



2024-2029

# Nonpoint Source Pollution Management Plan



NATURAL RESOURCES  
DIVISION

## Table of Contents

Acronyms .....	1
Section One: Introduction .....	3
Section Two: Program Description .....	16
Section Three: Statewide Agriculture NPS Management .....	28
Section Four: Statewide Forestry NPS Management .....	43
Section Five: Statewide Surface Erosion NPS Management .....	51
Section Six – Statewide Urban Runoff NPS Management.....	60
Appendix A – NPS Plan Stakeholder Group.....	67
Appendix B – Risk Matrix Report .....	69
Appendix C – List of Federal Lands.....	70
Appendix D – Progress Towards 2018-2023 Goals.....	72

## Acronyms

<b>319</b>	Clean Water Act Section 319
<b>AAES</b>	University of Arkansas System Division of Agriculture Agricultural Experiment Station
<b>ADH</b>	Arkansas Department of Health
<b>ADPHT</b>	Arkansas Department of Parks, Heritage, and Tourism
<b>AFO</b>	Animal Feeding Operation
<b>AGFC</b>	Arkansas Game and Fish Commission
<b>AGIS</b>	Arkansas Geographic Information System Office
<b>ANRC</b>	Arkansas Natural Resources Commission
<b>APCEC</b>	Arkansas Pollution Control and Ecology Commission
<b>ARDOT</b>	Arkansas Department of Transportation
<b>ASWCC</b>	Arkansas Soil and Water Conservation Commission
<b>AWRC</b>	Arkansas Water Resources Center
<b>AWWCC</b>	Arkansas Water Well Construction Committee
<b>BMP</b>	Best Management Practice
<b>CALF</b>	Cattle Access and Livestock Fencing
<b>CAFO</b>	Confined Animal Feeding Operation
<b>CFR</b>	Code of Federal Regulations
<b>CREP</b>	Conservation Reserve Enhancement Program
<b>CRP</b>	Conservation Reserve Program
<b>CSP</b>	Conservation Stewardship Program
<b>CWA</b>	Clean Water Act
<b>DEQ</b>	Arkansas Department of Energy and Environment Division of Environmental Quality
<b>EPA</b>	U.S. Environmental Protection Agency
<b>EQIP</b>	Environmental Quality Incentive Program
<b>FOTG</b>	Field Office Technical Guide
<b>FSA</b>	Farm Service Agency
<b>GAAP</b>	Generally Accepted Accounting Principles
<b>GAO</b>	General Accounting Office
<b>GDP</b>	Gross Domestic Product
<b>GIS</b>	Geographic Information System
<b>GRTS</b>	Grants Reporting and Tracking System
<b>HUC</b>	Hydrologic Unit Code
<b>MCL</b>	Maximum Contaminant Level
<b>MRBI</b>	Mississippi River Basin Initiative
<b>NPDES</b>	National Pollutant Discharge Elimination System
<b>NPS</b>	Nonpoint Source Pollution
<b>NPS Plan</b>	Arkansas Nonpoint Source Pollution Management Plan
<b>NPS Program</b>	Arkansas Nonpoint Source Pollution Management Program
<b>NRCS</b>	USDA Natural Resources Conservation Service
<b>NATURAL RESOURCES DIVISION</b>	Arkansas Department of Agriculture's Natural Resources Division

<b>NSW</b>	Natural and Scenic Waterway
<b>NWQI</b>	National Water Quality Initiative
<b>OMB</b>	Office of Management and Budget
<b>PLET</b>	Pollutant Load Estimation Tool
<b>RCPP</b>	Regional Conservation Partnership Program
<b>RFP</b>	Request For Proposal
<b>RUSLE</b>	Revised Universal Soil Loss Equation
<b>SMZ</b>	Streamside Management Zone
<b>STEPL</b>	Spreadsheet Tool for Estimating Pollutant Loads
<b>SWAT</b>	Soil Water Assessment Tool
<b>SWPP</b>	Source Water Protection Program
<b>TMDL</b>	Total Maximum Daily Load
<b>TNC</b>	The Nature Conservancy
<b>UIC</b>	Underground Injection Control Program
<b>USACE</b>	U.S. Army Corps of Engineers
<b>USDA</b>	U.S. Department of Agriculture
<b>USFS</b>	U.S. Department of Agriculture Forest Service
<b>USFWS</b>	U.S. Fish and Wildlife Service
<b>USGS</b>	U.S. Geological Survey
<b>WEPP</b>	Water Erosion Prediction Project
<b>WHIP</b>	Wildlife Habitat Improvement Program
<b>WHPP</b>	Wellhead Protection Program
<b>WQT</b>	Water Quality Technician
<b>WRE</b>	Wetland Reserve Easements
<b>WRP</b>	Wetland Reserve Program

## Section One: Introduction

Arkansas is a state rich in water resources. The citizens of Arkansas rely on these water resources for a variety of uses – drinking water, irrigation, recreation, industry, and wildlife support. The lakes, reservoirs, streams, and groundwater of Arkansas are vital to our citizens’ quality of life. The way we manage our water resources affects not only the citizens and wildlife of Arkansas, but also people and wildlife living downstream, all the way to the Gulf of Mexico.

Efforts to protect the state’s water resources target both point source discharges (i.e., those with a discernible, confined, and discrete discharge) and nonpoint sources (NPS) (i.e., diffuse sources of pollution such as agricultural and urban runoff). Point source discharges are regulated through the National Pollutant Discharge Elimination System. Reductions in NPS pollution generally require watershed-scale improvements in management activities and implementation of best management practices (BMPs). The Arkansas NPS Pollution Management Program (Arkansas NPS Program) was developed to coordinate and monitor efforts to reduce NPS pollution.

The Arkansas 2024-2029 NPS Management Plan (NPS Plan) is intended to serve as a statewide reference. Used in conjunction with the most recent approved List of Impaired Waterbodies (303(d) list) and state Integrated Assessment Report (305(b) report), this plan is intended to provide an overarching guide to development, coordination, and implementation of activities and programs to reduce, manage, control, or abate NPS pollution in Arkansas. This plan provides a focal point for agencies, organizations, and individuals to discuss and address NPS pollution.

A brief history of the Arkansas NPS Program is outlined below.

- In 1987, the Clean Water Act (CWA) was amended, establishing the Section 319 Nonpoint Source Management Program. Under this program, to be eligible for CWA grant funds, states were required to develop a statewide program to control NPS.
- Arkansas Department of Pollution Control and Ecology (now Arkansas Department of Energy and Environment Division of Environmental Quality (DEQ)) began developing the Arkansas NPS Program.
- In January 1990, at the request of DEQ, Governor Bill Clinton designated the Arkansas Soil and Water Conservation Commission (ASWCC) as the lead agency for the Arkansas Agriculture NPS Program for a three-year trial period.
- In 1993, the state evaluated the ASWCC Agriculture NPS Program, and Governor Jim Guy Tucker extended ASWCC’s responsibility for the program for another three years.
- In 1996, after another evaluation of the Agriculture NPS Program, Governor Jim Guy Tucker designated ASWCC as the permanent lead agency for the Arkansas Agriculture NPS Program.
- In September 1996, ASWCC submitted a draft state NPS Plan to address all state sources of NPS pollution, not just agriculture, to the U.S. Environmental Protection Agency (EPA).
- Later in 1996, with the agreement of the EPA, Governor Mike Huckabee gave ASWCC the responsibility for coordinating management of all categories of NPS pollution in Arkansas.
- In 1997, the ASWCC statewide NPS Plan was approved by EPA.
- In 2002, ASWCC updated the 1997 plan to address NPS management for 2003-2004 and it was approved by EPA.

- In 2005, the name of ASWCC was changed to Arkansas Natural Resources Commission (ANRC).
- In 2005, ANRC prepared the first five-year NPS Plan for 2006-2010, which was approved by EPA.
- ANRC prepared five-year NPS plans for 2011-2016 and 2018-2023, which were approved by EPA.
- In 2019, the Arkansas Transformation and Efficiencies Act was signed into effect, and ANRC became the Arkansas Department of Agriculture's Natural Resources Division (Natural Resources Division).

A detailed description of the Arkansas NPS Program is provided in Section 2. The Arkansas NPS Program uses a non-regulatory, voluntary approach. Activities, programs, and initiatives that require a permit or are otherwise regulated by a state or federal agency are not under the purview of the Arkansas NPS Program.

### The Changing Landscape

The Arkansas NPS Program is being implemented within a changing federal policy, programmatic, and physical landscape. This 2024-2029 NPS Plan incorporates and addresses policy and program changes that have occurred since 2018, including:

- Increased federal focus on water quality improvements that have impacts on social justice and disadvantaged communities,
- Increased federal focus on projects that immediately address climate resiliency,
- Reorganization of state agency structure,
- Changes in the state agencies responsible for NPS-related programs,
- Other changes in state programs related to NPS pollution, and
- Changes in federal guidance of NPS programs.

This 2024-2029 NPS Plan also addresses changes in the physical landscape in Arkansas since 2018. Figures 1.1 and 1.2 provide a snapshot of the changing physical landscape for managing NPS pollution. For example:

- Land use in Arkansas continues to change. Figure 1.1 shows 2019 land use. Table 1.1 shows a comparison of 2011 and 2019 land use.
- The population in northwest Arkansas is projected to double by 2050, while other areas of the state are experiencing population decline. Figure 1.2 shows the population change between 2015 and 2020 for each county.
- Changes in the crops grown in the state (Section 3).
- Changes in animal agriculture in the state (Section 3).
- Increased use of low impact development (LID) in some areas of the state (Section 6).

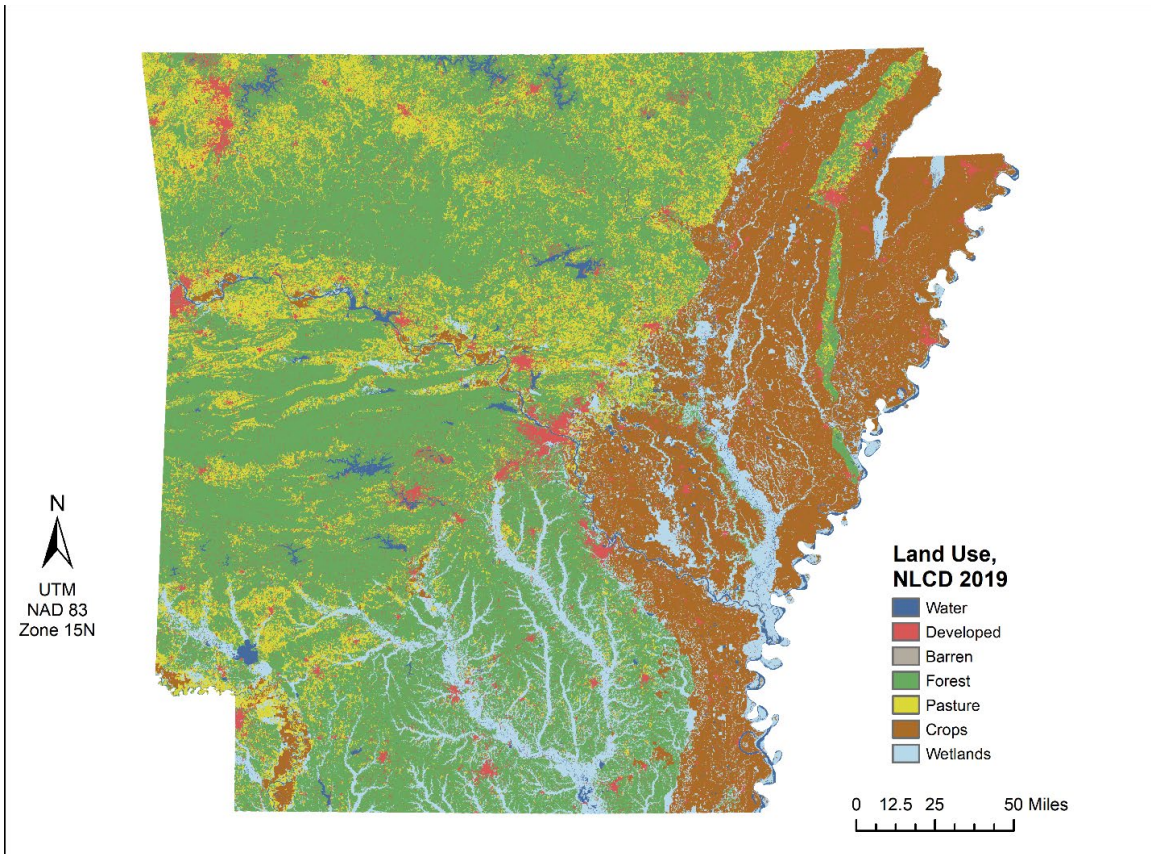


Figure 1.1. Arkansas land use, 2019

Table 1.1. Land use comparison, 2011-2019 (Homer et al. 2015, Dewitz and U.S. Geological Survey 2021)

Land Use	2011	2019	Percent Change
Water	2.29%	2.32%	1.4%
Developed	6.11%	6.23%	2.0%
Barren	0.22%	0.21%	-1.4%
Forest <sup>a</sup>	47.14%	47.12%	-0.1%
Pasture <sup>b</sup>	13.34%	13.19%	-1.2%
Crops	20.32%	20.32%	0.0%
Wetlands <sup>c</sup>	10.57%	10.60%	0.3%

a: Also includes scrub, shrub, and herbaceous land covers. Does not include wooded wetlands, i.e., bottomland hardwoods.

b: Also includes haylands.

c: Includes wooded wetlands, i.e., bottomland hardwoods.

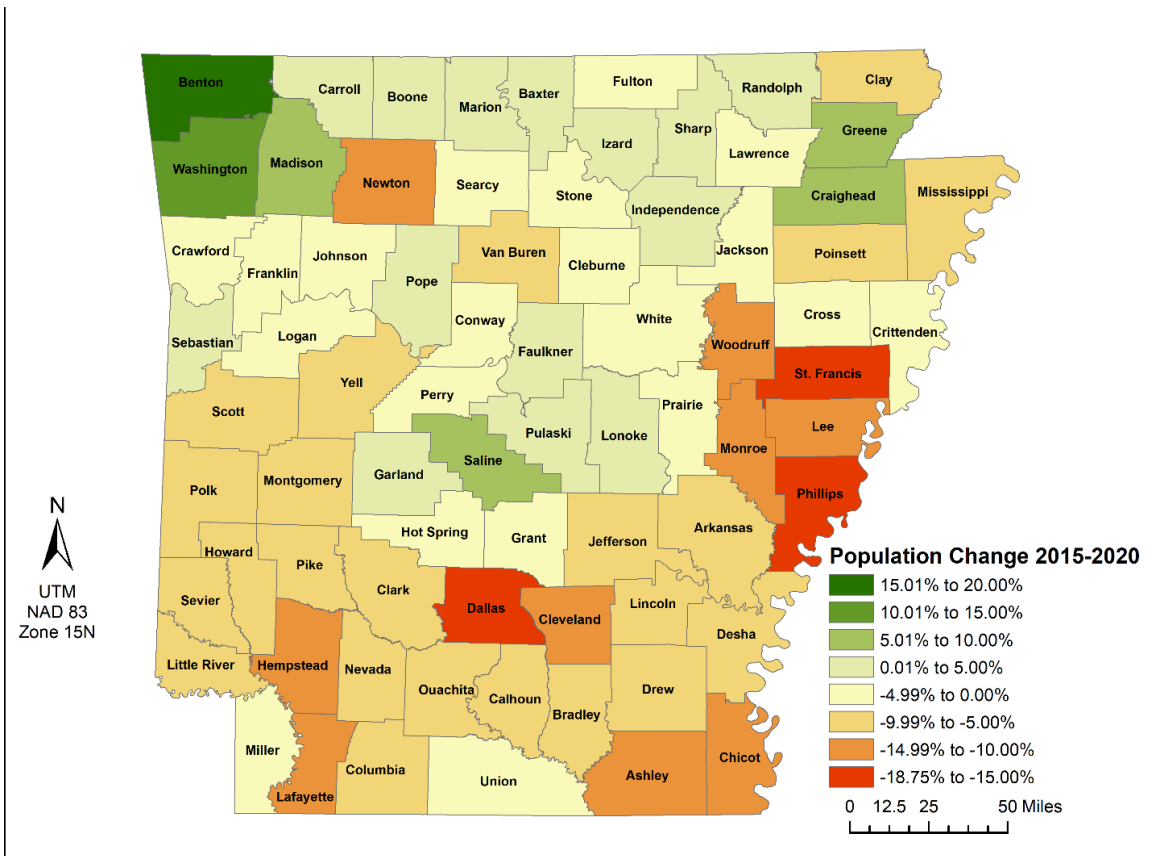


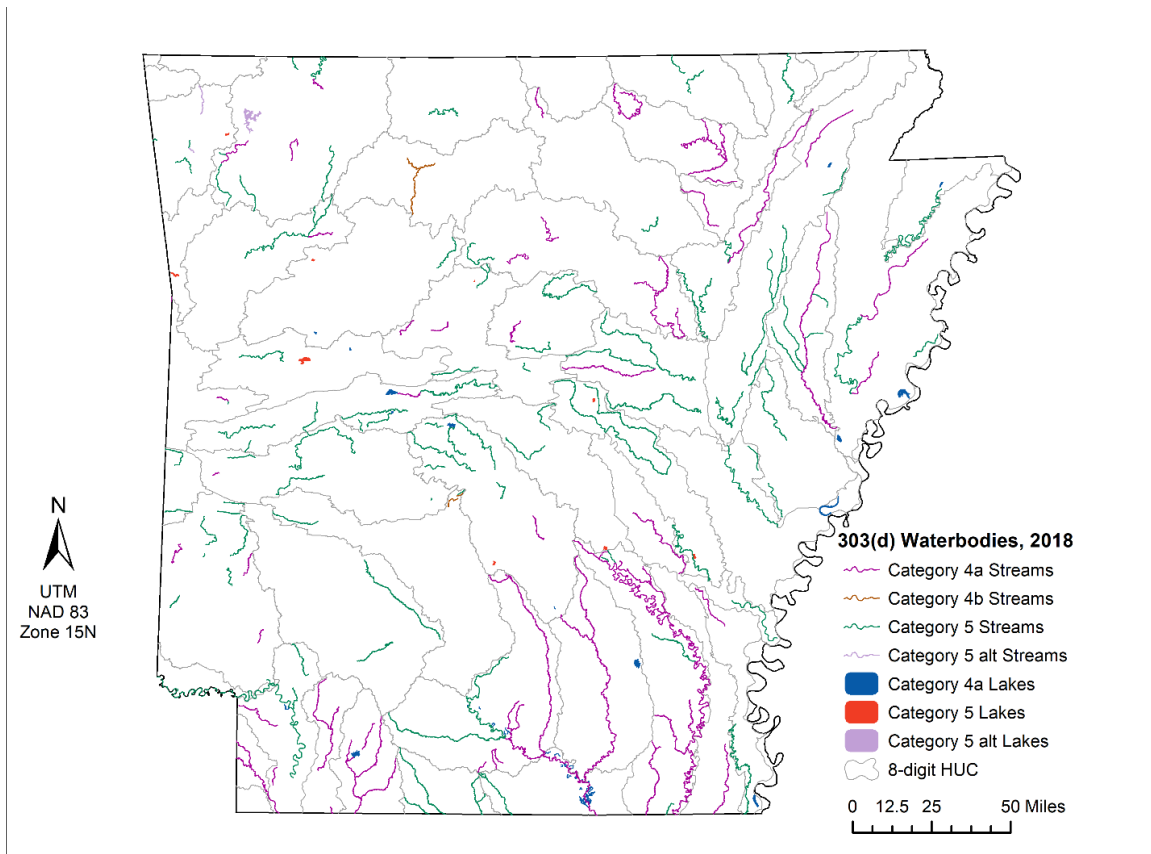
Figure 1.2. Arkansas population change, 2015-2020 (U.S. Census Bureau 2022)

## Surface Water Quality Management in Arkansas

The purpose of the CWA 319 program, and thus the Arkansas NPS Program, is to improve surface water quality. As a result, the Arkansas NPS Program is closely aligned with the Arkansas 305(b) report and 303(d) list, prepared every two years by DEQ.

