Final Report
Poteau River Watershed Management Plan
Project Number: 20-1100

Executive Summary

Introduction to Poteau River Watershed

The Poteau River watershed (HUC- 11110105) in Arkansas is approximately 557 mi2 in size (Figure 1). The watershed is located in the Ouachita Mountain and Arkansas River Valley Ecoregions (Omernick, 1987), primarily in Scott and Sebastian Counties in Arkansas. The Poteau River runs west into Lake Wister thence out of the lake to the northeast into the Arkansas River. The Poteau River is designated as a "priority watershed" in Arkansas by the Arkansas Department of Agriculture Natural Resources Division, Non-point Source Management Program (NPS Program), and is on the 303(d) list in both Arkansas and Oklahoma.

The watershed is dominated by forest land-uses (65%). Agricultural land-uses (mostly pasture) comprise a high percentage (22%), while developed areas make up approximately 6% of the watershed.

Historical studies in the watershed have included monthly ambient sampling, high flow (storm event) sampling and bioassessment (macroinvertebrate collections and habitat analysis in the spring and fall) at all seven stations in the high priority Poteau River mainstem watershed (East fork, West Fork, Jones Creek and the main stem of the Poteau river, Figure 2). Sampling parameters evaluated included nitrogen, phosphorus, TSS, TDS, sulfate, chloride and metals. Results of the study were used to evaluate NPS loading and peak concentrations in the river to those contributed by two point sources discharging on the western side of Waldron to the river. The macroinvertebrate community was found to be somewhat similar at all satiations sampled and appeared slightly depressed overall. Findings indicate that the Poteau River is affected by NPS issues (nutrients, TDS and metals) in all reaches, and particularly in the reaches above (east of) and within the City of Waldron. Recent studies have included unified stream

assessments (modified to address rural streams concurrent to urban streams), non-point source tracking and desktop analysis of known sources in the watershed.

Non-point Source Problem

The NPS Program, has designated the Poteau River watershed as Priority Watershed and also as a Nutrient Surplus Area, and it is on the Arkansas 303(d) list for phosphorus and metals. A TMDL was completed for the River in 2006 by ADEQ for these constituents. Impairment from metals is not apparent, and a water effect ratio (WER) study was completed in 2012 that is anticipated to address the metals concerns. Therefore, nutrients and TSS appear to be the principal concern in the watershed at this time. Several sources are believed to be contributors to these elevated levels including run-off from agricultural land uses, run-off from the developed areas around Waldron and other larger towns, two point source discharges and stream bank erosion.

Project Objectives

The overall objective of this project was to develop a 9-element watershed management plan (WMP) for the Poteau River watershed in Arkansas. The WMP includes identification of critical sub-watersheds at a small scale (12 digit HUC and smaller) and ranked implementation measures to reduce non-point source pollution loading from key areas. Additional monitoring and assessment data were collected in key areas to fill existing data gaps, mostly in the northern section of the watershed in the James and Sugarloaf drainages. The project also included a community involvement task that was used to educate the community and acquire watershed information and gain support for WMP implementation, and a task designed to address funding for WMP implementation. The WMP will ultimately be used by the City of Waldron and its partners to direct watershed protection activities and watershed restoration activities with the ultimate goal being reduction of pollutant loading and protection of the watershed into the future. Implementation of the WMP will reduce export of pollutants such as nitrogen, phosphorus, suspended sediments, minerals and metals into the

Poteau River, and further into Oklahoma, Lake Wister and ultimately into the Arkansas River.

