Arkansas Natural Resources Commission

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Asa Hutchinson
Governor

Arkansas Natural Resources Commission's Development of the Buffalo River Watershed Management Plan
Fourth Stakeholder Meeting
October 12, 2017: Jasper, AR
Meeting Summary

The Arkansas Natural Resources Commission (ANRC) sponsored the fourth and final stakeholder meeting as part of the development of a voluntary, non-regulatory watershed management plan (WMP) for the Buffalo River watershed. The meeting was held in Jasper on October 12, 2017. The meeting agenda is included as Attachment 1. Approximately 30 individuals attended the meeting, including farmers and landowners, as well as individuals from agricultural, conservation, recreational and other interest groups, and employees from state and federal agencies.

At the direction of Governor Asa Hutchinson, the Beautiful Buffalo River Action Committee was organized to establish an Arkansas led approach to identify and address potential issues of concern in the Buffalo River watershed, including the development of a voluntary, non-regulatory WMP for the Buffalo River watershed.

The meeting was facilitated by FTN Associates, Ltd. (FTN), an engineering and environmental consulting firm headquartered in Little Rock. The Arkansas Natural Resources Commission contracted with FTN to assist the agency with the development of the Buffalo River WMP. The process will be completed by June of 2018.

The meeting was initiated by summarizing the results of the June 2017 meeting in Marshall. A copy of the presentation is included as Attachment 2.

The focus of this meeting in Jasper was to discuss the recommended management practices and activities to be included in the watershed management plan. Recommended management activities and practices were proposed within 5 categories:

- Management practices
- Monitoring
- Additional Studies
- Awareness, Outreach and Education
- Teams

These recommendations were provided for stakeholder review prior to the meeting via the web and are listed in Attachment 3. The management emphasis is on vegetative establishment, soil health, and streambank restoration and stabilization.

Management practice recommendations were included for three types of land use – pasture, forest, and ecotones or edges between different land uses. Nitrate and E. coli reduction estimates, and relative cost, were provided by different pasture management practices for the six subwatersheds recommended for initial management focus. These estimates were for independent application of a particular management practice. Nearly all management practices are implemented as suites of practices, rather than independently. However, without knowledge of the specific field or acreage characteristics, it is not feasible to estimate which combination or suites of management practices might be implemented. In some subwatersheds, independent applications of a practice were estimated to achieve the target load reduction. For other subwatersheds, a combination of practices would be required to achieve target load reductions. In addition to recommended management practices by land use, karst sinkhole treatment, invasive/destructive species control, and unpaved road erosion control practices were also recommended. Identification of failing septic systems was also recommended within these subwatersheds.

There is an excellent on-going water quality monitoring program within the Buffalo River watershed, so the first recommendation in this category is to continue this monitoring program. Additional recommendations included adding total suspended solids (TSS) to the constituents being analyzed. Turbidity is currently being monitored, but it is not as useful as TSS in assessing erosion and sedimentation. ADEQ has indicated they can add this constituent to their list of water quality analytes. Adding a water quality monitoring site at the county road bridge downstream of Dogpatch Springs would help assess the relative contributions of nitrate, E. coli, and other constituents that might be entering the Buffalo River watershed from the contiguous Crooked Creek watershed through groundwater. The NPS Buffalo National River (BNR) and ADEQ are in the process of designing an algal monitoring program for the Buffalo River and its tributaries. Supporting the design and implementation of an algal monitoring program is a management plan recommendation. The EPA National Aquatic Resource Survey Program has developed and implemented a trash index as part of their monitoring efforts. Incorporating this trash index as part of tributary monitoring efforts could help determine the relative contribution of trash from the tributaries to the Buffalo River. The trash index monitoring could be conducted by a Stream Team or by watershed implementation teams, discussed below.

Four additional studies are recommended. The first is to conduct a microbial source tracking study in the Mill Creek subwatershed. As mentioned above, there is an indication that E. coli, as well as nitrate and other constituents, might be entering the Buffalo River subwatershed through Dogpatch Springs. Failing septic systems and the Marble Falls wastewater treatment facility might also be contributing bacteria to Mill Creek. While recommended treatment practices for permitted sources are not considered as part of the watershed management plan, having a better understanding of the relative contribution of human vs. non-human sources can help determine the relative contribution, and location, of non-human sources of E. coli.

The NPS has initiated continuous diel (24-hour period) DO monitoring at selected sites in the BNR. It is recommended that this diel DO monitoring be expanded to include all the tributary sites currently being sampled for water quality. Six tributary sites might be sampled each year so that over a 3-year period, all the sites would be monitored. The NPS Heartland Inventory program has a rotating panel design that could be followed in selecting tributary sites for monitoring. LiDAR data from the NRCS will be available state-wide in March 2018. This

LiDAR data could be used to prototype an assessment of streambank erosion and instability within the Calf Creek subwatershed. Stream teams or subwatershed teams could ground truth selected sites to assess the accuracy of the LiDAR analyses and identify candidate sites for streambank restoration and stabilization. If the LiDAR assessment was accurate, the analyses could be conducted for all 37 HUC12 subwatersheds within the Buffalo River watershed.

Finally, it is recommended the Bear Creek subwatershed serve as a prototype for quantifying ecosystem services provided in the watershed. Ecosystem services, by definition, are the benefits people obtain from ecosystems and the direct and indirect contributions of ecosystems to human well-being. As categorized by the Ecosystem Millennium Assessment, these include: *provisioning* services such as food, water, timber and fiber; *regulating* services that affect climate, floods, disease, wastes, and water quality; *cultural* services that provide recreational, aesthetic, and spiritual benefits; and *supporting* services such as soil formation, nutrient cycling, and photosynthesis (MEA 2005). Typically, only provisioning services have market value, with the monetary benefits determined within the market place where goods and services are bought and sold. However, there are significantly more benefits or values that are provided by ecosystem services other than provisioning services. Because these are provided "free", the loss of these benefits is not considered. For example, if microbial communities did not decompose manure and cycle nutrients, ranchers would have to pay for commercial fertilizer to provide the nutrients needed for forage, which would be a significant additional cost. Having a better understanding of these lost benefits might promote additional pasture management practices.