Section 303(d) of the CWA requires states to identify waters that do not meet, or are not expected to meet, applicable water quality standards. A list of these waterbodies is compiled in even numbered years into a document known as the List of Impaired Waterbodies prepared pursuant to Sections 305(b) and 303(d) of the CWA. The regulation (40 CFR 130.7) requires that each 303(d) list be prioritized and identify waters targeted for Total Maximum Daily Load (TMDL) development. Figure 1.3 shows streams identified as impaired in the final approved 2018 List of Impaired Waterbodies. The 2018 List of Impaired Waterbodies is the most recent version formally approved by EPA. Future lists of impaired waterbodies will be available on the DEQ website (as of April 2022 303(d) and 305(b) documents prepared by DEQ are available at [adeq.state.ar.us/water/planning/integrated/303d/list.aspx](http://adeq.state.ar.us/water/planning/integrated/303d/list.aspx)).





*Figure 1.3. Arkansas Impaired Waterbodies, 2018*

Water quality in Arkansas’s surface waters is managed through water quality standards defined in Arkansas Pollution Control and Ecology Commission (APCEC) Rule 2 (found at [adeq.state.ar.us/regs/files/rule02\\_final\\_220128.pdf](http://adeq.state.ar.us/regs/files/rule02_final_220128.pdf)). These standards include designation of uses for all waters of the state, narrative or numeric criteria designed to prevent impairment of those designated uses, and a policy to prohibit degradation of the quality of waters of the state (anti-degradation policy). Arkansas Rule 2 designated uses are described in the inset on page 7. Designations 4 through 9 are federally mandated designations that apply to virtually all surface waters of the state. Waterways with designations 1 through 3 are considered worthy of the highest level of protection by the state because of their beauty, value, or beneficial use.

Arkansas water quality standards are ecoregion-based; waters within each of the six ecoregions of the state have standards that were developed using data from least-disturbed streams within each respective ecoregion (Figure 1.4). The data were developed during an intensive, statewide study of the physical, chemical, and biological characteristics of least-disturbed streams during 1983-1986. As part of the 2023 Triennial Review of Rule 2, DEQ has proposed slight changes to the current ecoregion boundaries used in the standards to align with Omernik Level III ecoregion boundaries (see Woods et al. 2004). DEQ is also conducting ecoregion studies for the purpose of developing tiered aquatic life uses and revising criteria.

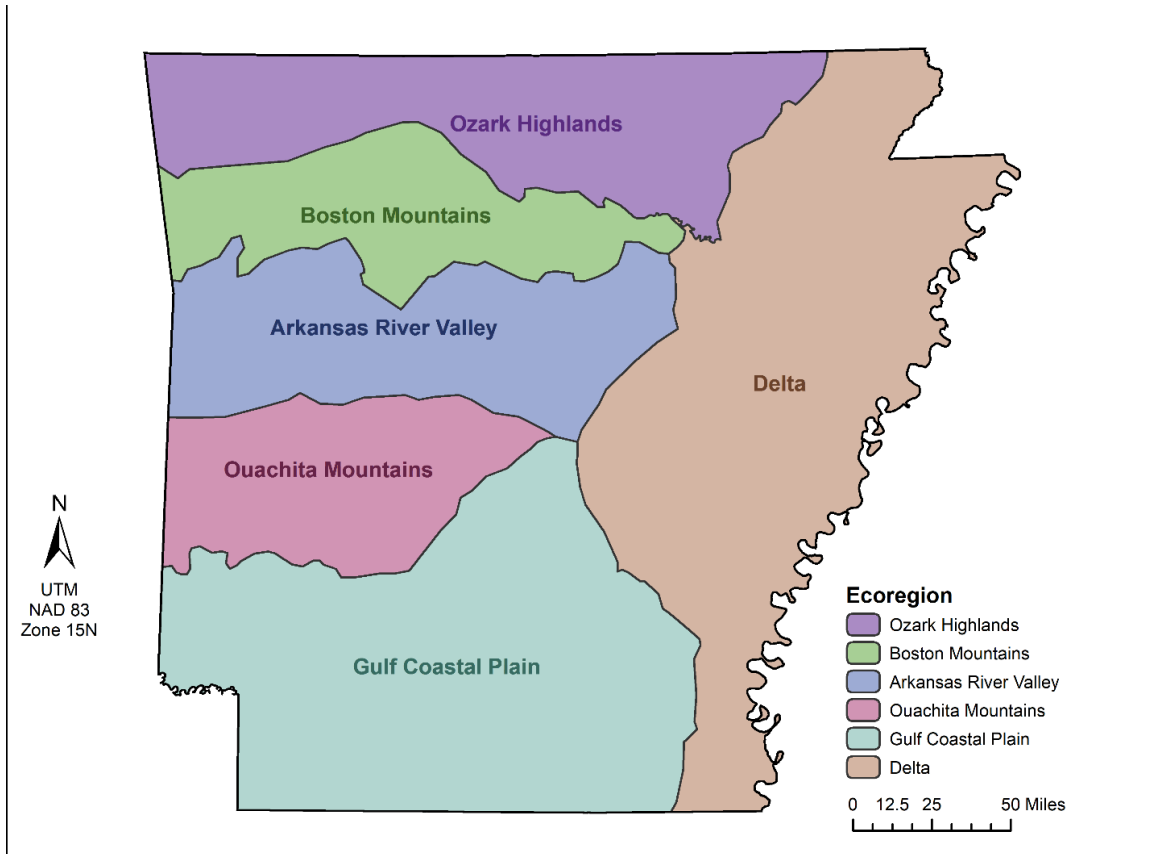


Figure 1.4. Arkansas’s ecoregions as defined in Rule 2 (APCEC 2022)

## Arkansas Designated Uses (APCEC 2022)

### State Designated Uses

1. **Extraordinary Resource Waters:** Some 16 percent of Arkansas’s total stream miles have been designated as Extraordinary Resource Waters. Extraordinary Resource Waters are characterized by scenic beauty, aesthetics, scientific values, broad scope recreation potential, and intangible social values. The Extraordinary Resource Waters designation gives DEQ the responsibility of providing extra protection for those waters. Streams designated as Extraordinary Resource Waters are shown in Figure 1.5.
2. **Ecologically Sensitive Waterbodies:** Ecologically Sensitive Waters include segments known to provide habitat within the existing range of threatened, endangered, or endemic species of aquatic or semi-aquatic life forms. Streams designated as Ecologically Sensitive Waters are shown in Figure 1.6.
3. **Natural and Scenic Waterways:** Arkansas has designated parts of five rivers as Natural and Scenic Rivers – Cossatot River, Little Missouri River, Saline River, and the Strawberry River in addition to the federally designated Natural and Scenic Rivers, which include Big Piney Creek, Buffalo River, Cossatot River, Hurricane Creek, Little Missouri River, Mulberry River, North Sylamore Creek, and Richland Creek. Streams designated as Natural and Scenic Waterways (NSWs) are shown in Figure 1.7.

### Federally Mandated Designated Uses

4. **Primary Contact Recreation:** Protects people from illness due to immersion in water. May include swimming, water skiing, skin diving, and surfing – all activities where ingestion is likely.
5. **Secondary Contact Recreation:** Protects people when engaging in activities where ingestion is unlikely, such as boating and wading.
6. **Aquatic Life:** Protects aquatic habitats for the propagation of fish, shellfish, and other aquatic life.
7. **Domestic Water Supply:** Protects waters that are the source of raw water supply to a drinking water system, not for direct consumption.
8. **Industrial Water Supply:** Protection for cooling and process water supplies, but not treatment for industrial wastes.
9. **Agricultural Water Supply:** Protects waters suitable for irrigation of crops, consumption by livestock, and other uses in support of farming and ranching operations.

Narrative and numeric water quality criteria are intended to protect waterbody designated uses. Table 1.2 lists examples of potential effects of common NPS on designated uses that water quality criteria address.

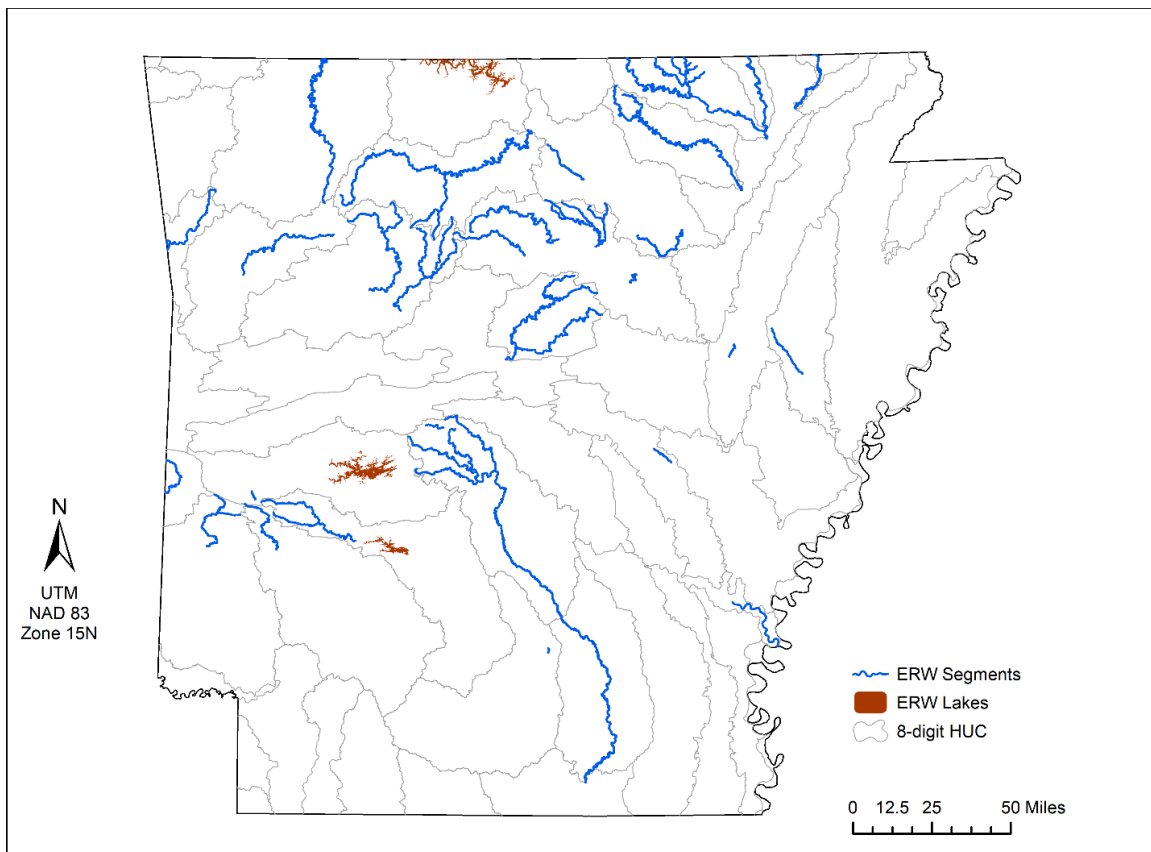


Figure 1.5. Streams and lakes designated as Extraordinary Resource Waters

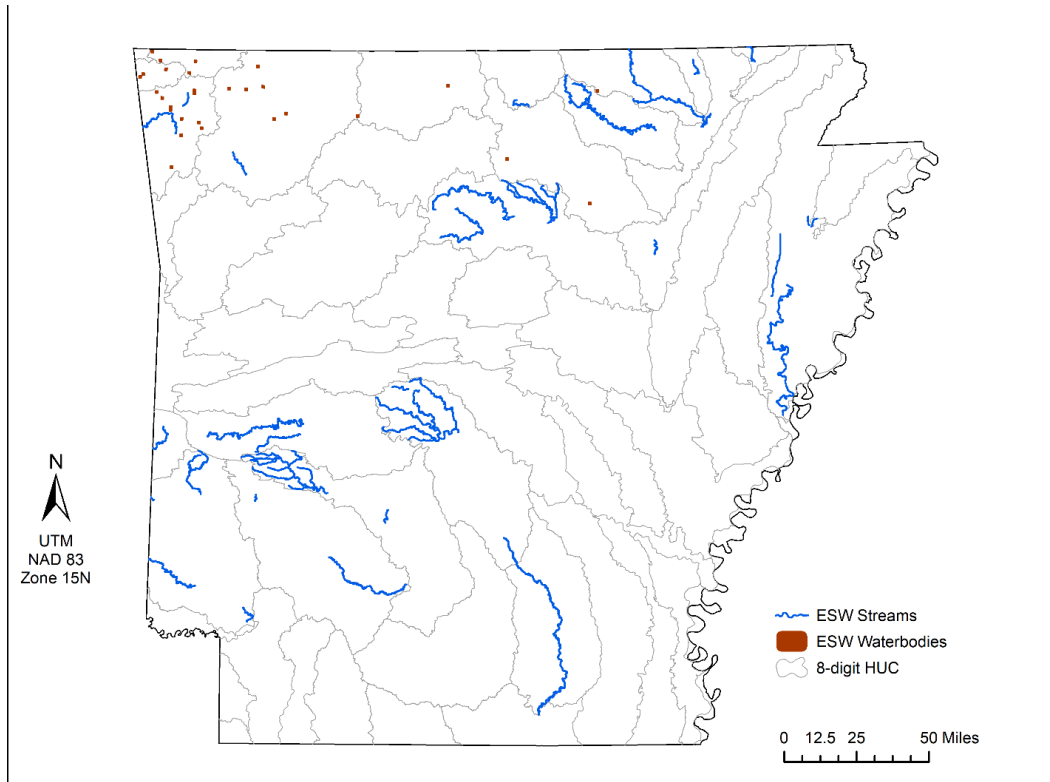


Figure 1.6. Streams and other waterbodies designated as Ecologically Sensitive Waterbodies

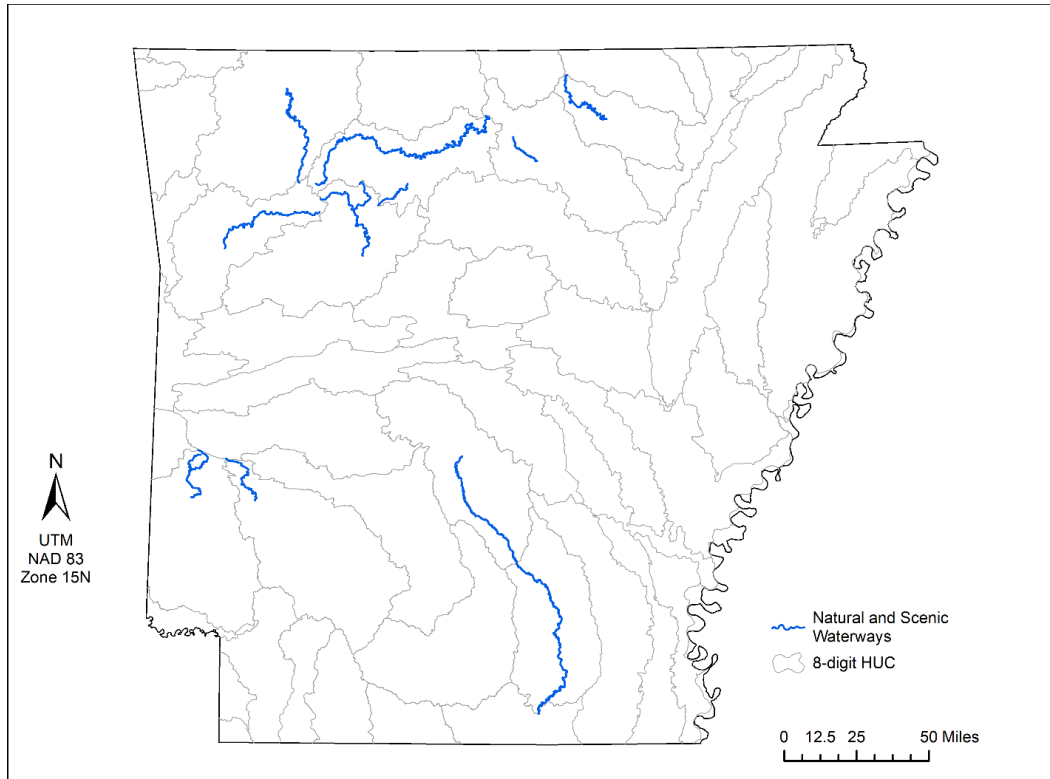


Figure 1.7. Streams and other waterbodies designated as NSWs

Table 1.2. Potential impacts of NPS on designated uses

<b>Pollutant</b>	<b>Primary &amp; Secondary Contact Recreation, Natural &amp; Scenic Waterway, Extraordinary Resource Waters</b>	<b>Aquatic Life, Ecologically Sensitive Waterbody</b>	<b>Domestic, Industrial, and Agricultural Water Supply</b>
Turbidity/sediment	<p>Turbid water is less aesthetically pleasing.</p> <p>Turbidity may adversely impact fishing and boating or swimming safety.</p>	<p>Sediment covers food sources and spawning sites, smothers bottom-dwelling organisms and periphyton.</p> <p>Turbidity makes finding food more difficult.</p>	<p>Additional treatment may be required to remove solids.</p> <p>Can negatively impact pumps and equipment.</p>
Nutrients	<p>Excessive aquatic plant growth or algal blooms can reduce aesthetics and ability to boat or swim.</p> <p>Ingestion of water with high nitrate levels can cause illness.</p>	<p>Decaying excessive plant growth and algae blooms reduce dissolved oxygen levels.</p> <p>Excessive plants and algae can reduce habitat quality for some species.</p>	<p>Blooms of certain algae impart unpleasant taste to drinking water or produce cyanotoxins.</p> <p>High levels of organic matter in raw water can result in formation of disinfection byproducts during drinking water treatment.</p> <p>Additional treatment may be required to remove solids (algae).</p> <p>High nitrate levels can be toxic to humans.</p>
Organic materials, e.g., leaves, plant residues, manure	<p>Materials in water may affect aesthetics.</p> <p>Large mats or piles of material can interfere with boating.</p> <p>Manure can introduce E. coli or other bacteria that may cause illness if ingested.</p>	<p>Decaying organic material can reduce dissolved oxygen levels.</p>	<p>May interfere with intakes.</p> <p>High levels of organic matter in raw water can result in formation of disinfection byproducts during drinking water treatment.</p>