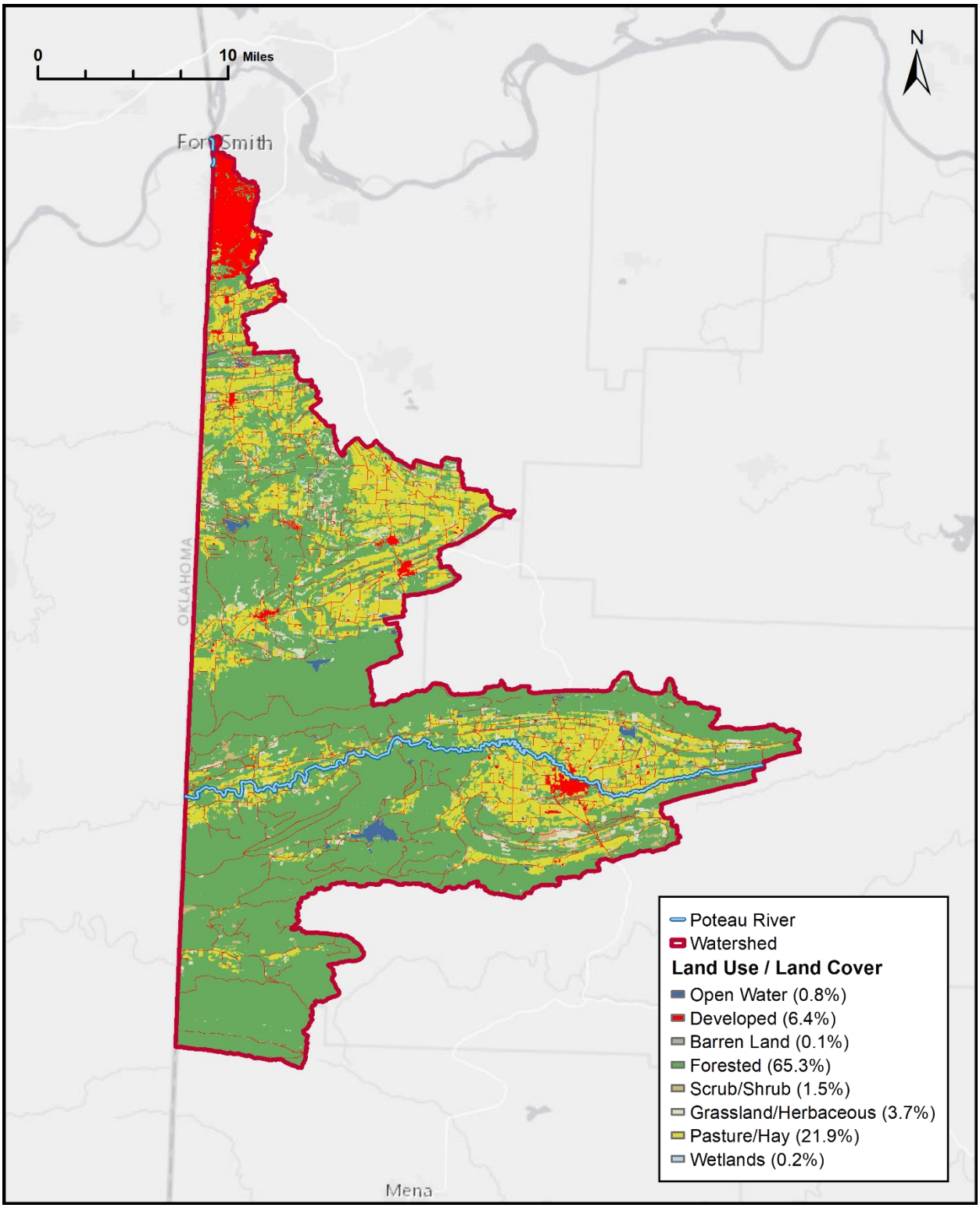

Figure 1. General overview of the Poteau River watershed.