There are currently many excellent awareness, outreach and educational programs within the Buffalo River watershed offered not only by the NPS BNR and their partners, but also other agencies and organizations such as the NRCS, University of Arkansas Cooperative Extension Program, County Conservation Districts, Arkansas Grazing Land Coalition, rural water utilities, and others. It is recommended that these programs and activities by supported and encouraged to continue.

Two sets of teams are proposed to help implement the recommended practices and activities. Watershed implementation teams are recommended for each subwatershed. Those individuals who live, work, recreate within any subwatershed usually have the greatest desire to see improved water quality for themselves, their children and grandchildren. One to three individuals could be identified in each subwatershed as the points of contract to which the remaining landowners in the watershed could voluntarily report what implementation measures they have accomplished. Stream teams are also recommended for the Buffalo River watershed. The AGFC administers a program to offer training and support for individuals interested in learning more about streams and their management. Stream teams can be as small as 2-3 individuals.

Over the past decade, there has been considerable work conducted on ways of leading and implementing change within organizations and communities. What has emerged is that there are three important domains to consider and two important elements within each domain. The domains are personal, social, and structural and the elements are motivation and ability. These three domains and two elements form a six-celled matrix (See slide 36 Attachment 2). In many instances, the emphasis is only on personal motivation and ability, ensuring that individuals have the motivation to change and are provided with the training and ability to make the change. However, the importance of social elements of peer pressure and support groups (e.g. Grazing Land Coalition) is also critical in supporting the personal domain. In addition, making changes in

the physical environment (i.e., structural domain) through cost-share and rewards (i.e., motivation), and by changing the physical environment in which individuals interact (e.g., electric fence vs. barbed wire fence) are also critical in bringing about changes in how land and water are viewed and managed. The key is to simultaneously address all six cells, not just one or two of the cells. In some cases, it might be possible to address all six, but the emphasis should be on implementing as many of the six cells as possible to encourage and promote change. This is the recommended approach for implementing the Buffalo River watershed management plan.

Questions raised during the meeting were captured, and responses to these questions are included in Attachment 4.

Next Steps

Comments from this meeting will be considered and, where applicable, will be incorporated into a final draft watershed management plan. The final draft Buffalo River Watershed Management Plan will be uploaded to the website previously used for the watershed management recommendations and available for stakeholder review for 30 days. Stakeholders will be notified when the final draft may be viewed on the website. Any comments received will be assessed and incorporated, where applicable, into the final Buffalo River Watershed Management Plan draft. The Draft Buffalo River Watershed Management Plan will be submitted to EPA for acceptance. EPA "accepts" the plan as opposed to "approving" it because there are no proposed mandatory regulations in this program. Following EPA acceptance, the watershed management plan will be available to guide implementation of management practices and activities within the Buffalo River watershed.

ATTACHMENT 1
Buffalo River Watershed Management Plan:
A Voluntary, Non-Regulatory Project
Carroll Electric Community Room
Jasper, AR
12 October 2017
Agenda

Time	Topic	Individual
1:00 pm	Welcome, Meeting Purposes: • Summarize the Marshall Meeting discussions • Discuss the recommendations for the Buffalo River Watershed Management Plan • Elicit stakeholder input on the recommended practices and activities • Discuss next steps	K. Thornton, FTN
1:05	Summarize the 8 June Marshall Meeting • Watershed Management Plan and planning process • WQ goals, target loads, and estimated load reductions and costs associated with various management practices	K. Thornton
1:25	Recommended Watershed Management Practices & Activities • Recommended Management Practices • Recommended Monitoring • Recommended Studies • Recommended Awareness, Outreach and Education Activities • Recommended Teams • Questions • Other Recommendations	K. Thornton
2:35	Influencing Implementation • Personal Domain • Social Domain • Structural Domain	K. Thornton
3:00	Next Steps	K. Thornton
3:15	**Adjourn**	

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Buffalo River Watershed Management Plan: A Voluntary, Non-Regulatory Project

4th Stakeholder Meeting
Jasper, AR
12 October 2017

Meeting Purposes

- Summarize Marshall June meeting
- Discuss recommended practices and activities for watershed management
- Receive your feedback
- Discuss next steps

8 June Marshall Meeting

- Watershed Management Plan
  - Water Quality Emphasis
    - Extraordinary Resource Water
  - Nonpoint Sources – non-regulatory
  - Voluntary participation

8 June Marshall Meeting

- Watershed Management Plan
  - Focus on sustaining and improving water quality
  - Does not address regulated/permitted facilities or operations (BBRAC Issue)
  - No requirement to participate
    - Are benefits of participating

