible for locations and are trained on the proper disposal of hazardous materials. When hazardous materials are no longer wanted, the PI’s and/or supervisors are responsible for requesting a material pick-up through Environmental Health & Safety’s on-line EHS Assistant program. EHS then picks up the materials and properly disposes of them.

MCM 6: Pollution Prevention/Good Housekeeping for Municipal Operations

1. Overall compliance with permit conditions and SWMP

The co-permittees believe that the chosen BMPs are appropriate and have furthered the goals of reducing the discharge of pollutants to the maximum extent practicable. The three co-permittees have developed their pollution prevention/good housekeeping control measures after a thorough review of all their operations which are affected by stormwater runoff or which affect stormwater runoff. The City and County interviewed operational personnel in all divisions and departments of each entity to tailor the program for each unique entity. MU tapped into their existing hazardous materials program which contains comprehensive data on the types of materials being used on campus as well as the persons using them.

The City's municipal operations, including Public Works, Utilities, and Parks and Recreation are very broad in scope and nature. These operations are carried out in a professional manner and operations staff training has always included elements of pollution prevention pertinent to each department, such as the proper disposal of transformer oil in the electric department. This good housekeeping training BMP augments the existing professionalism, broadens it, and brings focus to preventing stormwater pollution in particular. Therefore, this BMP is effective. In addition to the good housekeeping training, stormwater staff attends the Risk Management Safety Audits of City-owned facilities to detect and correct any potential sources of stormwater pollution.

The County conducts street sweeping after "chip seal" operations to remove loose gravel and oil.

Boone County collects and recycles used oil from vehicle maintenance at the Road and Bridge Storage Shed located at 5551 South Tom Bass road. The County provides a covered storage area and secondary containment for used oil drums. The facility burns used oil in the heating furnace for the shop. During the warm season, oil drums may be picked up and recycled off premises. Used oil and antifreeze collection and recycling procedures are included in the training programs.

As a regulated Large Quantity Generator, MU must follow strict guidelines regarding management of unwanted chemicals, including used oil from all University operations.

The co-permittees continue to schedule and conduct pollution prevention training for municipal staff. Education includes steps that can be taken to prevent or reduce pollutant runoff from municipal operations. This is an ongoing program for all permittees.

The annual area-wide household hazardous waste (HHW) collection event that has historically been hosted by the co-permittees was canceled in 2021 due to Covid-19 pandemic. The co-permittees are collaborating with the Mid-Missouri Solid Waste District to host a Boone County Recycling Collection event scheduled for May 7, 2022.

The City continued to sponsor Household Hazardous Waste Collections on the first and third Saturday of April through November at their 1313 Lakeview Ave facility. The total collections properly disposed of:

- 4,230 gallons of oil
- 6,320 gallons of paint were diverted

- 81.3 tons of household hazardous waste collected and diverted from landfill
- 435 gallons of antifreeze
- 337 lead acid batteries
- 420 gallons of oil/antifreeze mix
- 14.5 tons of general pesticides, corrosives, etc.
- 515 gallons of gasoline
- 577 volunteer hours (17 collection events held)
- There were 4,612 cars serviced in total

Note that one collection event in June was cancelled due to the Juneteenth holiday.

The City will continue to sponsor Household Hazardous Waste Collections on the first and third Saturday of April through November in 2022 at their 1313 Lakeview Ave facility.

The Boone County Sheriff's Office, in partnership with the Youth Community Coalition and law enforcement agencies throughout Boone County including Ashland, Columbia, Centralia, Hallsville, University of Missouri, and VA Hospital Police Departments, conducted Prescription Drug Take Back events at multiple locations in April and October 2021. These events coincided with the National Drug Take Back events sponsored by the Drug Enforcement Agency. Over 1,000 pounds of prescription drugs were collected from Boone County residents in 2021. This program will continue in 2022

2. Progress toward achieving the statutory goal of reducing the discharge of pollutants to the MEP

The co-permittees have met all measurable goals associated with their ongoing BMPs for pollution prevention. All have developed an operation and maintenance program with the ultimate goal of preventing pollutant runoff from municipal operations to the maximum extent practicable.

City BMPs include street sweeping programs and training for employees. It is recognized that training is essential for City workers and ongoing discussions of stormwater issues take place in employee safety meetings. New employee training for every City employee includes stormwater and good housekeeping training. The City has included pollution prevention education into the employee handbook. Stormwater Utility Educator trains personnel in each City Department about pollution prevention and good housekeeping.

- The City's street sweeping program continues to be an aggressive and effective BMP which picks up many pollutants, including soluble pollutants, before they are mobilized by stormwater. It would be difficult or impossible to remove from runoff with other structural BMPs.
- There are 1,093 striped lane miles of 12' wide streets owned and maintained by the City.
- The Central Business District is swept every 8 weeks; Saturday and Sunday when MU has home football games.
- All other streets are swept every four months on a routine schedule.
- Streets are also swept as soon as practicable after snow events.
- Public Works continues to refine its street maintenance operations to minimize loose gravel.
- The street sweeping team (including 4 sweepers) averaged 27.9 miles per day on 336 unique days, with a total of 9,374.5 miles swept in 2021.