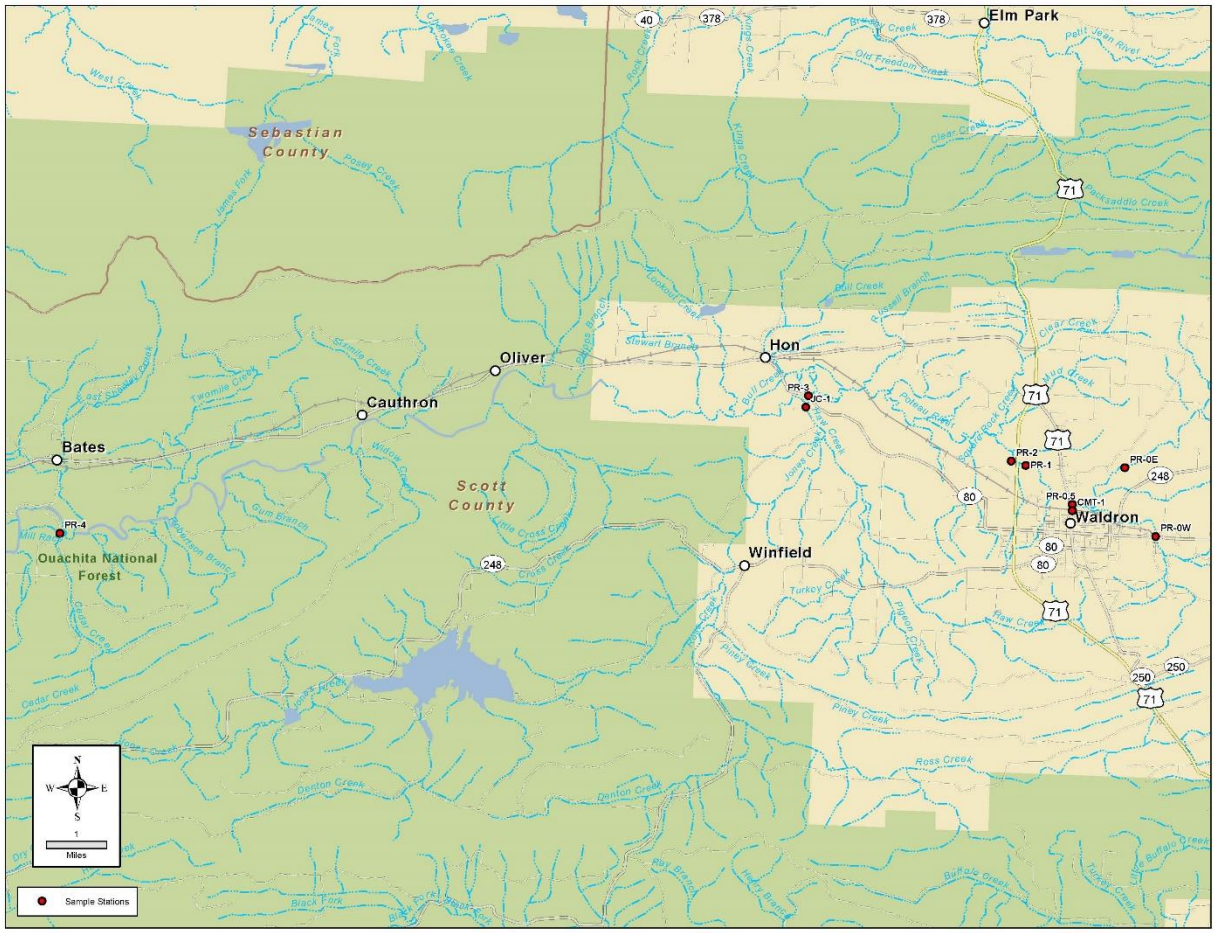

Figure 2. Monitoring stations used in 2015 and 2018 studies focused on main stem of the river and its major sub-watersheds in Arkansas.

Tasks and Timeline Completed During Project

The project began in October 2020 when the Workplan and Funding agreements were approved and signed. There was no quantitative data collection for this project, so no QAPP was developed. The project focused on finalizing assessment work completed previously, analysis of existing data and how it drives watershed planning, SWAT modeling and development of the watershed management plan (WMP). The WMP was completed in December 2022 and submitted to the NRD for review, and subsequently submitted to the EPA, after NRD revisions/edits were completed.

Project Cooperators

The project was funded with a 319 grant from the Arkansas NRD and EPA Region 6 which was awarded to the City of Waldron. The City contracted an environmental consulting group (GBM^c & Associates) who completed the WMP. The majority of the match was contributed by the City of Waldron, Tyson Foods/Poultry, The Poteau River Conservation District and the University of Arkansas Center for Water Resources (UA AWRC). These project cooperators were also partners in the effort and provided assessment data, modeling efforts and other supporting information.

Project Chronology

The project was divided into several tasks that are described below. Significant milestones and/or challenges are included with each description as well as the party responsible for the task and the timeline involved in task completion.

Task 1. Financial Review

Audit of Grant Expenditures in January of 2021 and 2022 was completed by the City of Waldron to ensure funds were being utilized effectively to meet the project objectives.

Task 2. NPS Assessment

In the upper (northern side) of the watershed no stream corridor assessments had been completed. Therefore, to fill existing data gaps some NPS assessment, including Unified Stream Assessments and desktop analysis. These efforts focused on identification of stream impacts/threats and possible non-point sources in areas previously not assessed.

Task 3. SWAT Model update

The intent was to update the latest version of the USDA SWAT model for the Poteau River using previously competed SWAT models. However, only hard copies of the model were available, so a new QSWAT model was constructed using the most up-to-date data available. This model was calibrated using data collected between 2016 and 2020, mostly by the UA AWRC. Model outputs included both constituent loading by HUC-12 subwatershed and an analysis of possible load reductions achievable by certain BMPs.