<b>Pollutant</b>	<b>Primary &amp; Secondary Contact Recreation, Natural &amp; Scenic Waterway, Extraordinary Resource Waters</b>	<b>Aquatic Life, Ecologically Sensitive Waterbody</b>	<b>Domestic, Industrial, and Agricultural Water Supply</b>
Temperature	Usually minor.	Higher temperatures reduce the dissolved oxygen holding capacity of water.  Some aquatic species are sensitive to water temperatures.	High temperatures may make water less useful for cooling.
Oil and grease	Materials in water may affect aesthetics and make water less desirable for swimming or boating.	Decaying organic material can reduce dissolved oxygen levels.  May interfere with the behavior of organisms.  Can be toxic to organisms.	Can be toxic to humans and plants.  May interfere with intakes or industrial processes.
Other organics, e.g., gasoline, engine coolant	Materials in water may affect aesthetics.  Can be toxic to humans on contact.	Decaying organic material can reduce dissolved oxygen levels.  May interfere with the behavior of organisms.  Can be toxic to organisms.	Can be toxic to humans.  These chemicals may also be harmful to irrigated plants or industrial processes.
Trash	Trash in water affects aesthetics and makes water less desirable for swimming.	May interfere with the behavior of organisms.  May contain chemicals toxic to organisms.  May be deadly if swallowed.	Can interfere with intakes.
Pathogens	Can make people or pets sick if ingested.	Usually minor.	Must be removed from drinking water to prevent illness.

<b>Pollutant</b>	<b>Primary &amp; Secondary Contact Recreation, Natural &amp; Scenic Waterway, Extraordinary Resource Waters</b>	<b>Aquatic Life, Ecologically Sensitive Waterbody</b>	<b>Domestic, Industrial, and Agricultural Water Supply</b>
Minerals, i.e., chloride, sulfate, TDS	High levels may make people or pets sick if water is ingested.	High levels can affect the health of some organisms.	High levels may affect human and plant health, or industrial processes.  May affect taste of drinking water.
pH	High and low pH waters can cause dermatitis in swimmers.  Water pH levels can affect water color and cause formation of flocculent, affecting aesthetics.	Water pH levels can affect toxicity of some chemicals to organisms.  The health of some organisms is affected by pH levels.	Irrigation water pH can affect soil chemistry.  Water pH levels can affect industrial processes or treatment processes.

**Groundwater Quality Management in Arkansas**

Especially in karst areas of Arkansas, groundwater quality can affect surface water quality. Therefore, groundwater quality management is part of NPS pollution management. Arkansas’s groundwater quality programs are administered by DEQ’s Groundwater Protection Program. The only water quality standards that may apply to Arkansas groundwater are drinking water standards. There are many groundwater protection programs within the state that include both regulatory and voluntary groundwater contamination prevention activities that address both point sources and nonpoint sources. Point source groundwater contamination prevention programs are almost entirely regulatory programs administered by DEQ. These include the Petroleum Tank Program (formerly Regulated Storage Tanks), Underground Injection Control (UIC) Program, Solid Waste Management Program, and Hazardous Waste Management Program. The majority of nonpoint sources of groundwater contamination are related to agriculture and other land use activities, and their management commonly involves several agencies. Examples include the Wellhead Protection Program administered by the Arkansas Department of Health (ADH), and the Arkansas Water Well Construction Committee administered by Natural Resources Division.

Ambient groundwater monitoring in Arkansas is performed by four organizations – the U.S. Geological Survey (USGS), DEQ, ADH, and Natural Resources Division.

**EPA’s Key Components of NPS Plans**

The NPS Plan serves two primary purposes:

- Ensures compliance with Section 319 requirements of the federal CWA for providing a long-term direction for the state’s approach to addressing NPS.

- Provides a comprehensive resource for the state’s coordinated efforts, programs, and overall goals for addressing NPS.

EPA issued the Nonpoint Source Program and Grants Guidelines for States and Territories in 2013 to provide guidance for development of NPS plans. Appendix A of the guidance describes eight key components that should be addressed in NPS plans. Table 1.3 summarizes the key components and where these components are addressed in this NPS Plan.

*Table 1.3. EPA’s Key Components of NPS Plans*

<b>Element Description</b>	<b>EPA Element Number</b>	<b>Section Reference</b>
Short- and long-term goals, objectives, and strategies to restore and protect water	1, 6(iv)	2-6 Goals and Objectives subsections
Balanced approach between statewide and local programs	2, 6(iii), 6 (vi)	2.4
Statewide watershed approach; integration/alignment among water programs	3, 6(ii)	2.4.1, 2.5, 3-6
Impairment reduction and protection from new impairments	4	2-6 Goals and Objectives subsections, Strategies subsections
Identifies impaired and protected waters and has a process/criteria to prioritize addressing them	5	1.2, Appendix B
Identifies NPS practices/actions	6(i)	3-6 Strategies subsections, see NPS Priority Watershed Factsheets
Funding sources	6(v)	2-6 Funding subsections, see NPS Priority Watershed Factsheets
Effectiveness monitoring/evaluation	6(vii)	2 Reporting subsections, 3-6 Program Tracking and Evaluation subsections
Existing baseline requirements established by other applicable federal or state laws	6	2
Efficient and effective management, including financial	7	2.3, 2.5, 2.6
Provision for evaluation and update of program/plan	8	2.3



## References

- DEQ. 2022. *2018 303(d) List*. November 30.  
[https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018 303\(d\) list.pdf](https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018%20303(d)%20list.pdf).
- DEQ. 2023. Arkansas's 303(d) List, 305(b) Report, and Assessment Methodology by Year. Accessed October 2023. <https://www.adeq.state.ar.us/water/planning/integrated/303d/list.aspx>.
- Dewitz, J. and U.S. Geological Survey. 2021. National Land Cover Database (NLCD) 2019 Products (ver. 2.0, June 2021): U.S. Geological Survey data release <https://doi.org/10.5066/P9KZCM54>.
- Arkansas Pollution Control and Ecology Commission. 2022. Rule 2 - Rule Establishing Water Quality Standards for Surface Waters of the State of Arkansas. Rule, Little Rock: Arkansas Pollution Control and Ecology Commission.  
[https://www.adeq.state.ar.us/regs/files/rule02\\_final\\_220128.pdf](https://www.adeq.state.ar.us/regs/files/rule02_final_220128.pdf).
- EPA. 2013. "CWA 319 Grant: Current Guidance." *United States Environmental Protection Agency*. April 12. Accessed September 2022. <https://www.epa.gov/sites/default/files/2015-09/documents/319-guidelines-fy14.pdf>.
- Homer, C.G., Dewitz, J.A., Yang, L., Jin, S., Danielson, P., Xian, G., Coulston, J., Herold, N.D., Wickham, J.D., and Megown, K. 2015. Completion of the 2011 National Land Cover Database for the conterminous United States—Representing a decade of land cover change information: Photogrammetric Engineering and Remote Sensing. v. 81, no. 5. p. 345–354.  
<http://www.ingentaconnect.com/content/asprs/pers/2015/00000081/00000005/art00002>.
- US Census Bureau. 2022. "Explore Census Data." United States Census Bureau. Accessed July 2022. <https://data.census.gov/>.
- Woods, AJ, TL Foti, SS Chapman, JM Omernik, JA Wise, EO Murray, WL Prior, JB Jr. Paga, JA Comstock, and M Radford. 2004. *Ecoregions of Arkansas*. Color poster with map, descriptive text, summary tables, and photographs, Reston, VA: US Geological Survey.  
[https://gaftp.epa.gov/EPADDataCommons/ORD/Ecoregions/ar/ar\\_front.pdf](https://gaftp.epa.gov/EPADDataCommons/ORD/Ecoregions/ar/ar_front.pdf).

## Section Two: Program Description

### Introduction

The Arkansas Department of Agriculture's Natural Resources Division (Natural Resources Division) is the lead agency responsible for the Arkansas Nonpoint Source Pollution Management Program (Arkansas NPS Program). The Arkansas NPS Plan, which is updated every five years, documents the framework, goals, and objectives for the Arkansas NPS Program.

### Program Goals and Objectives

The ultimate long-term goals of the Arkansas NPS Program are to restore designated uses to waterbodies identified as impaired by the Arkansas Division of Environmental Quality (DEQ) and to prevent impairment of waterbodies that are threatened due to changing or intensifying land uses. To that end, the Arkansas NPS Program has established several short-term objectives that, if accomplished, should provide measurable progress toward achieving the long-term goals. The following short-term objectives apply to the overall Arkansas NPS Program for 2024-2029:

- As resources allow, continue to make available competitive grants on an annual basis for statewide programs and watershed-based projects that are consistent with the goals and objectives of the Arkansas NPS Program, giving emphasis to: priority watersheds, watersheds with U.S. Environmental Protection Agency (EPA)-accepted nine element watershed management plans, or projects that could have an immediate impact on improving or protecting existing water quality.
- Give preference to implementation projects that defensibly target sub-watersheds, thus improving the opportunity to achieve measurable improvements in the timeframe of the NPS Plan.
- Continue to focus on increasing implementation of best management practices (BMPs) and other related behavioral changes that have the cumulative effect of improving water quality.
- Continue to improve mechanisms for tracking, measuring, and reporting implementation of BMPs.
- Continue to strengthen education, outreach, and involvement activities to move individuals and businesses from awareness to advocacy.
- Update the qualitative risk assessment matrix within six months following EPA approval of an updated 303(d) list, or as appropriate.
- Continue to review EPA-approved 303(d) list and all NPS projects to determine the potential to develop EPA success stories.
- Continue to develop local capacity of local watershed groups to effect behavioral change, giving emphasis to priority watersheds.
- Continue to promote the development of nine element watershed management plans and update and refine existing plans as appropriate.
- Strengthen existing, and develop new, working partnerships among cooperating entities in order to better leverage limited resources available to improve water quality.

- Foster improved sharing of data, Geographic Information System (GIS) layers, assessments, research, and other analytic tools that will enable improved targeting of NPS resources by all cooperating entities.
- Promote and support strengthened cooperation at the state and local levels to more effectively and efficiently target and coordinate resources to improve and protect existing water quality.
- Work within the framework of the Arkansas Water Plan and the Arkansas Nutrient Reduction Strategy to enhance the Arkansas NPS Program and seek to obtain increased non-federal funding.
- Continue to support and partner with the Arkansas Stream Heritage Partnership for the inventory and prioritization of stream barriers that are negatively affecting water quality and designated uses.
- Increase elements of sustainability and climate resiliency in Arkansas NPS Program.
- Increase awareness of, and access to, Arkansas NPS Program in underserved and disadvantaged communities.
- Increase promotion of protective measures and opportunities through the Arkansas NPS Program to ensure high quality waters remain intact.
- Fund at least three NPS projects aimed at improving project effectiveness.
- Continue to meet all statutory requirements associated with implementing the state’s NPS Program as established by EPA.

Additional long-term goals and short-term objectives are developed specifically for components of the Arkansas NPS Program. They are listed in the Goals and Objectives subsections of this NPS Plan.

Between 2018 and 2023, the Arkansas NPS Program awarded \$18,893,952 in 319 program grants, five new watershed management plans were accepted by EPA, and three updated watershed management plans were initiated. In addition, the Arkansas Watershed Steward Handbook was updated, and two NPS success stories were identified, submitted, and accepted by EPA.

## Program Strategies

The Arkansas NPS Program utilizes five strategies to achieve the program’s long-term goals and short-term objectives. These strategies are described below.

### 1. Pollution Prevention and Source Reduction:

NPS is the dominant contributor to the impairment of waterbodies. Reducing NPS is complex and involves many stakeholders representing important sectors of the state economy taking voluntary, coordinated action to implement BMPs over a sustained period of time. Moreover, the amount and distribution of NPS are highly variable in both time and space as shifts in land use patterns and population result in changing NPS stressors upon limited natural resources and land.

As a result, the Arkansas NPS Program will focus primarily on pollution prevention or source reduction. Regardless of the pollutant (e.g., sediment, nutrients, pathogens) or NPS (e.g., agriculture, forestry, surface erosion, urban runoff), the Arkansas NPS Program will focus on cost-effective and environmentally protective BMPs that efficiently address the targeted pollutant.

## **2. Watershed-Based Implementation:**

Limited funds make it impossible to effectively manage NPS from all sources in all watersheds of the state. Natural Resources Division identifies NPS priority 8-digit hydrologic unit code (HUC) watersheds. A watershed's HUC designation is a unique identification code describing where that watershed is in relation to other watersheds. The longer the HUC number, the more specific the location that is being identified (e.g., a 12-digit HUC is a more specific location than an 8-digit HUC). Watershed-based projects in priority watersheds are guided by EPA-accepted nine element watershed management plans.

## **3. A Voluntary Plan:**

The Arkansas NPS Program promotes voluntary action to improve water quality. Unlike point source pollution, which may be relatively easily identified and regulated, the characteristics of NPS require a different approach. Natural Resources Division addresses NPS primarily through citizen education and outreach coupled with financial assistance for voluntary adoption of practical and cost-effective BMPs. BMPs are generally designed to allow for the continuation of everyday activities while reducing or preventing NPS.

## **4. Building Local Capacity to Address Local Concerns:**

Since the inception of the Arkansas NPS Program, local watershed groups, organizations, conservation districts, and other stakeholders have been the greatest asset to watershed management. These entities' motivation, concern, and willingness to be watershed stewards generate action. They are typically the most motivated to develop and implement watershed management plans, resolve issues, and collaborate to improve watershed conditions and water quality.

The Arkansas NPS Program recognizes the important role of stakeholders in NPS management. Through the Arkansas NPS Program, Natural Resources Division works cooperatively with state and federal agencies, academic institutions, conservation districts, groups, and non-governmental organizations to promote watershed stewardship, specifically in relationship to water quality.

Since NPS pollution primarily stems from anthropogenic sources, the Arkansas NPS Program advocates building local capacity to effect changes by providing many and varied opportunities for volunteer involvement at the local level. When NPS problems do occur, it is generally because of a lack of knowledge or a perception problem. Although it is difficult at times to quantify this strategy's impact on water quality, especially in the short-term (i.e., one to five years), citizen education, outreach, and involvement are, and will continue to be, important tools for NPS management in Arkansas.

## **5. Adaptive Management**

Experience has shown that management plans need to be updated on a regular basis in order to integrate new, unique, or emerging needs and programs. The 2024-2029 NPS Plan will continue to

use an adaptive management approach. One element of this strategy will be to fund NPS projects that improve project effectiveness and protection of high-quality waters. As part of this approach, the NPS Plan stakeholder group will meet when necessary to review the plan for needed updates of the information therein and to suggest changes to the Arkansas NPS Program. The NPS Plan stakeholder group was formed to develop the 2006-2011 NPS Pollution Management Plan. Stakeholders include individuals and organizations that have any interest in identifying and solving NPS water quality problems and in monitoring the effectiveness of these solutions over time. In the past, representatives from over 100 federal and state agencies, local watershed groups, consulting firms, and local governments participated in the NPS Plan stakeholder group. A list of participating entities involved in preparing the 2024-2029 NPS Plan can be found in Appendix A.

### Program Structure

The Arkansas NPS Program balances statewide programs focused on general categories of NPS with watershed-based projects that seek to restore designated uses or prevent waters from becoming impaired through protective measures. Thus, the Arkansas NPS Program includes two major components: statewide efforts to address categories of NPS that are a concern statewide, and watershed-based projects.

### Statewide NPS Concerns

The Arkansas NPS Program includes state programs and other statewide efforts that address four general categories of NPS: agriculture, forestry, surface erosion, and urban runoff. Statewide efforts focus on NPS prevention and, to a lesser extent, abatement activities for a particular NPS source. Typical activities of the statewide efforts include identification and/or development of appropriate BMPs, BMP monitoring, water quality monitoring, demonstration projects, training, outreach, goals, and objectives. Table 2.1 lists the four statewide NPS categories and identifies the section in this NPS Plan where a description of statewide efforts to address them can be found, including goals and objectives.