- Stormwater Utility staff and Sustainability staff attend safety audits of City-owned facilities to identify any deficiencies related to good housekeeping and stormwater management on site.

The City would like to highlight the training conducted during the reporting period:

- The City continued its employee stormwater training which requires all employees attend on a bi-yearly (two-year rotation) basis. This year employee training was administered virtually through various YouTube videos made available to all staff. An all employee email was distributed that contained links to the online training videos as well as good housekeeping tips that could be reviewed at staff meetings.
- City staff attended the numerous webinars and virtual trainings on stormwater topics. These topics included water quality BMP's, flood mitigation solutions, stormwater purification, presto geosystems, efficient design solutions for storm sewer systems, etc.

Boone County Road and Bridge maintenance/material storage facility and operations is reviewed for compliance annually. The operation activities and procedures are reviewed annually, and training is provided to staff concerning hazardous materials handling, pesticide handling and spill response. This training is also applied to operations & maintenance of other facilities, infrastructure, etc. for which the County is responsible. Additionally, Boone County follows procedures listed in their Spill Prevention Control and Countermeasures (SPCC) plans for their South Facility and Hallsville Facility. Boone County also requires all new municipal development disturbing one acre or more, or redevelopment creating 3,000 square feet or more of impervious surface to provide water quality treatment BMPs.

Boone County would like to highlight the training conducted and received during this last calendar year:

- **Missouri Stream Teams Level 2 Training:** The Stormwater Educator attended the rectification and training for Missouri Stream Teams Level 2 certification.
- **REGFORM Conference:** Stormwater staff attended Missouri REGFORM to learn about EPA stormwater rulings and other stormwater-related topics.
- **North American Association for Environmental Education Conference:** The Stormwater Educator attended this virtual conference, which emphasized connections to nature, sustainable communities, and community science.
- **Missouri Environmental Educators Association Conference:** The Stormwater Educator attended the MEEA conference to learn about making stormwater more inclusive and digital education options.
- **Missouri State Conference on Cover Crops and Soil Health:** The Stormwater Educator and Urban Hydrologist learned about successes Missouri producers have had using regenerative agriculture practices.
- **Departmental Stormwater Fact Sheet:** Boone County Facilities Maintenance and Road and Bridge each received a publication on stormwater practices to positively impact water quality.
- **Missouri Soybean Association Crops & Conservation Field Day:** Boone County stormwater staff attended a half-day row-crop-focused event that included a look at cover crops, non-traditional weed control methods, pollinator buffer strips, soil health and water quality practices, SOYLEIC soybean breeding, and carbon credit markets.
- **Missouri Department of Conservation Partners Roundtable:** The Urban Hydrologist participated in this roundtable to learn how other agencies have approached conservation efforts during the pandemic and shared wins and lessons learned.
- **City of Columbia Stream Restoration Tour:** The Stormwater Coordinator and Urban Hydrologist

attended a tour of several stream restoration sites within the City of Columbia.

- **AWRA Virtual Annual Conference:** The Urban Hydrologist attended this conference to learn about implementing multidisciplinary projects, best practices discovered in the design and application of water resource management, implications of water policy decisions, and research into current and emerging issues.
- **Missouri State Conference on Cover Crops and Soil Health:** The Stormwater Educator and Urban Hydrologist attended this two-day virtual conference. Presentations and discussion panels featured the latest approaches with cover crop management, grazing of cover crops, soil health measurement, carbon payment programs and strategies for boosting soil health.

- Stormwater staff provided refresher training to all County inspectors on land disturbance inspection procedures.
- Staff members viewed multiple stormwater and regenerative agriculture-related webinars.

MU's non-structural BMPs, which center around training for employees, have been selected for fleet, chemical and waste facilities with a focus on hazardous chemicals, petroleum products, pesticides and infectious materials. Other non-structural BMPs address maintenance activities at the MU golf course, various landscape issues, and litter control.

MU's Department of Environmental Health and Safety is charged with environmental compliance and response to spills. EHS maintains trained personnel (currently six HAZWOPER trained personnel) and adequate supplies to respond to incidents. EHS coordinates remediation activities as appropriate.

MU has also chosen to highlight training during the reporting period:

- Spill, Prevention, Control and Countermeasures (SPCC) (EHS600): The SPCC Coordinator and all MU Campus oil-handling personnel are trained annually in the operation and maintenance of equipment to prevent discharges; discharge procedure protocols; applicable pollution control laws, rules and regulations; general facility operations; and the contents of the SPCC Plan. Used oil collection and recycling procedures are included in the training program. A total of 192 Individuals from numerous departments on and off campus within the MS4 permit area received SPCC training in 2021.
- Laboratory Hazards (EHS301): 642 individuals received this training in 2021.
- Working Safely (EHS302): 611 individuals received this training in 2021.
- Laboratory Safety (EHS303): 598 individuals received this training in 2021.
- Hazard Communication (EHS304): 589 individuals received this training in 2021.
- MU Specific Chemical Safety Training (EHS305): 651 individuals received this training in 2021.
- Two MU EHS staff members attended the annual REGFORM Missouri Water Seminar in 2021.