8 June Marshall Meeting

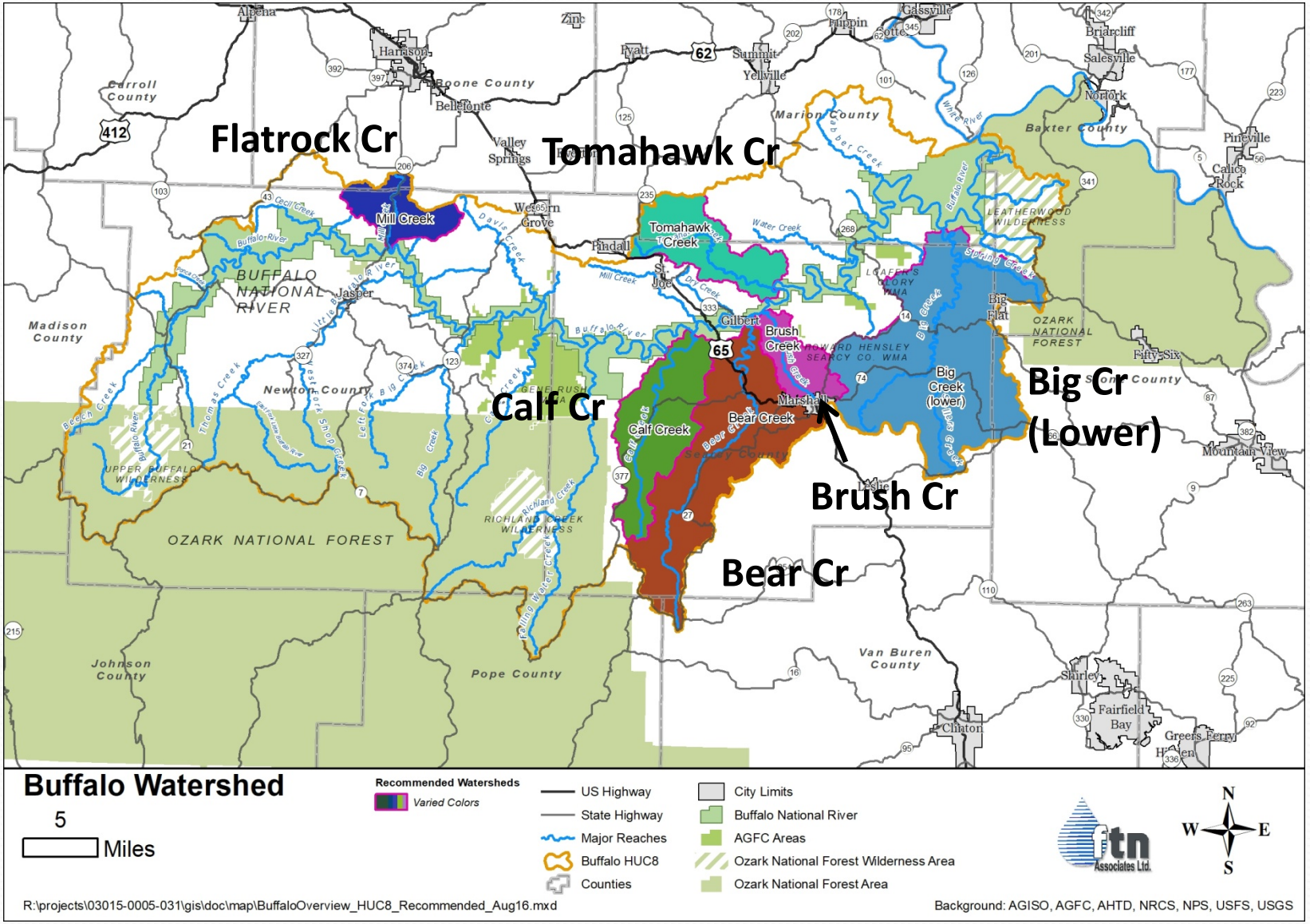
- Water quality desired outcome & goals
- Initial focus subwatersheds/tributaries
- Water quality target loads
- Management practices and estimated load reductions and relative cost

Desired Outcome:

Sustain, improve water quality

- **Three Goals:**
  - **Keep pollutants out of the water (surface and groundwater)**
  - **Minimize stream bank and bed disturbance**
  - **Leave no trace behind**

Initial Focus Tributaries



Constituent Focus for Mgt

- **Nitrate**
  - Soluble – surface & groundwater considerations
  - Corresponding Ortho-P, other soluble constituent reductions
- **E. coli**
  - Particulate transport
  - Corresponding sediment, TP reductions

Nitrate Reduction Estimates

Tributary	1985-1994 median - Target (mg/L)	2005-2015 median (mg/L)	Nitrate Reduction Needed to Achieve Target	Sources
Flatrock Cr	0.438	0.727	40%	On-site WWT , pasture
Calf Cr	0.230	0.337	32%	On-site WWT , pasture
Bear Cr	0.100	0.313	68%	On-site WWT , pasture
Brush Cr	0.515	0.770	33%	On-site WWT , pasture
Tomahawk Cr	0.225	0.382	41%	On-site WWT , pasture
Lower Big Cr	0.04	0.132	70%	On-site WWT , pasture

Bacteria Reduction Estimates

Tributary	Target E. coli concentration (cfu/100mL)	Median E. coli concentration 2009-2015 (cfu/100mL)	Reduction Needed to Achieve Target	Sources
Flatrock Cr	15	64	76%	On-site WWT , pasture
Calf Cr	15	15	0	
Bear Cr	21.5	21.5	0	
Brush Cr	7.3	20	64%	On-site WWT , pasture
Tomahawk Cr	36*	64	44%	On-site WWT , pasture
Lower Big Cr	4.5	25.3	82%	On-site WWT , pasture