*Table 2.1. NPS categories addressed through statewide efforts*

<b>Statewide NPS Category</b>	<b>Plan Section</b>	<b>Lead Agency</b>
Agriculture	3	Natural Resources Division
Forestry	4	Forestry Division and Natural Resources Division
Surface Erosion	5	Natural Resources Division and DEQ
Urban Runoff	6	Natural Resources Division and DEQ

Many cooperating entities participate in the statewide NPS efforts. To effectively coordinate and manage these efforts, lead agencies have been designated for each of the statewide NPS categories (Table 2.1). Additional cooperating entities are discussed in the plan sections for each of these NPS categories.

Arkansas NPS Program short-term objectives for statewide efforts to address NPS categories for 2024-2029 are:

- Utilizing GIS techniques, evaluate riparian corridor vegetation condition along streams impaired by turbidity to aid in the prioritization of conservation practice implementation.
- Net gain of protected or forested riparian buffer.

- Support, develop, or expand programs and practices that increase co-benefits that include water quality, wildlife habitat creation, and climate resiliency.
- Support Arkansas Nutrient Reduction Strategy marketing, messaging, and implementation.

### Watershed-Based Projects

Arkansas has emphasized watershed-based management in its Arkansas NPS Program since 1998. The water quality improvement and protection goals of the Arkansas NPS Program are achieved through watershed-based projects led and implemented by cooperating entities. Watershed-based projects create a sense of ownership within the project area and promote enthusiasm for new initiatives. Watershed-based projects can include preparation of nine element plans, education and outreach projects, water quality monitoring projects, water quality modeling and assessments to identify target sub-watersheds, projects to implement BMPs for improving water quality, projects to restore streams or wetlands, and protection of high-quality waters. Watershed-based projects may address the 8-digit HUC watershed scale or smaller sub-watershed scales, e.g., 12-digit HUC watershed.

To help focus Arkansas NPS Program efforts and resources, priority NPS watersheds (8-digit HUCs) are identified. In addition, the Natural Resources Division encourages other state and federal agencies and local watershed groups to collaboratively target efforts in these priority watersheds.

Priority NPS watersheds are identified using the qualitative risk assessment matrix. The risk assessment matrix assigns scores to each of the 58 8-digit HUC watersheds in Arkansas in 12 categories. While this analysis includes all watersheds in the state, watersheds with waterbodies on the state’s 303(d) list and with NPS Total Maximum Daily Loads (TMDLs) are given greater weight. Based on the overall scores calculated from the category scores, watersheds are grouped into quintiles.

In 2022, Natural Resources Division designated a new list of priority NPS watersheds for 2024-2029. Appendix B describes the selection process and qualitative risk assessment matrix used to identify these watersheds. The 12 priority NPS watersheds for 2024-2029 are listed below. Figure 2.1 shows the location of the priority watersheds.

- Bayou Bartholomew
- Beaver Reservoir
- Cadron Creek
- Illinois River
- Lake Conway – Point Remove
- Little Red River
- Lower Little River Arkansas, Oklahoma
- Lower Saline River
- Lower White River – Bayou Des Arc
- Middle White River
- Ouachita River Headwaters
- Poteau River

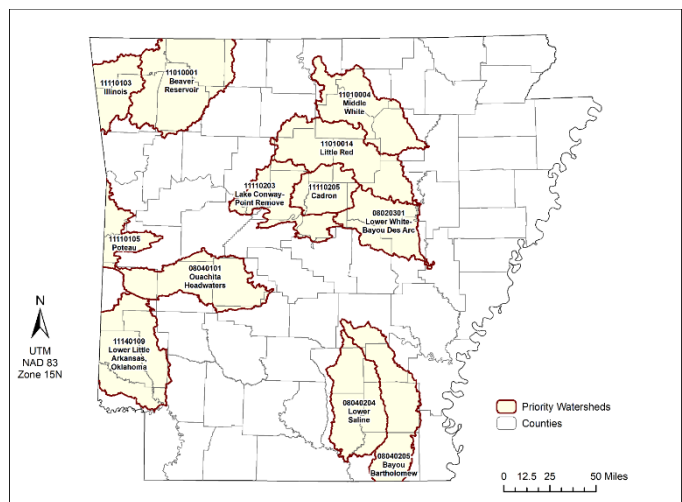


Figure 2.1. 2024-2029 NPS Plan Priority Watersheds

The elements of an effective watershed-based project are:

- **Building a Project Team and Public Support.** Developing effective institutional arrangements and ownership of the project by stakeholders.
- **Defining the Problem.** Developing an inventory of the watershed and its problems and conducting baseline monitoring.
- **Setting Goals and Identifying Solutions.** Developing project goals, a list of management measures, and a detailed plan for implementation.
- **Implementing Controls.** Obtaining funding, securing commitments, and installing controls.
- **Measuring Success and Making Adjustments.** Documenting success in meeting goals, monitoring, modifying management measures as needed, and ensuring project continuity.

The Arkansas NPS Program recognizes that water quality improvements most often occur where there are active and effective local watershed groups involved. Table 2.2 shows the status of local institutional capacity and planning in each of the identified NPS priority watersheds.

*Table 2.2. Status of Priority Watersheds (2022)*

<b>Priority Watershed</b>	<b>Active Local Watershed Groups</b>	<b>Nine Element Plan</b>
Bayou Bartholomew	None	Yes
Beaver Reservoir	Beaver Watershed Alliance Kings River Watershed Partnership H2Ozarks	Yes (updates in progress)
Cadron Creek	None	No
Illinois River	Illinois River Watershed Partnership	Yes (updates in progress)
Lake Conway – Point Remove	Lake Conway – Point Remove Watershed Alliance	In Progress
Little Red River	Little Red River Foundation Friends of the Little Red River Save Greers Ferry Lake	Yes
Lower Little River	None	Yes
Lower Saline River	Saline River Watershed Alliance	No
Lower White River – Bayou Des Arc	None	No
Middle White River	Friends of the North Fork and White Rivers	Yes
Ouachita River Headwaters	None	No
Poteau River	None	Yes

Arkansas NPS Program short-term objectives for watershed-based projects are:

- Ensure watershed-based projects include sustainability and climate resiliency practices.
- Increase efforts to incorporate watershed-based projects in underserved and disadvantaged communities.
- Revise proposal review process to streamline.

- Market Natural Resources Division programs that support NPS watershed-based projects.
- Prioritize watershed management plan updates and new plan development for 2024-2029.
- Support projects that increase co-benefits that include water quality, wildlife habitat creation, and climate resiliency.
- Balance implementation of restorative and protective conservation practices at the sub-basin scale based on local resource concerns.
- Conduct strategic baseline monitoring in three to four selected high priority 12-digit HUC watersheds determined by watershed modelling in 2024-2029 to assist in the development of watershed-based plans.

## Statewide Program Administration and Funding

### Administration

The Natural Resources Division has implemented the following procedures to efficiently and effectively manage the state's Arkansas NPS Program.

- Progress toward achieving Arkansas NPS Program objectives and milestones is reported in annual reports to provide assurance that funds are used effectively, are targeted toward state priorities, and truly address NPS issues affecting the waters of Arkansas.
- The Arkansas NPS Program is implemented through working partnerships with state and federal agencies, academic institutions, municipalities, counties, conservation districts, regional planning commissions, nonprofit organizations, and others (see Section 2.5.4 for examples). NPS Program vehicles for cooperation at the program level include the NPS Plan stakeholder group and the annual NPS meeting. Many agencies represented in the stakeholder group also participate on various other state and federal committees and task forces, such as the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service State Technical Committee. This cross representation promotes greater coordination and leveraging of limited funds to more adequately meet the needs of the Arkansas NPS Program.
- Natural Resources Division follows the generally accepted accounting principles issued by the Governmental Accounting Standards Board and undergoes an annual audit consistent with government audit standards specified in Office of Management and Budget and Government Accountability Office guidance. Entities that expend Section 319(h) funds are subject to audit requirements that assure compliance with state and federal laws and regulations. This financial oversight provides both EPA and the public with confidence in the integrity of Natural Resources Division's financial management.
- The Arkansas NPS Program is periodically reviewed and updated in order to integrate new, unique, or emerging needs and programs. The NPS Plan stakeholder group was developed to provide input on the development and update of the Arkansas NPS Plan. The continuing goal is an incrementally updated plan, adapting to the changing opportunities, knowledge, and needs of the state. This adaptive management process acts as a scoping mechanism that keeps the plan relevant and open to the state's changing NPS issues. It also helps avoid the need for major updates that are time-consuming and disruptive to ongoing efforts.



- Management programs on federal lands are reviewed for consistency with Arkansas NPS Program goals and objectives. A list of federal lands in the state is included in Appendix C along with the responsible agency. The Natural Resources Division will provide copies of this 2024-2029 NPS Plan to the director of each federal agency on this list. The U.S. Forest Service manages more land in Arkansas than any other federal agency.

## Funding

Natural Resources Division receives annual funding through an assistance agreement from the EPA for the purpose of enacting and maintaining the Arkansas NPS Program. The annual allocation from EPA is generally between \$3 to \$4 million and is contingent upon Natural Resources Division providing or securing a 40 percent match.

EPA requires states to utilize their funding allocations split equally between the two core focus areas of watershed-based projects, and other activities. Activity funds can be used to support any activity identified in the state's Arkansas NPS Program.

The Arkansas NPS Program and associated staff are funded through the assistance agreement with the exception of one staff position. To secure the non-federal match requirement, a minimum surcharge of three percent is added to the match requirement for sub-awarded funds. Additional non-federal matching funds may be secured through state funds or state-funded programs or activities directly associated with NPS abatement, reduction, or control. Examples of state-funded programs that can be used for the Arkansas NPS Program non-federal match include:

- **Water Quality Technician (WQT) Program:** WQTs are funded for multiple county conservation districts using state dollars for the purpose of developing nutrient management plans or conservation plans.
- **Agriculture Water Quality Loan Program:** Individuals may borrow up to \$250,000 for agriculture equipment or services for the implicit and expressed purpose to abate, reduce, or control NPS. Payments made by the borrower may be counted towards Arkansas NPS Program non-federal match requirements.
- **Non-Federally Funded NPS Projects:** Projects that address NPS and are totally funded with non-federal dollars by other state agencies, groups, or organizations may be counted towards NPS Program non-federal match requirements. Fiscal expenditure tracking and verification is documented and submitted to Natural Resources Division and dedicated solely to the Arkansas NPS Program. One example includes projects supported through the Arkansas Unpaved Roads Program or use of state funds through this program to leverage federal dollars.

In an effort to secure and maintain staff and the consistency of the Arkansas NPS Program, once every four to five years, the total annual funding allocation from EPA is dedicated to the administrative function of the program.

## Reporting

Natural Resources Division prepares an annual report that documents the state's implementation of the Arkansas NPS Program. Annual reports are available to the public on the Natural Resources Division website. The CWA details the requirements for the annual report. Specifically:

*Section 319(h)(11) Reporting and Other Requirements. Each State shall report to the Administrator on an annual basis concerning:*

- a. Its progress in meeting the schedule of milestones submitted pursuant to subsection (b)(2)(C) of this section; and*
- b. To the extent that appropriate information is available, reductions in nonpoint source pollutant loading and improvements in water quality for those navigable waters or watersheds within the State which were identified pursuant to subsection (a)(1)(A) of this section resulting from the implementation of the management program.*

To align with the new EPA guidance published on May 4, 2024, the following additional reporting requirements have been incorporated:

- **Annual Progress Reports:** Include detailed summaries of progress, tables displaying milestones and completion dates, and discussions on delays and corrective actions.
- **Federal Financial Reports:** Submit annual financial reports using Standard Form 425 or 425(a), with final reports due 120 days post-grant period.
- **Use of GRTS:** Report all mandated elements, including water quality data, via GRTS.
- **Climate Change and Resilience:** Ensure projects consider climate resilience and report on nature-based solutions' co-benefits.
- **Equity and Environmental Justice:** Include descriptions of activities and strategies to ensure equitable access to NPSMP benefits.
- **State Revolving Fund (SRF) Reporting:** Provide a synopsis of SRF usage and include financial metrics and outcomes for SRF-supported projects.

In Arkansas, responsibility for (a) and (b) above are divided between two state agencies.

- a. Natural Resources Division administers the Arkansas NPS Program and reports on progress toward meeting the program goals (i.e., “schedule of milestones” in CWA Section 319(h)(11)a); and
- b. DEQ is responsible for monitoring and assessing the waters of the state “to the extent that appropriate information is available.” Approximately every two years, DEQ issues the Integrated Report, which includes both the 305(b) report and the 303(d) list. Natural Resources Division uses information from the 303(d) list and 305(b) report to identify and report on Arkansas NPS Program success stories as well as establishing priority watersheds.

### **Cooperating Entities**

More than 100 cooperating entities have some responsibility for addressing NPS pollution in Arkansas. Participation of DEQ in the Arkansas NPS Program is explained in Section 2.5.3. Examples of other cooperating entities and how they contribute to the statewide NPS Program are provided below.

- U.S. Geological Survey (USGS) conducts water quality monitoring and studies that can inform NPS Program prioritization.
- Arkansas Department of Health’s Wellhead Protection Program and Source Water Protection Program inform public health priorities for the Arkansas NPS Program.

- University of Arkansas System Division of Agriculture Cooperative Extension Service implements the Arkansas Watershed Stewards Program to educate individuals about water quality protection relative to a wide variety of human activities.
- The Nature Conservancy provides education, outreach, and technical assistance related to a variety of nonpoint pollution sources present in Arkansas, and BMPs to address them.

## Watershed-based Projects Administration and Funding

### Administration

Projects are selected for funding through a competitive process. Natural Resources Division issues a request for pre-proposal (RFP) for NPS-related projects each year (except the administrative year) in July. The RFP provides a format for pre-proposal submission and a due date. Natural Resources Division may, at its discretion, solicit additional project proposals throughout the year or accept unsolicited proposals for consideration if it is in the best interests of the Arkansas NPS Program.

Entities eligible to receive Section 319(h) grants are invited to submit proposals to Natural Resources Division. Eligible entities include state and local government agencies, nonprofit organizations (see definition in 2 CFR 200.1 at [ecfr.gov/current/title-2/subtitle-A/chapter-II/part-200/subpart-A/subject-group-ECFR2a6a0087862fd2c/section-200.1](https://www.ecfr.gov/current/title-2/subtitle-A/chapter-II/part-200/subpart-A/subject-group-ECFR2a6a0087862fd2c/section-200.1)), and universities. Program staff maintain an active list of interested stakeholders (both entities and individuals are included). Any eligible entity may request to be added to the email distribution list to receive the RFP. Program staff work with potential grantees on a continuous basis to encourage a pool of proposals that address the most critical needs of the Arkansas NPS Program, as identified by Natural Resources Division. Natural Resources Division may, at its discretion, waive eligibility requirements on a case-by-case basis when it is in the best interests of the Arkansas NPS Program.

Project proposals pass through a structured multi-stage review process including approval by EPA. Projects are selected for funding as appropriate and as funds allow.

1. Program staff review submitted proposals for eligibility and completeness. Incomplete proposals may be returned for additional information or rejected outright. Rejected proposals may or may not receive further consideration based on the merits of the proposal and the needs of the Arkansas NPS Program.
2. Program staff reviews the proposals and other inputs to make funding recommendations to Natural Resources Division management.
3. Natural Resources Division management staff review recommendations and assist in making the final determination for project funding.

Entities with projects selected for funding are notified and asked to develop a work plan, if applicable. Natural Resources Division may, at its discretion, ask for project modifications to strengthen project outcomes. Natural Resources Division provides technical assistance to entities that submit project proposals to develop a detailed work plan that meets the needs of the proposing entity, the Arkansas NPS Program, and the requirements set by the CWA. This process helps shape projects, so they are more likely to achieve the intended results efficiently and effectively.

Once funded, watershed-based projects are administered primarily by project leaders (also referred to as project investigators or PIs) from the entity sponsoring the project. Project leaders report regularly to a designated program staff member who acts as project manager.

### Funding

The annual EPA allocation and subsequent assistance agreement awarded to Natural Resources Division is divided equally between two funding “pools” for watershed-based projects. The two pools of funding are:

- **Watershed Project Funds.** Projects located within NPS priority watersheds that have an EPA-accepted nine element watershed management plan are eligible for Section 319(h) funding from the EPA Watershed Project Funds. In the event that these funds are exhausted, projects meeting the criteria for Watershed Project Funds may be funded by NPS Program funds.
- **NPS Program Funds.** These funds can be used to address a proactive approach to protect water quality, non-priority watershed projects, or projects in watersheds without an EPA-accepted nine element watershed management plan.

In addition, there are state funding programs that can be used to match watershed-based projects. Examples include:

- **Wetland and Riparian Zone Tax Credit Program:** This Natural Resources Division program provides state tax credits to encourage private landowners to restore, enhance, and establish wetlands and riparian zones.
- **Unpaved Roads Program:** This Natural Resources Division program funds safe, efficient, and environmentally sound projects for the maintenance of dirt and gravel roads that have been identified as sources of sediment or dust.
- **Agriculture Water Quality Loan Program:** This Natural Resources Division program provides low-interest loans for purchase of agriculture equipment or services for NPS control.

Watershed-based projects may include a cost-sharing component for implementation and maintenance of specific BMPs. BMPs eligible for cost-sharing are selected and approved by the NPS Program staff on a project-by-project basis. Where practical, USDA initiatives and programs such as the Environmental Quality Incentives Program, Conservation Reserve Program, Conservation Reserve Enhancement Program, Wildlife Habitat Incentives Program, Wetlands Reserve Program, Mississippi River Basin Initiative, National Water Quality Initiative, and other state and local cost-share programs are coordinated with Natural Resources Division’s Title X Rules Governing Agriculture Cost-Share and can be a component of a watershed-based project. However, many of the Natural Resources Division programs operate on a county level rather than watershed level. Only initiatives within the Arkansas NPS Program project area may be used to augment the project.