Used oil and antifreeze collection and recycling procedures are included in each of the co-permittees training programs.

The annual area-wide household hazardous waste (HHW) collection event that has historically been hosted by the co-permittees was canceled in 2021 due to Covid-19 pandemic. The co-permittees are collaborating with the Mid-Missouri Solid Waste District to host a Boone County Recycling Collection event scheduled for May 7, 2022.

The co-permittees maintain the following Missouri State Operating Permits to reduce and/or eliminate pollutants from areas that the permittees operate:

City of Columbia:
General Operating Permit #MOR100032 – Land Disturbance Permit
Missouri State Operating Permit #MOR80F011 – Columbia Regional Airport
Missouri State Operating Permit #MO0112640 – Columbia Landfill and Yard Waste Compost
Missouri State Operating Permit #MO0004979 – Columbia Municipal Power Plant
Missouri State Operating Permit #MO0092924 – Columbia Regional Airport WWTF
Missouri State Operating Permit #MO0097837 – Columbia WWTP
Missouri State Operating Permit #MO0136034 – Columbia Water Treatment Plant

Boone County:
General Operating Permit #MOR100049 – Land Disturbance Permit
General Operating Permit #MOG750030 – No Discharge

MU:
General Operating Permit #MOR100039 - Land Disturbance Permit
General Operating Permit #MOG823021 – No Discharge
General Permit #MO-G350238 - Discharge Permit

3. BMPs implemented by government entity

No BMPs or MCMs were implemented by governmental entities other than those who are a party to this MS4 permit during the reporting period.

4. Summary of stormwater activities planned for the next reporting cycle (include implementation schedule)

All co-permittees will continue to implement ongoing BMPs as identified in the Joint Stormwater Management Program.

The co-permittees will continue to schedule and conduct pollution prevention training for municipal staff. Education will include steps that can be taken to prevent or reduce pollutant runoff from municipal operations. This is an ongoing goal for all permittees.

The annual area-wide household hazardous waste (HHW) collection event that has historically been hosted by the co-permittees was canceled in 2021 due to Covid-19 pandemic. The co-permittees are collaborating with the Mid-Missouri Solid Waste District to host a Boone County Recycling Collection event scheduled for May 7, 2022.

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5. Proposed changes to the program area and documented SWMP (MCM 2)

The co-permittees updated the July 2020 SWMP to reflect the requirements of their current Missouri State Operating Permit No. MO-0136557. The SWMP was approved by the Department of Natural Resources' Municipal Separate Storm Sewer System (MS4) Program on April 8, 2022, and will be reviewed again in 2025, in preparation for the upcoming permit renewal, and as needed.

6. Effective BMPs evaluated during the reporting period

BMP 1: Maintain operation and maintenance schedule for operation and maintenance program.

The co-permittees reviewed their hazardous materials management and SPCC operation and maintenance schedules and updated as necessary.

BMP 2: Identify and train all impacted employees.

The co-permittees continued to identify and train all impacted employees in 2021. Please see lists in section 2 of this MCM.

BMP 3: Review and update pollution prevention/good housekeeping training presentation(s)

The co-permittees reviewed and updated their applicable training presentations in 2021.

MU Environmental Health & Safety has moved the majority of their training courses to MIZZOU Canvas. A list of these courses is provided in section 2 of this MCM. The training courses are updated or replaced as necessary.

BMP 4: Schedule and conduct pollution prevention training.

All impacted employees were trained in 2021. An attendance roster and training date for each training session is kept.

BMP 5: Provide the public with proper, publicly announced, disposal opportunities to minimize the presence of household hazardous waste in local waterways.

The annual area-wide household hazardous waste (HHW) collection event that has historically been hosted by the co-permittees was canceled in 2021 due to Covid-19 pandemic. The co-permittees are collaborating with the Mid-Missouri Solid Waste District to host a Boone County Recycling Collection event scheduled for May 7, 2022.

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MU Environmental Health & Safety (EHS) collects and manages unwanted hazardous materials on the University Campus. Campus locations where hazardous materials are used or stored are managed through the designation of Principal Investigators (PI) and Supervisors. These individuals are trained on the proper disposal of hazardous materials. When hazardous materials are no longer wanted, the PI's and/or supervisors are responsible for requesting a material pick-up through Environmental Health & Safety's on-line EHS Assistant program. EHS then picks up the materials and properly disposes of them.

7. Water samples collected and analyzed during the covered reporting period by the permitted MS4 or on behalf of the permitted MS4

No water samples were collected by, or on behalf of, the permitted MS4 during this reporting period.