* 75th percentile of 2009-2015 medians

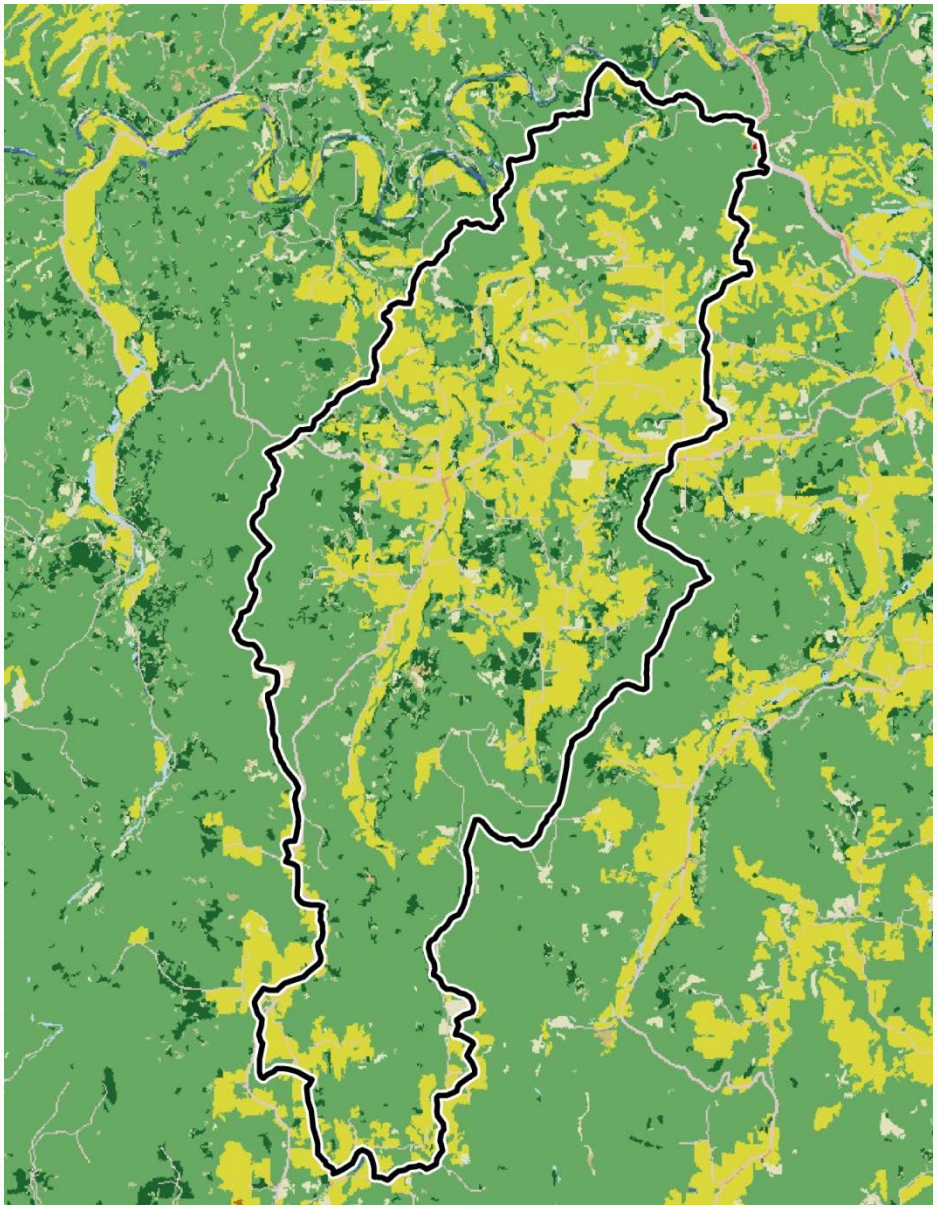
Practices – Expected Reductions

Practice	Nitrogen Reduction	Coliform Reduction	Sediment Reduction	Phosphorus Reduction
Prescribed grazing	20%	60% - 72%	20% - 60%	20%
Non-forest stream buffer	31% - 68%	41%	23% - 70%	50% - 70%
Forested stream buffer	37% - 70%	30%	45% - 95%	45% - 70%
Pasture planting/Mgt	66%	X	59%	67%
Stream exclusion	32% - 60%	30% - 95%	75% - 83%	60% - 76%

Calf Creek

31,755 acres

64% Forest
3.5% Developed
33% Pasture



Estimated Reduction/Cost*

Calf Creek Watershed = 31,755 ac (9,428 ac pasture)

Practice	Amount	Cost ($ 1,000) **	Nitrogen Reduction (46%)	Coliform Reduction	Sediment Reduction	Phosphorus Reduction
Stream exclusion	249,000 ft 249 tanks	809	46%	41%	9%	37%
Forested buffer	244 ac	489	46%	29%	7%	37%
Non-forest buffer	357 ac	143	46%	34%	11%	53%
Pasture planting/ Mgt	6,500 ac	1,625	46%	Unknown	8%	37%

*Independent BMP implementation

**EQIP 2016 non-HUC allocation (approximately 75% of total cost)

Additional Analyses

- Distributed Marshall meeting summary
- Included gully formation concerns (NRCS)
  - Addition of Bear Creek subwatershed
- Developed relationship between E. coli and fecal coliforms
  - Target reduction estimates based on E. coli
- Refined cost estimates for management practices

Recommended Management Practices & Activities

Recommended Watershed Management Practices/Activities

- Recommended Management Practices
- Recommended Monitoring
- Recommended Studies
- Recommended Awareness, Outreach and Education Activities
- Recommended Teams

Management Emphasis

- Vegetative enhancement
- Soil health
- Streambank restoration/stablization

Recommended Practices/Activities

- Management Practices
  - Pasture (NRCS, Coop Extension, Conservation Districts, Grazing Land Coalition)
    - Nutrient management plans
    - Livestock stream exclusion/controlled access
    - Forest/non-forest riparian buffers
    - Pasture planting/management
    - Prescribed/rotational grazing
    - Silvopasture establishment
    - Ponds/sediment basins