### Reporting

Project leaders are required to submit semi-annual reports describing the project’s progress, task activities, task completion, expenditures, and matching funds generated. Annual reports are also required providing implementation data to estimate pollutant load reductions as well as a discussion of successes, failures, and mid-course adjustments to the scope of work. All projects are required to submit a final report upon project completion.

To provide input into the adaptive management process, sponsors of active projects participate in the annual NPS stakeholder meeting as appropriate or requested. Project leaders present information and respond to questions about their project from NPS Program staff.

On the project level, Natural Resources Division estimates load reductions utilizing such tools as the Region 5, Spreadsheet Tool for Estimating Pollutant Loads, Pollutant Load Estimation Tool, and Revised Universal Soil Loss Equation models. Load reductions are entered into the Grants Reporting and Tracking System.

### Cooperating Entities

As noted above, a number of entities, including federal and state agencies, universities, and local watershed groups participate in Arkansas watershed-based NPS projects. Additional examples are listed below.

- U.S. Fish and Wildlife Service's Partners for Fish and Wildlife Program and other habitat programs can be elements of watershed-based projects. In addition, Safe Harbor Agreements can facilitate BMP implementation in projects where federally listed threatened and endangered species are present.
- Arkansas Game and Fish Commission's Stream Habitat Program and newly-created Private Lands Division can provide technical assistance with BMPs in watershed-based projects. Some materials can also be provided through the Stream Habitat Program.
- Universities conduct water quality monitoring and studies that can inform priorities and BMPs in watershed-based projects.

### References

Beaver Watershed Alliance. <https://www.beaverwatershedalliance.org/>.

EPA. 2023. "Nonpoint Source Success Stories: Arkansas." United States Environmental Protection Agency. July 17. Accessed September 2023. <https://www.epa.gov/nps/nonpoint-source-success-stories-arkansas>.

Friends of the Little Red River. <https://www.facebook.com/groups/891841060934400/>.

Friends of the North Fork and White Rivers. <https://friendsoftherivers.org/>.

H2Ozarks. <https://h2ozarks.org/>.

Illinois River Watershed Partnership. <https://www.irwp.org/>.

Kings River Watershed Partnership. <http://www.kingsriverwatershed.org/>.

Lake Conway – Point Remove Watershed Alliance. <https://www.facebook.com/LCPRwatershed/>.

Little Red River Foundation. <https://lrrf.org/>.

John Pennington, Tate Wentz, Jim Wise, Mike Daniels, Kristin Higgins, and Karl Vandevender. 2021. Arkansas Watershed Steward Handbook. Little Rock: University of Arkansas Cooperative Extension Service. Accessed 2023. <https://www.uaex.uada.edu/publications/PDF/AG1290.pdf>.

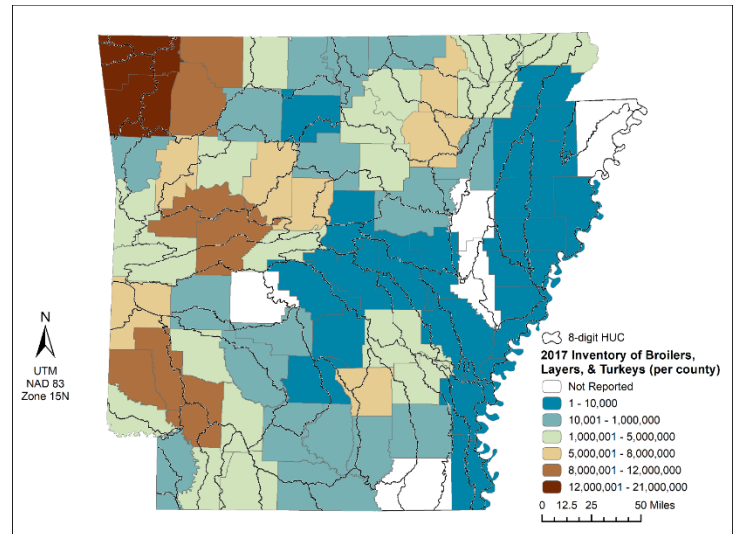
Saline River Watershed Alliance. <https://www.facebook.com/SRWA2020/>.

Save Greers Ferry Lake. <https://www.savegreersferrylake.org/>.

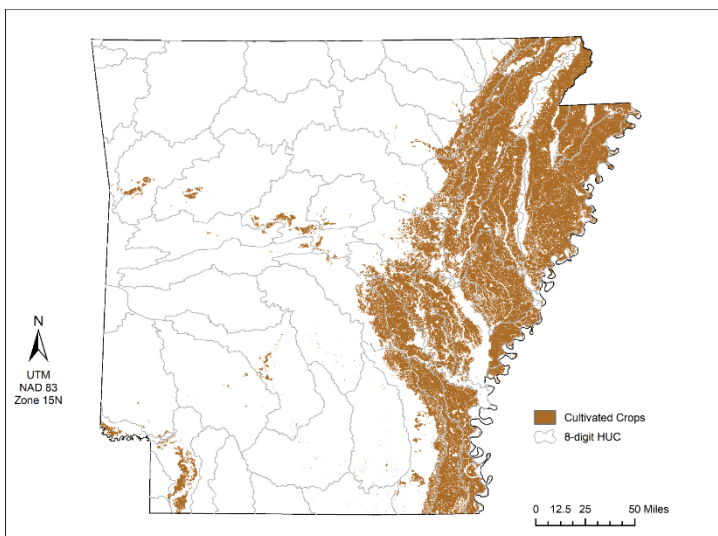
## Section Three: Statewide Agriculture NPS Management

### Introduction

Statewide efforts to manage agricultural nonpoint sources (NPS) focuses on lands used for animal production and croplands, including hay lands, but excluding tree farms and plantations, which are addressed through statewide forestry NPS management. Agriculture, including crop and animal production and processing, and industries supporting those sectors, is the largest economic sector in Arkansas. Arkansas farmers provide jobs and produce food and fiber for domestic and international markets. Collectively, crop and animal production totaled \$8.2 billion in total agricultural cash receipts in 2020, ranking 15<sup>th</sup> nationally (English & Popp 2022). Over 40 percent of the land in Arkansas is used for agriculture (cropland, pasture, and hay land) (USDA National Agricultural Statistics Service 2022). Figures 3.1 through 3.3 illustrate the estimated distribution and concentration of poultry production, row crop agriculture, and cattle production across the state. In addition to crop and animal production, agricultural lands can provide environmental benefits to wildlife and all citizens of the state.



*Figure 3.1. Estimated distribution and concentration of poultry production in Arkansas by county, 2017 (USDA National Agricultural Statistics Service 2019)*



*Figure 3.2. Distribution of cultivated cropland, 2019 (Dewitz and U.S. Geological Survey 2021)*

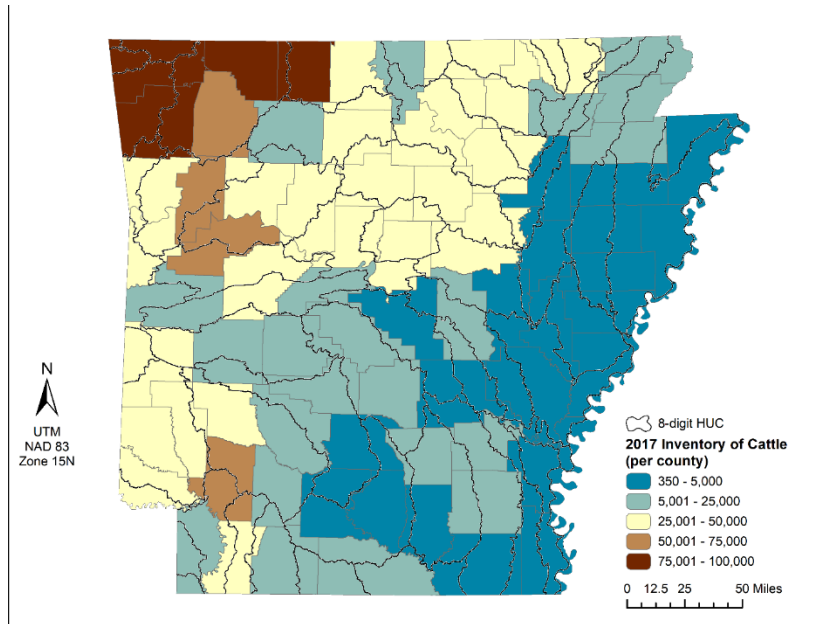


Figure 3.3. Estimated distribution and concentration of cattle production in Arkansas by county, 2017 (USDA National Agricultural Statistics Service 2019)

Figure 3.4 summarizes changes in the aggregate acreage for row crops and pasture in Arkansas from 2017 through 2022. The aggregate acreage for both cropland and pasture remained fairly consistent during that time. Cropland had a peak of 6.53 million acres in 2018 and a minimum of 5.42 million acres in 2019. Pasture area had a peak of 5.22 acres in 2022 and a minimum of 4.58 acres in 2018.

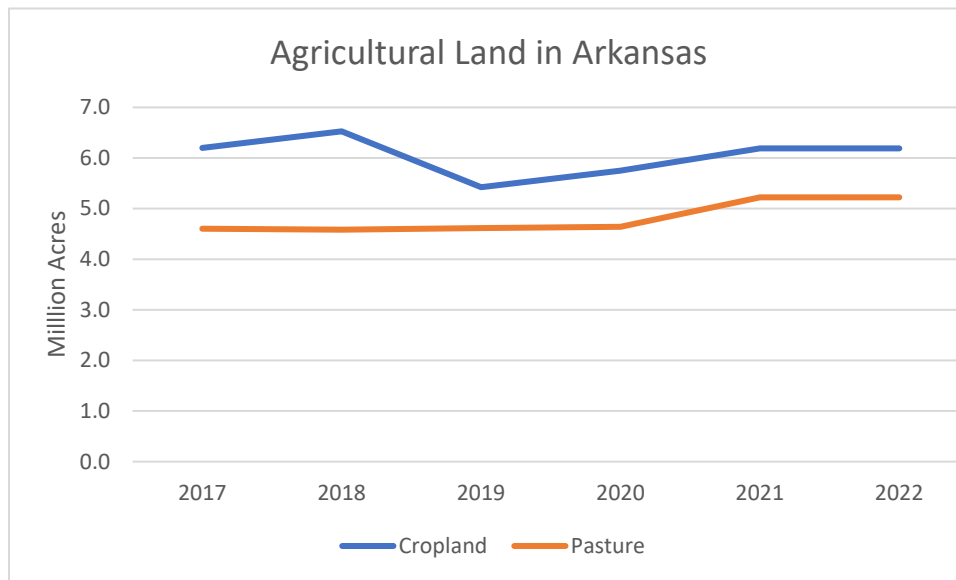


Figure 3.4. Agricultural land in Arkansas 2017-2022 (USDA National Agricultural Statistics Service 2022)

A summary of changes in animal agriculture in Arkansas between 2017 and 2022 is shown in Figure 3.5. Animal production remained fairly constant during that time period. Broiler production averaged 1.068 billion birds with a maximum of 1.109 billion in 2019 and a minimum of 1.050 billion in 2020. Chicken production (excluding broilers) averaged 25.68 million birds with a maximum of 27.16 million in 2021 and a minimum of 23.56 million in 2017. Cattle production ranged from 1.7 million head in 2022 to 1.78 million in 2019 and 2021. Hog production ranged from 116,000 head in 2021 to 147,000 head in 2022 (USDA National Agricultural Statistics Service 2022).

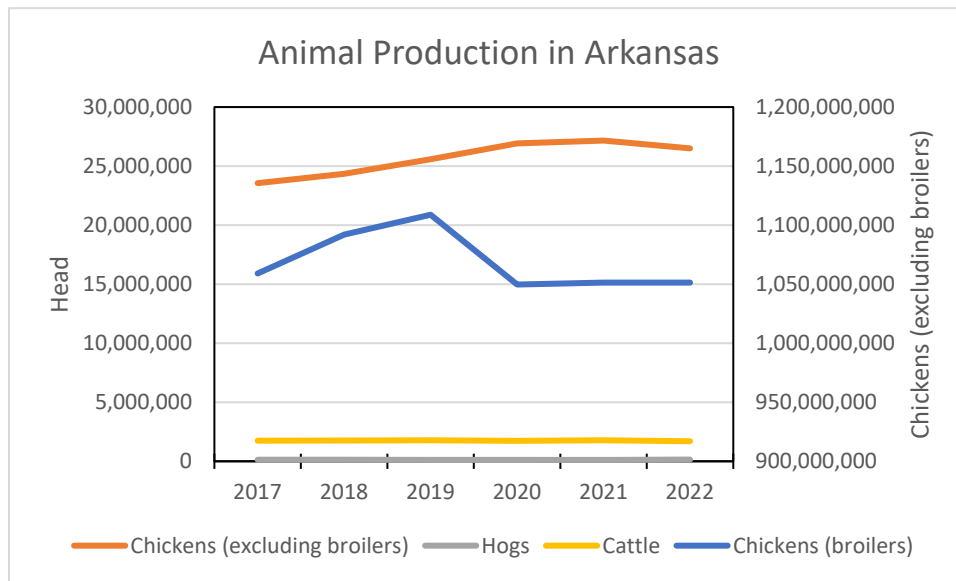


Figure 3.5. Agriculture animal production in Arkansas 2017-2022 (USDA National Agricultural Statistics Service 2022)

### Arkansas Agriculture NPS

Agricultural activities can result in polluted runoff entering waterbodies. Common NPS pollutants associated with agriculture that impact water quality in Arkansas include sediment, nutrients, oxygen-demanding organic matter, and pathogens. For these pollutants, losses are generally greatest when rainfall is intense, a condition for which water runoff and erosion losses are also greatest. For fertilizers, losses are greatest when intense rainfall occurs shortly after application. Nutrients and pathogens from agriculture also have the potential to impact groundwater quality, particularly in karst areas of the state.

Erosion of agricultural lands (particularly cropland) can cause high turbidity and total suspended solids (TSS) concentrations in surface waters. Eroded soil particles (sediment) suspended in water contribute to water turbidity and TSS concentrations. Removal of riparian vegetation and unrestricted livestock access to riparian areas, streambanks, and stream channels can destabilize streambanks and channels resulting in increased streambank and channel erosion and sediment loads. Eroded soil can carry nutrients, fertilizer, and bacteria to surface waters.

In general, watersheds with significant agricultural lands have higher nutrient levels in runoff than forested watersheds (Atwell and Bouldin 2022, Braund et al. 2021, Giovannetti et al. 2013). Nitrogen and phosphorus in runoff and eroded soils can come from animal wastes deposited by livestock, animal



wastes applied as fertilizer (e.g., poultry litter), and application of other fertilizers (e.g., commercial chemical fertilizer). Application of nutrients to agricultural lands is a common practice in Arkansas. When more nutrients are present than can be used by the plants, the nutrients can be transported from agricultural lands to surface and groundwater. Inorganic forms of nitrogen, particularly nitrate, are very water soluble and can be easily carried to surface waters in runoff or to aquifers in infiltrating water. Phosphorus and organic forms of nitrogen tend to bond to soil particles and are carried to surface waters with eroded soil. In addition to local and state-level nutrient impacts, there is also concern about nutrient losses from Arkansas agricultural lands contributing to the large hypoxic zone in the Gulf of Mexico.

Oxygen-demanding organic matter from agriculture lands include animal wastes and crop residues. These materials can be carried to surface waters in runoff. Animal feces may carry pathogens with the potential to cause diseases in humans. Runoff from fields or riparian areas where manure has been deposited by livestock, or where manure or poultry litter has been used as fertilizer, may contain increased numbers of bacteria if the manure or litter has not been incorporated or the bacteria have not been subject to stress. Livestock loafing in waterbodies can also deposit manure containing pathogens directly into surface waters.

### **Emerging NPS Issues in Arkansas Agriculture**

Changing climatic conditions have the potential to significantly impact agriculture and NPS pollution in Arkansas. Changing climatic conditions are anticipated to affect variability in rainfall amounts with increasing frequency of heavy rainfall and periods of drought-like conditions. Periods of heavy rainfall will increase sediment and nutrient loads to streams and lakes from runoff and streambank erosion. During drought conditions, decreased streamflow, increased residual sediment and nutrient loads, and expected temperature increases will likely decrease dissolved oxygen levels in streams and may result in more frequent algal blooms (Backlund et al. 2008).

With the update of the *Arkansas Nutrient Reduction Strategy* in 2022, there is increased focus in the state on tracking implementation of NPS best management practices (BMPs) and estimating associated changes in nutrient loads leaving the state. Reducing sediment and nutrient runoff from agricultural lands is an important element of the Arkansas Nutrient Reduction Strategy.

### **Statewide Agriculture NPS Management Goals and Objectives**

The ultimate long-term goal of statewide agriculture NPS management is for agriculture to not be a cause of water quality impairment of Arkansas waters (surface water or groundwater). This can be accomplished through education, targeted awareness, BMP training and implementation, monitoring, and other voluntary programs.

More specifically, goals that can be achieved within 15 to 20 years include:

- Increase the number of conservation practice implementation projects with the objective of reducing sediment and nutrient loads fivefold from 2018-2023 period.
- Increased participation in Title X Cost-Share Program leading to new partnerships with conservation districts to expand BMP implementation.
- Expand messaging and implementation of the Arkansas Nutrient Reduction Strategy with support of Gulf Hypoxia Program funding.

- Expansion of programs that highlight multiple co-benefits from water quality improvement, wildlife habitat creation, and climate resiliency.
- Develop tools that enable measurement of the combined effects of implementing multiple water quality BMPs in farming systems and assess their effectiveness at a watershed or sub-watershed level.

Short-term objectives are intended to move statewide agriculture NPS management toward its long-term goals. Short-term objectives for 2024-2029 are listed in Table 3.1 with milestones. Progress toward these objectives will be reported in the NPS Annual Report. A summary of progress toward statewide agriculture NPS management long-term and short-term goals from the 2018-2023 plan is included in Appendix D.