Task 4. Development of 9-Element Plan

A WMP was developed for the Poteau River that included the 9 key elements recommended by EPA. The plan included historical monitoring data, NPS assessment info, USA data, and SWAT modeling/analysis as the basis for the ranking of key issues and identification of critical areas.

Task 5. Stakeholder/Community Involvement and Education

The stakeholder and community outreach task included two key parts: 1) development of a stakeholder group to inform the technical team on possible NPS's and to help guide future watershed management activities including implementation actions resulting from this WMP. This effort allowed us to capitalize on their firsthand knowledge of the watershed and to develop and build enthusiasm for future implementation measures. 2) To educate the stakeholders and the overall community concerning what a WMP is, the value of the water resources of the Poteau River and the reasonable path to protecting the resources.

Task 6. Reporting and Grant Coordination

An important component of the project was reporting of progress and expenditures to the NRD. Several quarterly reports, two annual reports and this Final Report were a part of that effort. Grant coordination and reporting was completed by the City of Waldron and GBMc & Associates staff.

Lessons Learned

The project was successful and the WMP completed on time and in budget due largely to the efforts of the City of Waldron the UA AWRC and the other cooperators who all worked together to pool data, evaluate public information and come up with a plan that was accurate and manageable. The NRD staff were also very helpful and a critical component of the project success, as they aided in development of the draft Workplan, submission of the reports required by the 319-grant program and in helping the city through the grant process.

Lessons learned:

- Utilize local contacts that are connected to the community to garner stakeholder participation and support.
- Farmers have a low likelihood of participation in watershed related activities/meetings and are also unlikely to provide information about what they do on their sites to protect water quality. To maximize their participation, begin early and make personal contacts. Utilize key people as noted in bullet 1 to help.

Technical Transfer

Good and accurate watershed management planning requires an abundance of data from each of the main sub-watersheds in the basin and a vast amount of knowledge of the basin characteristics and land uses.

- Time spent walking stream corridors (USA's) and driving through the watershed (windshield surveys) are invaluable to the identification of non-point source issues in a watershed. In particular this is where stream bank/channel erosion is identified.
- SWAT models appear sensitive to HUC-12 level calibration and care should be taken to ensure that the calibration does not become skewed and/or made less accurate when focused on HUC-12 data.
- Survey of BMP use by landowners can provide critical information to steer future implementation. This should be a routine tool used in development of WMPs.

EPA Feedback Loop

This important project could not have been competed without grant funding from EPA and support from the Arkansas NRD. We appreciate the funding of this project and hope to work with the NRD and the EPA in the future on such projects.

Project Success Conclusions

This project is considered a success as it resulted in the completion of a WMP for the Poteau River in Arkansas that was supported by a local stakeholder group and several key cooperators. The project was completed on time and within budget.

Key Outcomes and Findings

The overall key outcome from this project was the completion of a WMP for the Poteau River in Arkansas. This WMP was approved by the NRD in early January 2023, and by the EPA in February 2023.

An overall target of 35% TSS reduction was established in the WMP that was also expected/intended to garner similar reduction levels of phosphorus and nitrogen suitable to reduce nutrient loading to Lake Wister. The key findings are summarized in a Figure 3 and Table 1 presented below, both in terms of priority watersheds for pollutant reductions/BMP implementation and suggested implementation measures to reduce pollutant loading and attain the goals of the plan.