NO_3 Estimated Reduction/Cost ($K)*

Practice	Flatrock (40%)	Calf Cr (32%)	Bear Cr (68%)	Tomahawk (41%)	Brush Cr (33%)	Big Cr (L) (70%)
Stream exclusion	40%/ $150**	32%/ $810	42%/ $1,700	41%/ $520	33%/ $200	53%/ $1,800
Forested buffer	40%/ $90	32%/ $490	49%/ $1200	41%/ $320	33%/ $120	49%/ $1,300
Non-forest buffer	34%/ $22	32%/ $140	34%/ $240	36%/ $75	33%/ $35	49%/ $250
Pasture planting/Mgt	40%/ $820	32%/ $1,600	46%/ $2,000	41%/ $1,600	33%/ $550	41%/ $5,000
Prescribed grazing	14%/ $260	14%/ $640	14%/ $550	14%/ $500	14%/ $210	14%/ $1,400

** EQIP 2016 non-HUC allocation (approximately 75% of total cost)

E. coli Estimated Reduction/Cost ($K)*

Practice	Flatrock (75%)	Calf Cr (0%)	Bear Cr (0%)	Tomahawk (41%)	Brush Cr (53%)	Big Cr (L) (71%)
Stream exclusion	51%/ $150**	41%	54%	53%/ $390	42%/ $250	54%/ $1,800
Forested buffer	37%/ $110	29%	45%	38%/ $340	30%/ $180	45%/ $1,300
Non-forest buffer	36%/ $22	43%	36%	36%/ $75	35%/ $36	36%/ $250
Pasture planting/Mgt	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Prescribed grazing	54%/ $260	54%	54%	54%/ $370	54%/ $210	54%/ $1,400

*Independent BMP implementation

**EQIP 2016 non-HUC allocation (approximately 75% of total cost)

Recommended Practices/Activities

- Management Practices
  - Forest (NRCS, AFC, USFS, USNPS, Coop Ext.)
    - Pre-harvest planning – skid trails, landings
    - Streamside management zones
    - Roads – water bars, diversion ditches, grade control
    - Revegetation following harvest
    - Prescribed burns
    - Trail management

Recommended Practices/Activities

- **Management Practices**
  - Ecotones/edges (NRCS, AGFC)
    - Gamebird habitat restoration
    - Streambank restoration/stabilization
    - Filter strips/native plants
  - Karst Sinkhole Treatment
  - Invasive or destructive species control
  - Unpaved roads erosion management
  - Identify failing on-site WWT

Recommended Monitoring

- Continue existing monitoring
- Additional monitoring
  - Additional constituent - TSS
  - Additional station – County road access downstream of Dogpatch Springs
  - Algal species and densities
    - Support USNPS & ADEQ in developing / enhancing a monitoring program in the Buffalo/tributaries

Recommended Monitoring

- **Additional Monitoring**
  - **Trash Index**
    - **Three times/yr –**
      - **Earth Day (week of April 22)**
      - **Week following Memorial Day**
      - **Week following July 4th**
    - **Heartland stations and panel frequency**
    - **Heartland & Stream Team(s)**

Recommended Studies

- **Microbial Source Tracking**
  - **Flatrock Creek & Dogpatch Springs**
  - **Partition human/non-human sources**
  - **Quantitative PCR with host-specific markers**
  - **Establish Flatrock Creek PCR stations based on ADEQ 2015-2017 study results**
  - **Bi-weekly January – December**

Recommended Studies

- Dissolved Oxygen (DO)
  - Support USNPS Tributary Sites Program
    - Diel DO study
    - 6 tributaries/year, 3 year rotation
    - Continuous monitoring May 1 – Sept 30
    - Conforms to ADEQ water quality assessment requirements

Recommended Studies

- Streambank Erosion
  - LiDAR Analysis
    - NRCS LiDAR data available March 2018
    - Calf Creek prototype
    - Ground truth suspect areas
    - Design/implement streambank restoration/stabilization plan

Recommended Studies

- Ecosystem Services
  - Quantify (value) ecosystem services in Bear Creek
    - Identify potential ecosystem services
    - Quantify market value services
    - Use non-market valuation procedures to estimate non-market benefits

Recommended Awareness, Outreach and Education Activities

- Support existing BNR awareness, outreach and education programs, e.g.,
  - Leave No Trace media
  - Day-By-The Buffalo
  - Stream and cave ecology camps
  - Bioblitz Citizen Science
  - At The Waters Edge

Recommended Awareness, Outreach and Education Activities

- **Support existing BNR partners and programs**
  - **Buffalo National River Partners**
  - **Ozark Unlimited Resources**
  - **Park Neighbors and Partners**
  - **NorthArk/UCA Learning Center, ASU Learning Center**

Recommended Awareness, Outreach and Education Activities

- Support and use existing programs of
  - Cooperative Extension Service
  - County Conservation Districts
  - Arkansas Unpaved Roads Program
  - Arkansas Grazing Lands Coalition
  - Rural water utilities
  - Nonprofit interest groups

Recommended Teams

- **Subwatershed Implementation Team(s)**
  - **Champion implementing recommended practices & activities**
  - **Monitor progress, adapt to changing conditions**
  - **5-7 residents of a subwatershed**

Recommended Teams

- **Stream Team(s) (AGFC)**
  - **Monitor water quality and promote streambank restoration/stabilization**
  - **Encourage wildlife habitat initiatives and alternative sources of revenue**
  - **2-5 individuals within subwatershed**

Comments – Additional Recommendations

Influencing Implementation

Influencing Implementation*

Domain	Motivation	Ability
Personal	Links to Values and Personal Benefits	Training, Skill Building
Social	Peer Pressure	Social Support
Structural	Rewards, Accountability	Change The Environment

* Grenny et al. 2013. Influencer: The New Science of Leading Change

Pasture Management Practices*

Domain	Motivation	Ability
Personal	•Better pasture/forage quality •Increased rate of gain •Reduced hay feeding •Sustain water supply •Cost-share programs	• Grazing land conf. •Field days •YouTube/other videos •Grazing stick • NRCS tech assistance • AR Coop Ext.
Social	•Leaders implementing practices •Cattleman of the Year Award	• Grazing land coalition •Field days •Rancher to rancher exchanges •Conferences

Pasture Management (Con't)*

Domain	Motivation	Ability
Structural	•EQIP funding •RCPP funding •319 funding •USFWS CALF funding	•Grow grass, not algae campaign •Grazing stick •Promote 2 strand electric fence •4-5 forage paddocks •Stockpile paddock •Alternative water supply

*Simultaneous actions, not either-or.