*Table 3.1. Statewide agriculture NPS management short-term objectives for 2024-2029*

<b>2024-2029 Objective</b>	<b>Milestones</b>
Increase outreach to historically underserved producers and agricultural communities	Gather demographic information about watershed-based project participants
Support, develop, or expand programs, projects, and practices that increase co-benefits that include water quality, wildlife habitat creation, and climate resiliency of Arkansas agriculture	Number of watershed-based projects with co-benefit elements  Number of BMPs implemented that contribute to climate resiliency of agriculture
Increase conservation district participation in Title X Cost-Share Program	Review previous five-year average of conservation district Title X Cost-Share participants
Support Arkansas Nutrient Reduction Strategy marketing, messaging, and implementation	Number of advertisements and level of participation in nutrient reduction related programs  Number of watershed-based projects funded through Gulf Hypoxia Program with quantifiable reduction in nutrient loss
Review existing Natural Resources Division agricultural assistance programs to ensure that program awareness is being achieved across all sectors	Review initiation and completion
Partner with and assist Natural Resources Conservation Service (NRCS) in the review, selection or development of National Water Quality Initiative (NWQI), Mississippi River Basin Initiative (MRBI), Regional Conservation Partnership Program (RCPP), Environmental Quality Incentive Program (EQIP), or other conservation programs that will improve or enhance water quality in watersheds on an annual basis	Review input provided to NRCS on time

2024-2029 Objective	Milestones
Participate in the State Technical Committee and its Water Quality sub-committee annually or as it convenes	Number of meetings attended by Arkansas NPS Program personnel
Provide funding for monitoring in-stream water quality to a minimum of one NRCS Program Initiatives (MRBI, RCPP or NWQI) NPS priority 12-digit hydrologic unit code (HUC) watersheds yearly	Funding contributed to NRCS program initiatives for water quality monitoring  Number of priority watersheds where funding is provided  Number of 12-digit HUCs where funding is provided

**Statewide Agriculture NPS Management Strategies**

Statewide agriculture NPS management utilizes four strategies to achieve the program long-term goals and short-term objectives. One strategy is to continue the voluntary process whereby federal and state programs cooperate in priority watersheds where agriculture-related water quality problems have been identified.

The second strategy is to support state regulations that can reduce agriculture NPS. One example is Arkansas regulatory controls on the application of nutrients and poultry litter; another example is certification and training of nutrient applicators and nutrient management planners.

The third strategy is to encourage and support research and advancement in agriculture BMPs. There are emerging technologies in agriculture BMPs that may be of interest in Arkansas. An example is the use of virtual fencing technology for prescribed grazing or controlling livestock access to pasture streams (Ellis 2021, Smith 2021).

The fourth strategy is to continue to encourage and support implementation of agricultural BMPs that reduce NPS. Agricultural BMPs are typically based on NRCS guidance in their National Conservation Practice Standards and the Field Office Technical Guide (FOTG). Other NRCS-approved practices may be used in the Arkansas NPS Program provided those practices are part of an overall farm plan developed by or under the direction of NRCS. A current catalog of NRCS BMPs for Arkansas can be found at [nrcs.usda.gov/programs-initiatives/eqip-environmental-quality-incentives/arkansas/environmental-quality](https://nrcs.usda.gov/programs-initiatives/eqip-environmental-quality-incentives/arkansas/environmental-quality). The U.S. Environmental Protection Agency (EPA) classifies agricultural BMPs into six management strategies (EPA 2003) distinguished by the targeted agricultural operations and potential pollutants. The strategies relevant for Arkansas agriculture NPS are:

- Nutrient management,
- Erosion and sediment control,
- Animal feeding operations,
- Grazing management, and
- Irrigation water management.

These management strategies are discussed below.

## Nutrient Management

The goals of nutrient management practices are to minimize nutrient loss from edge-of-field runoff to surface waters and/or leaching to groundwater. Development and implementation of a nutrient management plan for cropland and pasture operations helps minimize nutrient loss by (1) specifying nutrient application rates necessary to achieve realistic production, (2) improving the timing of nutrient application, (3) using BMPs that increase nutrient use efficiency, and (4) using BMPs that reduce runoff.

The NRCS Conservation Standard Practice 590-CPS-1 provides guidance for effective nutrient management. Additional resources can be found in the Nutrient Management Section of the NRCS Arkansas FOTG, and the University of Arkansas System Division of Agriculture (UADA) Cooperative Extension Service Livestock Nutrient Management and Water Sustainability websites ([uaex.uada.edu/environment-nature/water/quality/nutrient-applicators.aspx](http://uaex.uada.edu/environment-nature/water/quality/nutrient-applicators.aspx) and [uaex.uada.edu/environment-nature/water/sustainability.aspx](http://uaex.uada.edu/environment-nature/water/sustainability.aspx)).

Nutrient management practices commonly used in Arkansas include split nutrient application and nitrification or urease inhibitors. Practices that may not currently be in widespread use in Arkansas, and that could be highly effective for reducing loss of nutrients to water resources, include two-stage ditches, riparian buffers, filter strips, use of precision application technology, sediment basins, and vegetated treatment areas (Christianson 2021, NRCS 2020).

## Erosion and Sediment Management

The goal of erosion and sediment management practices is to reduce soil loss from agriculture lands and the transport of eroded material to surface waters. Guidance for erosion and sediment control measures can be found in the NRCS Arkansas FOTG.

Erosion and sediment management practices that are commonly in use, or have been frequently funded, in Arkansas include critical area planting, conservation crop rotation, drainage water management, herbaceous weed treatment, irrigation and drainage tailwater recovery, mulching, no-till, and reduced till (Christianson 2021, USDA National Agriculture Statistical Service 2019). Practices that are not currently in widespread use but could be highly effective for reducing erosion and sediment transport include conservation cover, conservation crop rotation, cover crop, filter strips, grassed waterways, riparian forest buffers, riparian herbaceous buffers, sediment basins, stormwater runoff control, strip cropping, vegetative barriers, and water and sediment control basins (Christianson 2021, NRCS 2020, USDA National Agriculture Statistical Service 2019).

## Animal Feeding Operations Management

The goal of these management practices is to minimize impacts on water quality and public health from animal feeding operations (AFOs). This goal is achieved by addressing the following eight components:

1. Divert clean water (roof drainage, run-on from uplands, etc.) from contacting feedlots and holding pens, animal manure, or manure storage systems.
2. Design and maintain buildings, collection systems, conveyance systems, and storage facilities to prevent seepage to groundwater and surface water.
3. Design, construct, and operate liquid manure storage systems to provide adequate storage for animal waste, contaminated runoff, and direct rainfall, considering planned utilization practices and schedule. Dry manure storage should be sheltered from precipitation until utilization.
4. Apply manure in accordance with a nutrient management plan.

5. Manage manure land application areas to minimize transport of sediment and applied waste offsite by stormwater runoff.
6. Maintain records that document manure production and utilization, including land application.
7. Use animal mortality management approaches that do not adversely affect groundwater or surface water.
8. Consider the full range of environmental constraints and requirements when siting a new AFO or expanding an existing AFO.

Guidance for AFO NPS management measures can be found in the NRCS Arkansas FOTG.

Animal feeding operation management practices commonly used in Arkansas include nutrient management plans and waste storage facilities. Practices that could be highly effective for managing impacts of AFOs on water quality but are not commonly used in Arkansas include vegetated treatment areas and constructed wetlands (Christianson 2021, NRCS 2020).

### Grazing Management

The goal of management practices for pasture and other grazing lands is to protect water quality and aquatic and riparian habitat. This is accomplished through:

1. Improving or maintaining the health and vigor of selected forage or cover crops and maintaining a stable and desired plant community while, at the same time, maintaining or improving water quality and quantity, reducing accelerated soil erosion, and maintaining or improving soil condition for sustainability of the resource.
2. Excluding livestock, where appropriate, and/or controlling livestock access to and use of sensitive areas, such as streambanks, wetlands, estuaries, ponds, lake shores, soils prone to erosion, and riparian zones.
3. Implementing other grazing management measures in the Prescribed Grazing section of the NRCS Arkansas FOTG.

Grazing management practices that are commonly in use, or have been frequently funded, in Arkansas include access control, critical area planting, fencing, nutrient management plans, prescribed grazing, and watering facilities. Practices that could be highly effective for reducing water quality and habitat impacts from grazing, but that are not commonly used in Arkansas include riparian buffers and silvopasture (Christianson 2021, NRCS 2020).

### Irrigation Water Management

The goal of these management practices is to reduce NPS pollution of groundwater and surface waters caused by irrigation. This is accomplished through operating the irrigation system so that the timing and amount of irrigation water applied match crop water needs. This reduces the discharge of irrigation water, which can carry pollutants, from the edge of the field and controls deep percolation. In furrow irrigation systems, a tailwater management system may be needed to control the transport of pollutants to surface waters. Guidance for irrigation water management measures can be found in the NRCS Arkansas FOTG and on the UADA Cooperative Extension Service website at [uaex.uada.edu/environment-nature/water/agriculture-irrigation/](http://uaex.uada.edu/environment-nature/water/agriculture-irrigation/).

Irrigation water management practices commonly used in Arkansas include land leveling, deep tillage, tailwater recovery, reservoirs, computerized pipe hole selection, and multiple-inlet irrigation for rice.

Those practices that are effective but not currently widely used include surge irrigation and advanced irrigation scheduling (Nian, Huang, Kovacs, Henry, & Kurtz 2019).

### Partner Focus BMPs

There are over 50 agricultural BMPs that have been implemented in Arkansas through federal programs over the years. Several BMPs that reduce NPS are currently being emphasized by Natural Resources Division partners, though not necessarily for just their water quality benefits. Examples are listed in Table 3.2.

*Table 3.2. Examples of NPS BMPs that are currently being emphasized in partner programs*

<b>Partner</b>	<b>BMPs</b>	<b>Program</b>	<b>Program purpose</b>	<b>Climate Co-Benefit(s)</b>
Arkansas Soil Health Alliance	Cover crops, reduced till, no-till	All	Improve soil health and water quality, reduce production costs	Carbon sequestration, nitrate immobilization, reduce nitrous oxide production
UADA Cooperative Extension Service	Prescribed grazing	300 Days Grazing System	Reduce production cost	Carbon sequestration
	Nutrient management	Arkansas Nutrient Management Planner software	Improve water quality	Reduce nitrous oxide production, reduce potential for greenhouse gas emission
USDA Farm Service Agency (FSA)	Conservation easements  Wetland easements	Conservation Reserve Enhancement Program  Farmable Wetlands Program	Increase wildlife habitat, improve water quality	Carbon sequestration
Conservation Districts and U.S. Fish and Wildlife Service (USFWS)	Access control	Cattle Access and Livestock Fencing (CALF)	Improve water quality	Carbon sequestration
Ducks Unlimited, USA Rice, Farm Credit Associations of Arkansas, NRCS	Winter flooding of rice fields	Rice Stewardship Partnership	Increase waterfowl habitat	None apparent
Arkansas Game and Fish Commission	Winter flooding of rice fields	Waterfowl Rice Incentive Conservation Enhancement	Increase waterfowl habitat and hunting	None apparent

<b>Partner</b>	<b>BMPs</b>	<b>Program</b>	<b>Program purpose</b>	<b>Climate Co-Benefit(s)</b>
The Nature Conservancy	Two-stage ditches	Delta Program	Reduce flooding, erosion, and maintenance; improve water quality	Climate resiliency
Alliance to Advance Climate-Smart Agriculture	Crop rotation, cover crop, silvopasture, etc.	Alliance to Advance Climate-Smart Agriculture	Incentivize and reward farmers and ranchers for adopting climate-smart agricultural practices that will enhance agricultural productivity, benefit producers, and improve climate resilience	Carbon sequestration, climate resiliency, greenhouse gas reduction

**Statewide Agriculture NPS Management Administration**

While Natural Resources Division is the lead agency for statewide agriculture NPS management, this effort relies on many partners. Partners include federal, state, and local agencies that provide expertise through technical assistance and research, and education through outreach programs to farmers. In addition, state regulatory agencies contribute to this program through administration of rules and regulations. Commodity groups, farm organizations, and nonprofit organizations also participate in statewide agriculture NPS management through education, outreach, and technical assistance. Examples of partners in statewide agriculture NPS management and their contributions are provided below. Coordination with partners occurs in watershed-based projects and participation on various state and federal committees and task forces, such as the NRCS State Technical Committee and the Arkansas Conservation Partnership. Cooperating entities in statewide agriculture NPS management include:

**Arkansas Department of Agriculture Divisions**

**Natural Resources Division**

Several Natural Resources Division programs and rules outside of the Arkansas NPS Program contribute to management of agriculture NPS. These include the Nutrient Management Program, Nutrient Management Applicator and Planner Certification Programs, the Groundwater Protection and Management Program, and Arkansas Nutrient Reduction Strategy.

**Livestock and Poultry Division**

The Arkansas Department of Agriculture’s Livestock and Poultry Division contributes to management of agriculture NPS primarily through their regulations related to animal carcass disposal. Proper disposal of carcasses ensures they do not become sources of NPS. The Liquid Animal Waste Program, formally Rule 5 with the Arkansas Pollution Control and Ecology Commission, was transferred to the Livestock and Poultry Division in 2023.

## Other State Entities

### **University of Arkansas System Division of Agriculture**

UADA consists of two units: the Cooperative Extension Service and the Arkansas Agricultural Experiment Station (AAES). The Cooperative Extension Service develops research-based agriculture education and training programs and delivers these programs through faculty located in offices in every county of the state. The AAES network supports research, including highly applied demonstration projects with direct application to NPS pollution management.

### **Arkansas Discovery Farm Program**

The Discovery Farm Program is a network of privately owned farms on which water quality research is conducted to evaluate the effectiveness of agriculture BMPs, including their effectiveness in reducing NPS. The research is coordinated by UADA faculty members and is conducted in collaboration with federal and state conservation agencies.

## Federal Agencies

### **U.S. Department of Agriculture**

The USDA includes two agencies with important roles in management of agriculture NPS. The NRCS provides technical assistance to landowners, communities, and local governments for many soil and water conservation activities, including agriculture BMPs. NRCS programs in Arkansas important for agriculture NPS management include EQIP, Conservation Stewardship Program (CSP), MRBI, NWQI, and RCPP. The FSA supports farms and farming communities with programs including the following conservation programs that can reduce agriculture NPS: Conservation Reserve Program, CREP, and Source Water Protection Program.

### **U.S. Fish and Wildlife Service**

The USFWS assists with management of agriculture NPS through its Partners for Fish and Wildlife Program. This program provides technical assistance to restore, improve, and protect wildlife habitat on private lands through partnerships with private landowners and other organizations while leaving the land in private ownership. Many habitat-related improvements can reduce agriculture NPS.

## Local Entities

### **Conservation Districts**

The 75 county conservation districts in Arkansas establish natural resource priorities at the local level and provide support and input into how soil and water conservation programs are implemented at the local level, working cooperatively with landowners and federal and state government agencies. Conservation districts provide technical assistance to thousands of landowners across the state and develop conservation plans for implementing agriculture BMPs. In many cases these conservation plans and BMPs are implemented using only private funds. Conservation districts coordinate at the state level through membership in the Arkansas Association of Conservation Districts.



## **Arkansas Resource Conservation and Development Councils**

There are seven Resource Conservation and Development Councils in Arkansas. These councils provide a grassroots mechanism for stabilizing and growing rural communities while protecting and developing natural resources. Councils identify social, economic, and environmental issues in their region, and then develop and implement plans to address these issues through local leadership.

### **Tracking and Evaluation**

Statewide agriculture NPS management can be tracked and evaluated on three levels: short-term inputs, intermediate processes, and long-term outcomes. Tracking and evaluation will be based upon management activities, behavioral changes, and removal of streams from the state 303(d) list.

Short-term inputs are tracked through management activities, e.g., what activities and BMPs are implemented, how many farmers implemented BMPs or participated in education and outreach activities, how many fact sheets were developed, how many newspaper articles were published, how many dollars were expended to address a particular issue. Several partner organizations report this information in their annual reports. Some of this information is provided to Natural Resources Division and is included in the Arkansas NPS Program annual report. These input measures track effort expended, which is a first and necessary step toward effecting change.

Intermediate processes are tracked and evaluated through determining whether management activities result in behavioral changes. To assist in identifying changes in behavior, agriculture BMP implementation data must be collected. Currently, some data on BMP implementation is compiled and reported in the Natural Resources Division annual report. Congressionally mandated confidentiality requirements can make it difficult to obtain the data needed to analyze and report BMP implementation. With the update of the Arkansas Nutrient Reduction Strategy in 2022, there is increased focus in Arkansas on tracking and reporting implementation of agriculture BMPs and estimating associated changes in nutrient loads leaving the state. Reducing agriculture NPS nutrient losses is an important element of the Arkansas Nutrient Reduction Strategy. BMP reporting capabilities are expected to increase in the near future.

The long-term outcome of statewide agriculture NPS management is whether streams impacted by pollutants from agricultural sources are improved to the point that they can be removed from 303(d) List of Impaired Waterbodies. Sources of data for tracking water quality improvements are the Arkansas Division of Environmental Quality (DEQ) ambient monitoring network and synoptic surveys, U.S. Geological Survey monitoring sites, Arkansas Water Resources Center (AWRC) dedicated monitoring sites, and research by universities and others. Ultimately, this data is compiled into the state's 305(b) report, which is published by DEQ biennially.

The Arkansas 2018 303(d) List of Impaired Waterbodies includes streams where agriculture is identified as a source of the impairing pollutant. Agriculture is one of five potential pollutant sources specifically identified in the 303(d) list. Agriculture is identified as a suspected source for 21 impaired stream segments in the 2018 list, representing almost 324 stream miles (DEQ 2020). Figure 3.6 shows changes in impairments due to agriculture from the final 2016, final 2018, draft 2020, and draft 2022 303(d) lists.