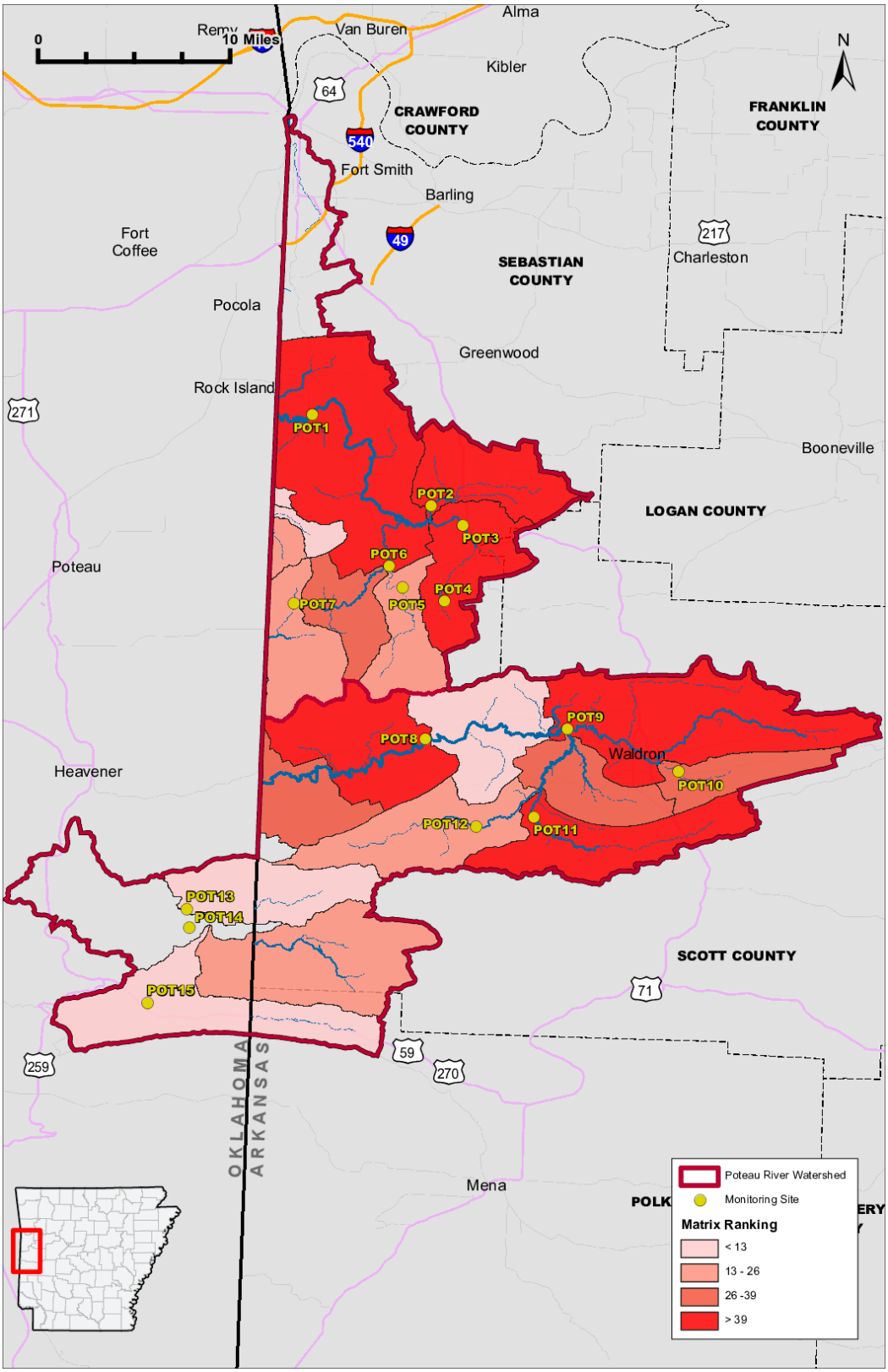

Figure 3. Priority rankings of top watershed concerns in the PRW. Higher values=higher priority to address.

Table 1. Prioritization of recommended Watershed Management Practices.

Rank	Poteau River	James Fork	Management Action (Practice)
1	Bull/Square/EF, Lower Jones, & Ross	Cherokee Creek & Prairie Creek	Implementation of pasture BMPs (rotational grazing, lower cattle stocking rate, & improve riparian buffers)
2	Ross, Bull/Square/EF, & Headwaters Poteau River	Cherokee	Riparian buffer/Vegetated filter Strips
3	--	Upper Sugarloaf, Prairie Creek, & West Creek	Streambank stabilization
4	Bull/Square/EF, Ross,& East Shadley	--	Unpaved road maintenance and upgrades
5	--	BB/Johnson/SH, Headwaters James Fork, & Gap Creek	Streambank stabilization
6	Headwaters Poteau River	BB/Johnson/SH	Implementation of pasture BMPs (rotational grazing, lower cattle stocking rate, & improve riparian buffers)
7	Headwaters Poteau River, Upper Jones, & Bull/Square/EF	Cherokee Creek	Implementation of residential/commercial BMPs
8	--	Riddle Creek & Gap Creek	Streambank stabilization
9	Upper Black Fork, & Headwaters Poteau River	BB/Johnson/SH	Unpaved road maintenance and upgrades
10	East Shadley	West Creek	Implementation of pasture BMPs