Streambank Restoration/ Stabilization*

Domain	Motivation	Ability
Personal	•Reduced land loss •Gamebird hunting leases •Aesthetics •Reduced flood damage •Cost-share programs	•NRCS tech assistance • AR Coop Ext. •AGFC tech assistance •TNC tech assistance
Social	•Leaders implementing practices •Conservationist of the Year Award	•Rancher to rancher exchanges •Conferences •Field Days

Streambank Restoration – Stabilization (Con't)*

Domain	Motivation	Ability
Structural	•EQIP funding •RCPP funding •319 funding •AGFC – Stream Teams	•Timber •Buffer strips/zones •Wildflowers

*Simultaneous actions, not either-or.

Potential Funding Sources

- ANRC 319 Program – e.g., Conservation Districts
- NRCS
  - Env. Quality Incentives Prog (EQIP) – Indiv. Landowner
  - Conserv. Stewardship Prog (CSP) – Indiv. Landowner
  - Healthy Forest Reserve Prog (HFRP) – Indiv. Landowner
  - State Ac for Wildlife Enhance (SAFE) – Indiv. Landowner
  - Regional Conservation Partnership Prog (RCPP) – Conserv. Districts
- FSA CRP (Continuous) – Indiv. Landowner

Potential Funding Sources (Con't)

- **USFWS**
  - **Controlled Access Livestock Fencing (CALF) Program – Indiv. Landowner**
  - **Partners for Wildlife – Indiv. Landowner**
- **TNC – Indiv. Landowner**
- **Arkansas Unpaved Roads Program (AEDC, AFGC, TNC) – Counties**

Not Starting From Scratch

- County Conservation Districts
  - Pasture planting
  - Manure management
  - Bank stabilization
  - Streambank restoration
  - Stream exclusion with alternate water sources
  - Equipment
- NRCS
  - Pasture planting
  - Manure management
  - Bank stabilization
- US NPS
  - Bank stabilization
  - Tree planting
  - Stream fencing
- AR Grazing Land Coalition
  - Conferences
  - Field Days

Next Steps

Next Steps

- Meeting Summary – distributed to everyone attending and on email list (or address)
- Continue to elicit your input
- Prepare final draft watershed management plan
- Post web-site copy for review
- Assess comments and submit final plan to EPA for acceptance
- Stakeholders Implement the Plan

Snap Shot Reports

- Water Quality Improvement or Nonpoint Source Reduction, Control or Abatement
  - ANRC documenting water quality improvement projects, agency programs, or stakeholder activities
  - Numerous categories
    - BMPs
    - Education and Outreach
    - Monitoring
    - Others
- http://www.arkansaswater.org/ - Reporting Form

Points of Contact

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Thank You

ATTACHMENT 3:

Recommended Watershed Management Practices and Activities

There are five categories in which recommendations are being made:

1. Recommended Management Practices;
2. Recommended Monitoring;
3. Recommended Studies;
4. Recommended Awareness, Outreach and Education; and
5. Recommended Teams.

These recommendations are intended to address concerns about nutrient and E. coli levels in surface waters and groundwater, as well as concerns about erosion in the watershed, channel instability, excess sediment in streams, and stream water temperatures. Most of the recommendations below were suggested by participants in the stakeholder meetings.

Recommended Management Practices

Recommended land use management practices are provided for three land uses – pasture, forest, and ecotone (transition area from one land use type to another, such as pasture to streambank or pasture to forest) management.

Recommended pasture management practices:

- Nutrient management plans,
- Livestock stream exclusion/controlled access,
- Forest/non-forest riparian buffers,
- Pasture planting/management,
- Prescribed/rotational grazing,
- Silvopasture establishment, and
- Ponds/sediment basins.

Recommended forest management practices:

- Pre-harvest planning – skid trails, landings;
- Streamside management zones;
- Roads – water bars, diversion ditches, grade control;
- Revegetation following harvest;
- Prescribed burns; and
- Trail management.

Recommended management practices for ecotones:

- Gamebird habitat restoration,
- Streambank restoration/stabilization, and
- Filter strips/native plants.

In addition to land use management practices, karst sinkhole identification and treatments, unpaved roads erosion management, invasive or destructive species control, and identification of failing on-site wastewater treatment systems (e.g., septic systems) are also recommended. Karst sinkhole treatments include cleaning trash from sinkholes and minimizing pollutant sources around the sinkholes.

Recommended Monitoring

- Support existing monitoring and enhance those programs.
- Add total suspended solids as a constituent for analysis in the water quality samples already being collected.
- Consider adding a station at the county road downstream of Dogpatch Springs so that loading from Dogpatch Springs can be assessed.
- Support the Buffalo National River and ADEQ in developing an algae monitoring program to assess algal species and densities in the Buffalo River and its tributaries.
- Develop a trash index and implement a trash monitoring program for tributaries.

Recommended Studies

- Initiate microbial source tracking for E. coli in Flatrock Creek subwatershed, including Dogpatch Springs contributions, using quantitative polymerase chain reaction and host-specific markers.
- Support the Buffalo National River program in its diel (24 hour) monitoring of dissolved oxygen and evaluation of relationships with nutrient loading in the Buffalo River and its tributaries.
- Conduct LiDAR analysis in recommended subwatersheds, starting with Calf Creek, to assess streambank erosion using the NRCS LiDAR data that will be available in March 2018. Ground truth the LiDAR data at selected locations through Watershed Implementation or Stream Teams.
- Quantify ecosystem services in recommended subwatersheds, starting with Bear Creek subwatershed, using both market and non-market valuation approaches for better understanding and appreciation of the value of these services and quality of life in the Buffalo River watershed.