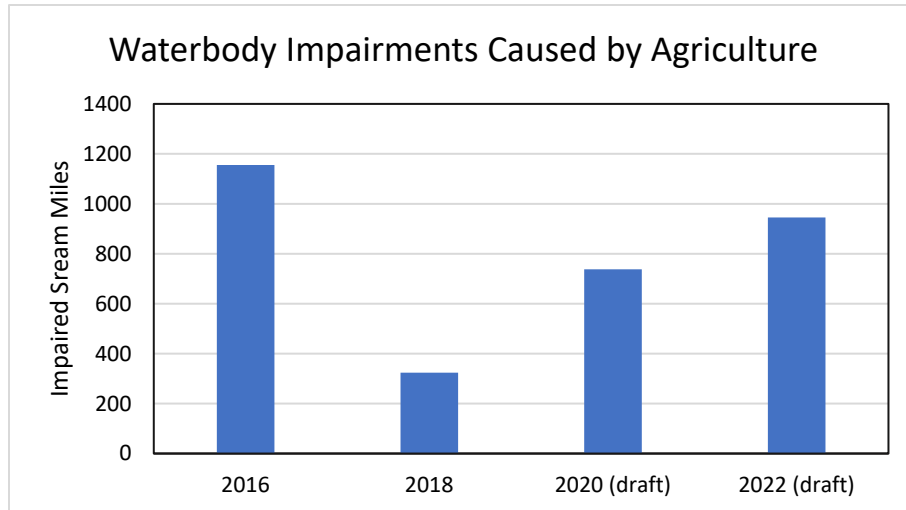


Figure 3.6. Waterbody impairments due to agriculture from recent 303(d) lists (DEQ 2023)

### Funding

Agriculture NPS management activities not funded by the Section 319 program are not identified or counted against the state's NPS effort. However, funding for agriculture NPS management from federal sources such as NRCS and the FSA is significant in Arkansas. The Natural Resources Division Arkansas Water Resource Agricultural Cost-Share Program and Agriculture Water Quality Loan Program are other sources of funding available for agriculture NPS management outside the Section 319 Program. These funding sources and projects have influenced statewide agriculture NPS management.

Management of agriculture NPS is now seen as important for protection of drinking water sources nationally and in Arkansas. The 2018 Farm Bill specified that at least 10 percent of NRCS conservation funding be targeted for source water protection.

### References

- AGFC. 2022. Arkansas Waterfowl Rice Program (WRICE). Accessed September 2023. <https://www.agfc.com/education/arkansas-waterfowl-rice-program-wrice/>.
- Arkansas Association of Conservation Districts. 2014. Controlled Access Livestock Fencing (CALF) Initiative - Special Projects. Accessed September 2023. [https://aracd.org/special\\_projects/CALF.html](https://aracd.org/special_projects/CALF.html).
- Atwell, Amelia K, and Jennifer L Bouldin. 2022. "Effects of agricultural intensity on nutrient and sediment contributions within the Cache River watershed, Arkansas." *Water* (MDPI) 14: 1-11.
- Backlund, Peter, Anthony Janetos, and David and Schimel. 2008. *The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity in the United States*. Washington, D.C.: US Department of Agriculture Climate Change Science Program.
- Braund, Danielle, Greg Phillips, Randy Easley, and Sally Entreklin. 2021. "The relationship between land use and nutrient concentrations in Central Arkansas: Identifying potential nonpoint-sources of pollution in the Lake Conway-Point Remove watershed." *Aquatic Entomology Virginia Tech*. July. <http://sentrekin.com/wp-content/uploads/2021/07/The-relationship-between-land-use-and-nutrient-concentrations-in-central-Arkansas.pdf>.

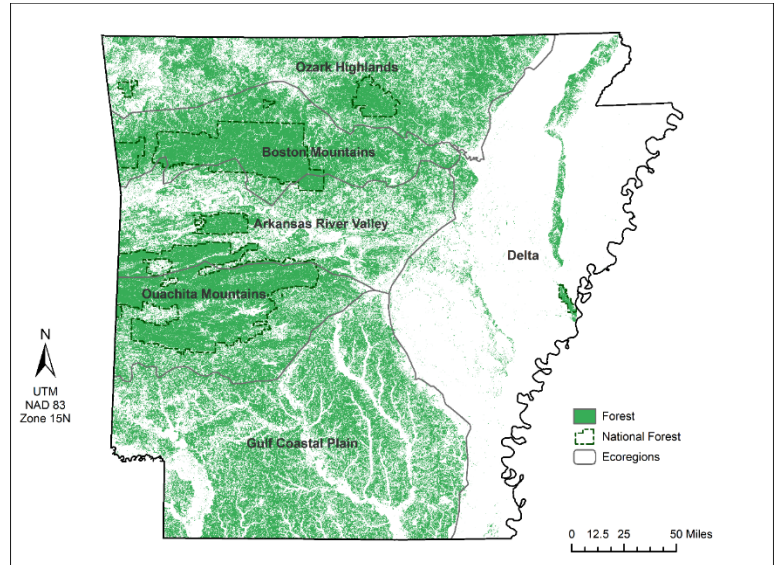
- Christianson, R. 2021. Common Data for Hypoxia Task Force Member States through 2020. Retrieved December 2021, from [https://public.tableau.com/app/profile/reid.christianson/viz/HTF\\_NRCS\\_Conservation/AllPractices\\_V2?publish=yes](https://public.tableau.com/app/profile/reid.christianson/viz/HTF_NRCS_Conservation/AllPractices_V2?publish=yes).
- DEQ. 2020. *2018 303(d) List*. November 30. [https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018\\_303\(d\)\\_list.pdf](https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018_303(d)_list.pdf).
- DEQ. 2023. Arkansas's 303(d) List, 305(b) Report, and Assessment Methodology by Year. Accessed October 2023. <https://www.adeq.state.ar.us/water/planning/integrated/303d/list.aspx>.
- Dewitz, J, and USGS. 2021. National Land Cover Database (NLCD) 2019 Products. Souix Falls: US Geological Survey, June. Accessed 2022. doi:<https://doi.org/10.5066/P9KZCM54>.
- Ducks Unlimited. 2016. Conservation in Ricelands. Accessed September 2023. <https://www.ducks.org/conservation/waterfowl-habitat/conservation-in-ricelands>.
- Ellis, Gail. 2021. "Researchers deploy virtual fencing technology to improve grazing and water quality." *Oklahoma State University*. June 24. Accessed September 2022. [https://news.okstate.edu/articles/agriculture/2021/ellis\\_virtual\\_fencing.html](https://news.okstate.edu/articles/agriculture/2021/ellis_virtual_fencing.html).
- English, L. and Popp, J. 2022. *Research Report 1007: Economic Contribution of the Agricultural Sector to the Arkansas Economy in 2020*. University of Arkansas: Arkansas Agricultural Experiment Station.
- EPA. 2003. National Management Measures for the Control of Nonpoint Pollution from Agriculture (EPA-841-B-03-004). July. <https://www.epa.gov/nps/national-management-measures-control-nonpoint-source-pollution-agriculture>.
- FSA. n.d. Farmable Wetlands Program. Accessed September 2023. <https://www.fsa.usda.gov/programs-and-services/conservation-programs/farmable-wetlands/index>.
- Giovannetti, Josh, Leslie Massey, Brian Haggard, and Robert Morgan. 2013. "Land use effects on stream nutrients at Beaver Lake watershed." *Journal of the American Water Works Association* 105: 1-10. [https://www.researchgate.net/publication/271027101\\_Land\\_use\\_effects\\_on\\_stream\\_nutrients\\_at\\_Beaver\\_Lake\\_Watershed](https://www.researchgate.net/publication/271027101_Land_use_effects_on_stream_nutrients_at_Beaver_Lake_Watershed)
- Jennings, John; Gadberry, Shane; Simon, Kenny. 2020. "Arkansas 300 Days Grazing System - Getting Started." University of Arkansas Cooperative Extension Service. December. Accessed September 2023. <https://www.uaex.uada.edu/publications/pdf/FSA-3139.pdf>.
- NRCS. 2020. Conservation Practice Physical Effects FY2021. Retrieved September 1, 2021, from USDA Natural Resources Conservation Service. <https://www.nrcs.usda.gov/resources/guides-and-instructions/conservation-practice-physical-effects>.
- . 2022. *Conservation Practice Standards*. Accessed September 2022, 2023. <https://www.nrcs.usda.gov/resources/guides-and-instructions/conservation-practice-standards>.
- . 2022. *Field Office Technical Guide (FOTG)*. Accessed September 2022. <https://www.nrcs.usda.gov/resources/guides-and-instructions/field-office-technical-guides>.
- Natural Resources Division. n.d. Nonpoint Source Management. Accessed September 2023. <https://www.agriculture.arkansas.gov/natural-resources/divisions/water-management/nonpoint-source-management/>.

- . 2022. *2022 Arkansas Nutrient Reduction Strategy (ANRS)*. strategy, Little Rock: Natural Resources Division. Accessed July 2023. <https://www.agriculture.arkansas.gov/wp-content/uploads/2022/07/2022-7-21-ANRS-FINAL-PUBLISH.pdf>.
  - . 2022. *Groundwater Protection and Management Program*. Accessed September 2022. <https://www.agriculture.arkansas.gov/natural-resources/divisions/water-management/groundwater-protection-and-management-program/>.
  - . 2022. *Nutrient Management Program*. Accessed September 2022. <https://www.agriculture.arkansas.gov/natural-resources/divisions/conservation/nutrient-management-program/>.
- Nian, Y, Q Huang, K Kovacs, C Henry, and J Kurtz. 2019. "The Use Pattern of Irrigation Practices by Arkansas Producers." In B.R. Wells *Arkansas Rice Research Studies 2018*, by R Norman and K Moldenhauer, 321-325. Fayetteville: University of Arkansas. <https://www.uaex.uada.edu/environment-nature/water/agriculture-irrigation/Pages%20from%20B.R.%20Wells%20Arkansas%20Rice%20Research%20Studies.pdf>.
- Smith Thomas, Heather. 2021. *Virtual Fence Keeps Cattle Where You Want Them*. March 26. Accessed December 2021. <https://www.farmprogress.com/marketing/looking-back-markets-celebrating-passion-agriculture>.
- TNC. 2021. "A Well-timed Effort." In *Arkansas 2021 Impact Report*, by The Nature Conservancy, 10. Little Rock: The Nature Conservancy.
- USDA Farm Services Agency. Conservation Reserve Enhancement Program. <https://www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-enhancement/index>.
- UACES. n.d. Nutrient Management Tools. Accessed September 2023. <https://www.uaex.uada.edu/farm-ranch/animals-forages/manure-management/nutrientmanagementtools.aspx>.
- . 2022. *Arkansas Crop Irrigation*. Accessed September 2022. <https://www.uaex.uada.edu/environment-nature/water/agriculture-irrigation/>.
  - . 2022. *Livestock Nutrient Management in Arkansas*. Accessed September 2022. <https://www.uaex.uada.edu/environment-nature/water/quality/nutrient-applicators.aspx>.
  - . 2022. *Water Sustainability in Arkansas*. Accessed September 2022. <https://www.uaex.uada.edu/environment-nature/water/sustainability.aspx>.
- USDA National Agricultural Statistics Service. 2019. *Census of Agriculture, 2017 Census Volume 1, Chapter 2: County Level Data, Arkansas*. April. Accessed January 2023. [https://www.nass.usda.gov/Publications/AgCensus/2017/Full\\_Report/Volume\\_1,\\_Chapter\\_2\\_County\\_Level/Arkansas/](https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_2_County_Level/Arkansas/).
- USDA National Agricultural Statistics Service. 2022. *United States Department of Agriculture*. November 30. [https://www.nass.usda.gov/Statistics\\_by\\_State/Arkansas/index.php](https://www.nass.usda.gov/Statistics_by_State/Arkansas/index.php).

## Section Four: Statewide Forestry NPS Management

### Introduction

Statewide forestry management addresses NPS from Arkansas forest lands, including tree plantations and farms. The forest products industry is an important component of the Arkansas economy. In 2021, the timber, paper products, and related industries contributed over \$6.5 billion in value added impacts to the Arkansas economy (Tian and Pelkki 2022). Standing timber in Arkansas is valued at \$12.6 billion (Arkansas Economic Development Commission 2022). Timber is a major resource harvested in the Gulf Coastal Plain Ecoregion of southern Arkansas, where the greatest volume of loblolly pine is grown. The economic impact of the forest products industry is greater in Arkansas than in any other southern state (Magnolia Reporter 2021). Arkansas forests are also important to the state outdoor recreation economy. In 2021, outdoor recreation contributed \$3.5 billion to the Arkansas economy (Gatling 2023).



*Figure 4.1. Forest land in Arkansas, 2019  
(Dewitz and U.S. Geological Survey 2021)*

More than 56 percent of Arkansas’s land area is forested (Arkansas Forestry Division 2022). Private landowners; including farmers, ranchers, and other individuals, own more than 67 percent of the forest land in the state and many actively manage their forest lands. National forests account for 13 percent of Arkansas’s total forested acreage. Forest resource companies own or lease 14 percent of the state’s forest land. The remaining six percent is classified as “other public” in the 2021 Forest Survey (Arkansas Forestry Division 2022). Figure 4.1 shows the distribution of forest land in Arkansas. The production of timber is a common objective in forestry, but it is certainly not the only objective valued by Arkansas landowners, as many recognize the added importance of wildlife habitat, aesthetics, and water quality.

### Arkansas Forestry NPS

The magnitude of NPS pollution from forestry activities is generally less than that from agricultural activities. However, forestry activities, such as timber harvesting, tree planting, and road construction, have the potential to degrade surface water quality when best management practices (BMPs) are not followed, particularly in vulnerable headwater streams. Impacts of forest management on aquatic habitats, biota, and water quality in streams of the southeastern United States, including in Arkansas, have been itemized and described in Filipek (1993). Pollutants typically associated with forestry activities

include sediment, organic chemicals, and organic debris. Forestry activities can also contribute to stream temperature and dissolved oxygen impairment.

Sediment is typically the primary pollutant associated with forestry activities. Removal of streamside vegetation, timber harvesting, road construction and use, and tree planting activities disturb existing vegetation and soil, increasing the potential for erosion. Forestry activities may also remove streamside riparian vegetation, resulting in streambank erosion and reduced filtering of sediment and other pollutants from runoff.

Organic chemicals that may be released during forestry activities include fuel, oil, and coolants used in equipment for timber harvesting and road building operations.

Oxygen-demanding organic debris from forestry activities include residual logs, slash, litter, and soil organic matter. These materials can be carried to surface waters by runoff. Larger organic debris and accumulations of smaller debris may alter stream flows, resulting in increased bank erosion and/or sedimentation.

Removal of riparian vegetation reduces stream shading and increases stream temperatures. Temperature increases can be dramatic in smaller headwater streams, adversely affecting aquatic habitat and species.

### **Emerging NPS Issues in Arkansas Forestry**

Changes to precipitation and temperatures have the potential to affect forestry NPS pollution by directly influencing the forested landscape. Forest production helps increase resiliency to the effects of variable climate conditions by absorbing greenhouse gases and providing carbon sinks (Friedel 2022). However, higher temperatures and increased drought frequency expected with changing climatic conditions have the potential to incite forest health issues. Stressed forests are more susceptible to fires, insects, and disease. Any reduction in the quantity or quality of forest stands could result in increased NPS pollution in the form of higher stream temperatures, increased erosion, and transportation of nutrients formerly held in forest plants.

### **Statewide Forestry NPS Management Goals and Objectives**

The long-term goal of statewide forestry NPS management is that through targeted awareness, BMP training, monitoring, and other voluntary programs, forestry will never be identified as contributing to impairment of the waters of the state. More specifically, long-term forestry NPS management goals that can be achieved in the next 10-15 years include:

- Forestry activities will not contribute sediment or other pollutants to waterbodies in such amounts as to cause impairment of waters of the state.
- Support Arkansas Forest Action Plan, particularly Strategy 3 Water Supply Protection.

Short-term objectives are intended to move statewide forestry NPS management toward its long-term goals. Short-term objectives for 2024-2029 are listed in Table 4.1 with milestones. Progress toward these goals and objectives will be reported in the NPS Annual Report. A summary of progress toward statewide forestry NPS management long-term and short-term goals from the 2018-2023 plan is included in Appendix D.

Table 4.1. Statewide forestry NPS management short-term objectives for 2024-2029

2024-2029 Objective	Milestones
Increase outreach to historically underserved forest landowners	Gather demographic information about watershed-based project participants
Support, develop, or expand programs, projects, and practices that provide co-benefits to water quality, wildlife habitat, and climate resiliency of Arkansas forests	Number of watershed-based projects that implement forestry BMPs that provide benefits beyond water quality improvement  Number of BMPs implemented that contribute to climate resiliency of Arkansas forests
Improve quality of forestry BMP monitoring	Changes to forestry BMP monitoring approach
Update <i>Arkansas Forestry Best Management Practices for Water Quality Protection</i>	Number of revisions to document
Natural Resources Division and Forestry Division will foster an increased partnership with the Forest and Drinking Water Collaborative	Number of programs, watershed-based projects, amount of funding

### Statewide Forestry NPS Management Strategies

Statewide forestry NPS management utilizes four strategies to achieve the long-term goals and short-term objectives. One strategy of statewide forestry NPS management is to continue the voluntary process whereby federal and state programs cooperate in priority areas of the state where water quality problems have been identified. If the cooperative process results in improved implementation of BMPs and reductions in NPS pollutant loads, it will be viewed as successful.

The second strategy is Arkansas Department of Agriculture’s Natural Resources Division (Natural Resources Division) support for forestry NPS management partners and partnerships. This includes participating in and supporting regional forest conferences, workshops, or outreach training, and providing specialized technical assistance, outreach, supplies, and equipment when appropriate.

The third strategy is to encourage and support advances in forestry BMPs.

The fourth strategy is to continue to encourage and support implementation of forestry BMPs that reduce NPS. The Arkansas Department of Agriculture’s Forestry Division interprets, monitors, and updates guidance for forestry BMPs for Arkansas. Recommended BMPs are documented in the Best Management Practices for Water Quality Protection manual developed by the Forestry Division in 2002, with updates in 2018 and 2021. This manual provides guidelines for BMP implementation for a variety of forestry operations including streamside management, active and inactive roads, harvesting, site preparation, chemical usage, reforestation, prescribed fires, and wildfire suppression. The results of the 2017-2018 BMP Implementation Survey reported that use of most of these BMPs are common practice in Arkansas managed forests. The statewide BMP implementation rate was 93 percent, four percentage points higher than the rate reported in the 2011 survey. Private non-industrial forest lands averaged 86 percent, a significantly lower implementation rate than any other ownership group. Public (federal and state) lands averaged 99 percent BMP implementation, while industrial lands scored 97 percent and corporate lands averaged 96 percent. By physiographic region, the Delta scored 92 percent, the Ozark region scored 93 percent, the Ouachita region scored 95 percent, and the Southwest region or Gulf

Coastal Plain scored 93 percent for BMP implementation. The 2018 survey grouped forestry BMPs into four major categories: harvesting, regeneration, roads, and streamside management zones (SMZs).