Recommended Awareness, Outreach, and Education Programs

- Support existing Buffalo National River awareness, outreach and education programs, such as

  - Leave No Trace,
  - Day-By-The Buffalo,
  - Stream and cave ecology camps,
  - Bioblitz Citizen Science, and
  - At The Waters Edge.

- Support existing Buffalo National River partners and programs, such as

  - Buffalo National River Partners,
  - Ozark Unlimited Resources,
  - Park Neighbors and Partners,
  - NorthArk/UCA Learning Center, and
  - ASU Learning Center.

- Support existing education and outreach programs by

  - Cooperative Extension Service,
  - County Conservation Districts,
  - Arkansas Unpaved Roads Program,
  - Arkansas Grazing Lands Coalition
  - Rural water utilities, and
  - Nonprofit interest groups.

Recommended Teams

- Watershed Implementation Team(s) for each recommended subwatershed to champion implementing recommended practices & activities, monitor progress, and adapt to changing conditions.

- Stream Team(s) to help monitor water quality and promote streambank restoration / stabilization, as well as encourage wildlife habitat initiatives and alternative sources of revenue.

ATTACHMENT 4

Questions Raised at the October 12 2017 Meeting and Responses

Question: Does Flatrock Creek refer to the Mill Creek subwatershed?

Response: Yes. The official USGS name for that HUC12 is Flatrock Creek. It is typically referenced as Mill Creek.

Question: Please explain the difference between forest and non-forest buffer.

Response: Forest buffers are developed by planting native tree species, which grow into forested areas with corresponding understory species. Forested riparian buffers are very effective in stabilizing and restoring streambanks as well as reducing pollutant transport and loading to streams. Non-forested buffers consist of planting native grasses which can also serve to stabilize and restore streambanks and reduce pollutant transport and loading to streams. Non-forest buffers are generally preferred next to cropland because agricultural equipment use is not impeded by trees.

Question: There have been issues with the phosphorus detection limit. Are you recommending lower detection limits?

Response: It may be feasible that a for lower phosphorus detection limit could be set as well as the addition of total nitrogen and total phosphorus analysis, but this is at the discretion of ADEQ.

Question: Is the algal monitoring by ADEQ and BNR separate efforts, or a joint effort?

Response: The proposed algal monitoring is a joint effort between the BNR and ADEQ. Both agencies are interested in implementing an algal monitoring program.

Question: On the DO study, would the six subwatersheds monitored on the three-year rotation include other subwatersheds than the recommended six?

Response: Yes. All of the currently monitored tributaries would be monitored. It is recommended this occur by partitioning the tributaries into three groups of six, with a different group of six monitored each year. This would result in each group of tributaries being monitored every three years.

Question: Once the plan is final, who benefits? Do landowners in the recommended subwatersheds have a greater likelihood of receiving funding?

Response: The desired outcome is that all stakeholders will benefit. For EPA Section 319 funds, those recommended subwatersheds would receive greater consideration for funding. Other funding programs have different priorities, but having an EPA accepted watershed management plan has influenced other agencies to fund projects within the recommended subwatersheds in the past. However, there is no assurance of funding.

Question: How does funding from EPA 319 work? Does ANRC lose the money if it doesn’t get used within a certain time period?

Response: EPA provides funding to ANRC to be used within five years. Most 319 project contracts are for three to five years.

Question: What is the most efficient and likely way to get money?

Response: NRCS programs, such as EQIP, generally have more money to distribute than the 319 program. NRCS funding typically goes directly to landowners. Funding from 319 is declining. Funds are awarded to organizations, such as County Conservation Districts, who then can contract with individual landowners to implement practices.

Question: In your tables you show that it would take $1.8 million to implement practices to meet the reduction targets. How many $1.8 million projects could 319 fund?

Response: The $1.8 million estimate was for an independent application of a single management practice within the subwatershed. These cost estimates are for relative comparison among management practices. Typically, management practices are implemented as suites of practices, so the total cost to achieve the target load reduction might be less, but it could also be more, depending on the specific characteristics of the subwatershed. 319 funds do not exceed more than $75 thousand for a single cost share project. Cost share projects are subject to ANRC's Title X Agricultural cost share rules. However, 319 projects can include partnerships with other funding agencies or organizations, leveraging funds from multiple sources.

Question: It appears the primary purpose for prioritizing streams is to apportion funds. Looking at page three of the recommendations. What statutory requirements prevent the prioritization of Big Creek middle? Can you tell me what statutory requirements those are?

Response: The primary purpose of the watershed characterization was to determine in which subwatersheds there were indications that water quality has been declining over time, currently water quality is poorer than other tributaries, have natural resource concerns within the subwatershed, and have a significant portion of the subwatershed with karst geology. These subwatersheds were recommended for initial management focus. No subwatershed, with a water quality monitoring station at its mouth, was excluded, including Big Creek (middle). We looked at the same 20 criteria for all of the tributaries, regardless of the disposition of regulated/permitted facilities within the subwatershed. In fact, two of our recommended subwatersheds have permitted point sources, Marshall wastewater system discharges to Bear Creek, and the Marble Falls wastewater system discharges to Mill Creek. The statutory requirements for the program refer to which sources can be addressed through voluntary management practices. ANRC does not address regulated or permitted facilities or activities through its watershed management programs. Regulated/permitted facilities are addressed by another agency. Though issues with regulated sources can't be addressed in the plan, the plan includes tables listing all permitted and regulated facilities in the Buffalo River watershed.

Question: If the City of Marshall wants to make changes to their treatment, are there sources of funding available for that?

Response: Yes, there are loans and grants available to municipalities for upgrading treatment facilities. ANRC offers some of these loans, but not through the nonpoint source management program or 319 program.

Question: There has been a lot of talk about lack of funds to implement the practices. I think it would be good to include a recommendation to go to the governor and request special funding to jump-start implementation.

Response: Funding is generally always an issue, regardless of the program. Estimates of funds that might be required to implement management practices to achieve target loads, increase monitoring efforts, conduct additional studies, or improve outreach and education programs are included as part of the 9-elements that EPA requires in a watershed management plan. In addition, these recommendations will go to the BBRAC. Agency funding is established through the legislative process.

Question: Who is going to implement this plan?

Response: Hopefully you will - local groups, conservation districts, etc. Agencies can support implementation of projects and practices, but these are voluntary projects, implemented by stakeholders and land owners. ANRC looks for partners to implement the completed plans. For example, the Illinois River Watershed Partnership is implementing the Illinois River watershed management plan. The Beaver Watershed Alliance is implementing the Beaver watershed management plan. These partners help leverage funds for implementation. The Buffalo River watershed management plan will be one of 13 plans being implemented, so it is competing with other groups in the state for funds.

Question: How long before the draft plan will be available?

Response: We expect the final draft plan will be ready by the middle of November. We will notify people when it is uploaded to the web as we did for the recommendations.

Question: Will there be any more meetings?

Response: This is the final meeting for the Buffalo River Watershed Management Plan, but BBRAC will continue to have meetings. The public is invited to attend those meetings.

Question: Once the plan is finalized, who needs to take responsibility?

Response: As mentioned above, hopefully, stakeholders within the Buffalo River watershed will assume responsibility for implementation. The plan will be available as a guide for implementing practices. Groups in other watersheds have taken responsibility for watershed management plans.

Question: Is CRP available in Arkansas? I understand it is only available for land along streams.

Response: CRP is available in Arkansas. There are programs for both cropland and “marginal pasture”. Marginal pasture means pasture along streams. For cropland, land away from streams can be entered in CRP.

Question: Can a project that includes practices not listed in the watershed management plan get funding?

Response: Yes. The plan isn’t intended to exclude any practices. It includes those practices that stakeholders have identified and those that have been accepted by stakeholders and implemented in other watersheds. There are many additional practices that can also improve water quality.

Question: Is there a reason why not all stakeholder recommendations have been included?

Response: We are documenting all recommendations provided by stakeholders. Some of these are not directly related to water quality, so we haven't included them in the list of recommendations. However, we are providing all stakeholder recommendations to the BBRAC for consideration as well to other respective agencies that are not part of the BBRAC, such as the Arkansas Economic Development Commission. There were several stakeholder recommendations for economic activities that are not part of water quality management.

Question: When the watershed management plan is final, what organizations will be notified that it is ready, and how does that happen?

Response: In the past, word of mouth has been the most effective in announcing the EPA accepted watershed management plan is available. The plan will be uploaded to the arkansaswater.org website. ANRC usually sends out emails to some agencies. The fact that the plan is final will also be reported at the annual nonpoint source program meeting, which most of the relevant agencies attend, and in the program annual report.

Question: You have included streambank stabilization as a recommendation. I had rock vanes installed along an eroding streambank and it really helped. Would that be an option that could be included under the streambank stabilization recommendation?

Response: Yes. There are a number of streambank restoration and stabilization practices that are applicable and available for cost-share from different agencies.

Question: It would be helpful to include specific information describing how to use the LiDAR data, and quantify ecosystem services, including references.

Response: The plan includes more information and details about how these proposed studies could be conducted.

Question: It seems like water quality in the lower part of the Buffalo River watershed would be better because there is more water to diffuse pollutants. Is that the case?

Response: Discharge increases downstream in the watershed, which could increase dilution. However, it depends on where in the watershed the contaminant source is located to be able to answer this question.

Question: You have discussed E. coli, but I am concerned about poisons in the water from pesticides and herbicides. Are those a threat to swimmers? Also, I am interested in participating in a stream team.

Response: Pesticides can be harmful to swimmers depending on the particular pesticide and concentration. There has been some monitoring of pesticides and herbicides in the past.

Comment: You have recommended diurnal DO studies. It would be very helpful if all parameters needed for ADEQ to assess nutrients were monitored.

Response: Our understanding is that the parameters needed for ADEQ to assess nutrients include monitoring data for diurnal DO, total phosphorus and total nitrogen, and aquatic communities status. ADEQ is currently analyzing BNR samples for total phosphorus and total nitrogen. The National Park Service Heartland program does routine monitoring of aquatic invertebrates and fisheries, and BNR personnel are working with ADEQ to develop an algae monitoring program.

Comment: Seems like it would be helpful/useful for the agencies to work together to locate sanitary sewer lines, and locations with septic tanks. This could be used to target education efforts, or repair programs.

Response: This comment will be provided to the Arkansas Department of Health (ADH).

Comment: It would also be helpful to know where private wells are. Private well owners could need outreach and education regarding how to protect their wells from contamination, and how to get the water tested if they are concerned.

Response: This comment will be provided to ADEQ and ADH

Comment: I suggest you not rely on money so much as an incentive. Government funding of those programs in the future is likely to decrease. Other incentives, such as getting influential local people interested and involved, can also be effective.

Response: Agreed

Comment: Every county should have a copy of the plan someplace where it is easy to access, e.g., the conservation district, or courthouse.

Response: The plan will be available on the www.arkansaswater.org website and the Conservation Districts will be notified.