Harvesting BMPs involve planning the location of skid trails and log landings to minimize stream crossings and the number of landings. The 2017-2018 voluntary implementation survey found that 96 percent of surveyed tracts used harvesting BMPs.

Regeneration BMPs reduce NPS from site preparation and management activities including herbicide application, prescribed fire management, fire lane construction, and the use of heavy equipment. The 2017-2018 voluntary implementation survey found that 98 percent of surveyed tracts used regeneration BMPs.

Road BMPs reduce NPS from unpaved roads used in forest management and harvest. These BMPs involve planning the location of roads to minimize stream crossings and erosion, water management structures to reduce erosion, and procedures for closing roads that are no longer needed. The 2017-2018 voluntary implementation survey found that 92 percent of surveyed tracts used road BMPs.

SMZ BMPs are intended to maintain the integrity and function of riparian vegetation to protect streams from NPS. The 2017-2018 voluntary implementation survey found that 89 percent of surveyed tracts used SMZ BMPs.

## Statewide Forestry NPS Management Administration

The Forestry Division and Natural Resources Division are co-leads for statewide forestry NPS management. This effort relies on the efforts of many partners. Partners include federal, state, and local agencies that provide expertise, conduct forest management research, and provide incentive, education, and outreach programs to private landowners with non-commercial forests, as well as loggers. Commodity groups and nonprofit organizations also provide education, outreach, and technical assistance. Examples of partners in statewide forestry NPS management and their contributions are provided below. Coordination with partners occurs in watershed-based projects and participation on various state and federal committees and task forces, such as the Arkansas Conservation Partnership. Cooperating entities in statewide forestry NPS management include:

### Arkansas Department of Agriculture Divisions

#### **Forestry Division**

The mission of the Forestry Division is to protect Arkansas forests, and those who enjoy them, from wildland fire and natural hazards while promoting rural and urban forest health, stewardship, development, and conservation for all generations. The Forestry Division works directly with forest managers to identify and implement forestry BMPs that will prevent the degradation of local water quality from forestry practices.

The Forestry Division seeks to reduce sediment concentrations and loading in priority watersheds and statewide through proper and consistent voluntary implementation of forestry BMPs on private and public forest lands. The Forestry Division began providing a BMP training and education program for non-industrial forest landowners in 1998. In addition to the Arkansas Forestry Best Management Practices for Water Quality Protection guide to forestry BMPs, the Forestry Division helps forest landowners with BMPs through the Arkansas Forest Stewardship Program and their Technical Assistance Program. The Forest Stewardship Program recognizes and rewards landowners who manage their forest lands for



multiple uses and provides professionals to assist them in obtaining a written forest management plan. The Forestry Division also manages the state Forest Legacy Program. The Forest Legacy Program uses conservation easements and fee-simple acquisitions to protect environmentally important privately owned forest lands that are threatened by conversion to non-forest uses. The Forestry Division collaborates with forest industry associations and the University of Arkansas System Division of Agriculture (UADA) Cooperative Extension Service to provide training and technical assistance to help loggers, landowners, and forest managers implement recommended forestry BMPs to control NPS.

#### Other State Entities

##### **Arkansas Division of Environmental Quality**

Through a Memorandum of Understanding, the Arkansas Division of Environmental Quality (DEQ) refers citizen complaints about pollution from forestry activities to the Forestry Division for investigation and voluntary resolution before taking enforcement action.

##### **University of Arkansas System Division of Agriculture**

The University of Arkansas System Division of Agriculture (UADA) consists of two units: the Cooperative Extension Service and the Arkansas Agricultural Experiment Station (AAES). The Cooperative Extension Service develops research-based forestry and forest management education and training programs and delivers these programs through faculty located in offices in every county of the state. The AAES network supports forestry research, including BMP demonstration projects with direct application to forestry NPS pollution management.

##### **Arkansas Forest Resources Center**

The Arkansas Forest Resources Center is a University of Arkansas Center of Excellence. The mission of this center is to develop and deliver superior programs in research and extension that enhance and ensure the sustainability of forest-based natural resources.

#### Federal Agencies

##### **U.S. Department of Agriculture**

The U.S. Department of Agriculture (USDA) includes three agencies with important roles in management of forestry NPS. The U.S. Forest Service (USFS) mission is to sustain the health, diversity, and productivity of the nation's forests. In addition to managing the Ouachita and Ozark-St. Francis National Forests in Arkansas, USFS is among the largest forestry research organizations in the world. USFS research promotes ecologically sound management of national forests and private forest lands. Forestry BMPs are among the topics researched by USFS. The USFS also provides technical assistance to state forestry agencies and private forest managers.

The Natural Resources Conservation Service (NRCS) and Farm Service Agency (FSA) also support forestry BMPs on private lands through the same programs in Arkansas that support agriculture BMPs (see Section 3.4.1.3).

##### **U.S. Fish and Wildlife Service**

The U.S. Fish and Wildlife Service assists with forestry BMPs through its Partners for Fish and Wildlife Program in the same way it assists with agriculture BMPs (see Section 3.4.1.3).

## **U.S. Army Corps of Engineers**

The U.S. Army Corps of Engineers (USACE) provides environmental consulting services to federal, state, local, and private entities. USACE carries out environmental and natural resources management programs through its projects, including managing forests. Legislation passed in the 1990s added environmental protection and ecosystem restoration to the primary missions of USACE water resources projects along with navigation and flood control. Since that time, USACE has conducted small ecosystem restoration projects associated with USACE projects, including forest restoration projects.

### Local Entities

#### **Conservation Districts**

The 75 county conservation districts in Arkansas provide technical assistance and develop conservation plans for implementing forestry BMPs, just as they do for agriculture BMPs (see Section 3.4.1.4).

#### **Arkansas Resource Conservation and Development Councils**

The seven Resource Conservation and Development Councils in Arkansas address forestry NPS as part of their grassroots efforts to stabilize and grow rural communities while protecting and developing natural resources (see Section 3.4.1.4).

### Nongovernment Interest Groups

#### **Arkansas Timber Producers Association**

The Arkansas Timber Producers Association administers the Ark Pro Logger training program, launched in 1995. This training program is part of the outreach effort of the Sustainable Forestry Initiative of the national Sustainable Forestry Board. The mission of this program is to *“provide ongoing development and implementation of a training and education program for Arkansas loggers, procurement foresters, land management foresters and others who deal with loggers and logging contractors, designed to provide instruction that will assist in achieving sustainable forestry and stewardship practices.”*

#### **Arkansas Forestry Association**

First organized in 1947 as the Arkansas Wood Products Association, and later changing their name in 1971, the Arkansas Forestry Association (AFA) advocates for the sustainable use and stewardship of Arkansas’s forests and related resources to benefit members of the state’s forestry community. The AFA Education Foundation holds a number of landowner education workshops, publishes educational guides, and also offers Project Learning Tree curriculum and summer workshops for K-12 educators.

#### **The Nature Conservancy**

The Nature Conservancy in Arkansas conducts demonstration projects for prescribed burning in forest lands, as well as training people to conduct prescribed burns, contracting to conduct prescribed burns, and providing other technical assistance to people and organizations considering prescribed burning in forest lands. Prescribed burning has the potential to improve forest runoff water quality.

## **Arkansas Forests & Drinking Water Collaborative**

The Arkansas Forests & Drinking Water Collaborative was established in 2015 to provide a forum for dialog between drinking water utilities and forest managers and conservationists. This organization supports management and restoration of public and privately owned forest lands for the protection of surface drinking water supplies.

### **Tracking and Evaluation**

Statewide forestry NPS management can be tracked and evaluated on three levels: short-term inputs, intermediate processes, and long-term outcomes. Tracking and evaluation will be based upon program activities, behavioral changes, and removal of streams from the state 303(d) list.

Short-term inputs are tracked through management activities, e.g., number of landowners, loggers, foresters, or timber purchasers that participated in education and training programs; number of fact sheets were developed; number of newspaper articles published, etc. These input measures track effort expended, which is a first and necessary step toward effecting change. As part of training programs, it is important to incorporate surveys and tests in workshops for forestry professionals and landowners to assess participants' efforts to prevent forestry from contributing to the pollution of waterbodies. Several partner organizations report this information. Some of this information is provided to Natural Resources Division and is included in the Arkansas NPS Program annual report.

The second level of tracking and evaluation focuses on whether program activities result in behavioral changes, i.e., BMP implementation. In 1996, the Forestry Division adopted a BMP implementation monitoring framework protocol as recommended by the BMP Monitoring Task Force for the Southern Group of State Foresters. The Forestry Division completed the first BMP implementation survey in May 1998. Modifications were made to the survey in 2002 and 2005. In 2002, the survey instrument was amended to comply with updated Forestry Division BMP guidelines. In 2005, aerial reconnaissance became the method of selecting tracts for the survey. Direct comparison between the latest survey and those done prior to 2005 is not possible because of changes in the monitoring instrument and protocol. The Forestry Division monitors and reports forestry BMP implementation every two to three years. The most recent published survey was completed in 2018 and the results were published in Voluntary Implementation of Forestry Best Management Practices for Water Quality Protection in Arkansas. The Forestry Division will continue to monitor BMP implementation and is taking steps to improve the effectiveness of its monitoring.

The final level of evaluation is to measure whether streams are removed from the 303(d) List of Impaired Waterbodies. The state's 303(d) list needs to be continually reviewed. The most current 303(d) list did not identify forestry as a primary or secondary source contributing to surface water quality impairment (DEQ 2018). The impacts of forestry activities on surface waters are identified as surface erosion in the 303(d) list (see Section 5). The desired evaluation outcome is that forestry will not be listed as a primary or secondary contributing source in future 303(d) lists.

### **Funding**

The Forestry Division BMP implementation surveys are funded through the Arkansas NPS Program using Section 319 funds. In addition to NPS Program Section 319 funds, significant funding for implementation of forestry BMPs comes from program partners, particularly NRCS and FSA programs. As stated previously, the 2018 Farm Bill specified that at least 10 percent of NRCS conservation funding be

targeted for source water protection. Forest management, protection, and restoration can be important for protection of drinking water sources. Other state sources of funding for forestry BMPs include the Natural Resources Division Wetlands and Riparian Zones Tax Credit Program and the Forestry Division's Urban and Community Forestry Grant Program.

## References

- Forestry Division. 2022. Arkansas's Forest Facts, 2021. Little Rock: Forestry Division. Accessed November 2022. <https://www.agriculture.arkansas.gov/wp-content/uploads/2022/05/2021-Forest-Facts-of-AR-1.pdf>.
- . 2021. Best Management Practices for Water Quality Protection. Accessed November 2022. <https://www.agriculture.arkansas.gov/wp-content/uploads/2022/01/AR-Best-Management-Practices.pdf>.
- Arkansas Economic Development Commission. 2022. Timber & Forest Products Industry Report. Little Rock: Arkansas Economic Development Commission. Accessed November 2022. <http://info.arkansasedc.com/timber-report>.
- Arkansas Forestry Commission. 2018. Voluntary Implementation of Forestry BMP Management Practices for Water Quality Protection in Arkansas. Results of the 2017-2018 BMP Implementation Survey. [https://www.agriculture.arkansas.gov/wp-content/uploads/2020/05/2017\\_Monitoring\\_Report.pdf](https://www.agriculture.arkansas.gov/wp-content/uploads/2020/05/2017_Monitoring_Report.pdf).
- Dewitz, J, and USGS. 2021. National Land Cover Database (NLCD) 2019 Products. Sioux Falls: US Geological Survey, June. Accessed 2022. doi:<https://doi.org/10.5066/P9KZCM54>.
- Filipek, SP. 1993. "Timber Harvest." In *Impacts on Warmwater Streams: Guidelines for Evaluation*, by CF Bryans and DA Rutherford, 227-244. Bethesda MD: American Fisheries Society.
- Friedel, Melanie. 2017. "Forests as carbon sinks." *American Forests*, July 18. Accessed November 2022. <https://www.americanforests.org/article/forests-as-carbon-sinks/>.
- Gatling, Paul. 2023. "Outdoor recreation provides tourism growth opportunity in Arkansas." *Talk Business & Politics*, March 5. <https://talkbusiness.net/2023/03/outdoor-recreation-provides-tourism-growth-opportunity-in-arkansas/>.
- Magnolia Reporter. 2021. "Arkansas enjoys large economic impact from timber production." July 12. [http://www.magnoliareporter.com/news\\_and\\_business/local\\_business/article\\_6a731c34-df7d-11eb-93ec-076c5d99207d.html](http://www.magnoliareporter.com/news_and_business/local_business/article_6a731c34-df7d-11eb-93ec-076c5d99207d.html).
- Tian, Nana, and Matthew Pelkki. 2022. *Economic Contributions of Arkansas Forest Industries 2021*. fact sheet, Monticello: Arkansas Center for Forest Business at University of Arkansas at Monticello. Accessed November 2022. <https://www.uamont.edu/academics/CFANR/acfb.html>.

## Section Five: Statewide Surface Erosion NPS Management

### Introduction

Surface erosion is one category of pollution sources used by the Arkansas Division of Environmental Quality (DEQ) in the state 303(d) List of Impaired Waterbodies. This category includes erosion from land disturbing activities, unpaved road surfaces, and in-stream erosion. Statewide surface erosion management addresses nonpoint source (NPS) pollution from in-stream erosion (erosion of streambanks, stream channels, and ditches), unpaved roads, road shoulders, recreational trails, fire lanes, utility easements, unrestricted stream crossing and access by vehicles, and land disturbing activities not associated with agriculture or forestry, including construction activities that do not require a National Pollutant Discharge Elimination System permit. Erosion from agricultural and forest lands is addressed through statewide agriculture and forestry NPS management, respectively (see Sections 3 and 4 of this plan).

Unpaved roads make up a significant portion of Arkansas public infrastructure with 49 percent of all roads in the state unpaved, and 72 percent of county roads in Arkansas unpaved (Arkansas Department of Transportation 2023). Unpaved roads are important to tourism in Arkansas and the state outdoor recreation economy. Many scenic vistas, unique natural areas, public hunting lands, and stream access points are accessed via unpaved roads. The economic impact of tourism in Arkansas was greater in 2021 than it was prior to the pandemic (Arkansas Department of Parks, Heritage, and Tourism 2022).

Construction is an important economic activity in Arkansas. The U.S. Department of Commerce's Bureau of Economic Analysis estimated that 2019 gross domestic product (GDP) in the Arkansas construction industry totaled \$5.1 billion representing 3.8 percent of the state's total GDP (Associated General Contractors of America 2020). Major construction activities include the development of residential, commercial, and industrial facilities as well as highways, streets, and other infrastructure.

### Arkansas Surface Erosion NPS

Surface erosion is one of the most common nonpoint sources of pollution named in the 2018 Arkansas 303(d) list (DEQ 2020). Removing vegetation and disturbing soil increases the potential for soil erosion by wind and water as well as vehicular and pedestrian traffic. The potential for in-stream erosion can increase when a variety of activities occur in the watershed or channel, including changes in watershed vegetation or impervious cover, dredging of the channel, or changes to the channel, such as straightening, paving, or adding a road crossing. Pollutants associated with surface erosion include sediment, turbidity, nutrients, organic chemicals, metals, and organic matter.

Sediment (eroded soil) is the primary pollutant associated with surface erosion. Runoff can cause erosion of construction sites and unpaved roads. Typical unpaved road maintenance involves using a road grader to smooth the road surface, which makes for a smoother ride, but also loosens the surface material which can be picked up by runoff. The runoff then carries eroded soil or roadbed material to surface waters where it contributes to sedimentation and turbidity. Streambank erosion, channel, ditch head cutting, and other types of channel erosion also contribute to sediment load and turbidity in surface waters. Excessive streambank and channel erosion are symptomatic of river or stream instability. Stream instability is complex and can result from the cumulative effects of a range of activities over time in the watershed, and adjacent to or within the stream channel.

Nutrients can enter waterways adhered to eroded soil carried by runoff. Organic chemicals, such as fuel, oil, and coolants; and metals from vehicles and other machinery, may also enter waterways carried by runoff from unpaved roads, construction sites, trails, utility rights of way, and fire lanes.

Organic debris from land clearing, including brush, logs, and other vegetation, may be carried to waterways by runoff. Plant material from areas experiencing erosion, including streambanks, can also be carried to surface waters with eroded soil. These organic materials reduce oxygen levels in the receiving waters as they decompose. Larger organic debris and accumulation of smaller debris may alter stream flows, resulting in increased bank erosion and sedimentation.

### **Emerging NPS Issues in Arkansas Surface Erosion**

With the update of the Arkansas Nutrient Reduction Strategy in 2022, there is increased focus in the state on tracking implementation of NPS best management practices (BMPs) and estimating associated changes in nutrient loads leaving the state. Reducing sediment and nutrient runoff due to surface erosion is an important element of the Arkansas Nutrient Reduction Strategy.

The impacts of variable climate must also be considered when evaluating NPS pollution from surface erosion. Local climate conditions are expected to result in higher temperatures and greater frequency of hydrologic extremes. More frequent periods of higher quantity and intensity rainfall result in greater sediment and nutrient loads from surface erosion. Stream hydrology is also affected resulting in greater likelihood of unstable stream systems and increased streambank and channel erosion. Changing temperatures may affect the health of land covers. Poor quality cover can increase erosion. Some studies suggest that increased precipitation could have a greater effect on stream hydrology and stability than land use changes (Hart, Howe, & Blankenship 2023; RTI International 2023).

### **Statewide Surface Erosion NPS Management Goals and Objectives**

The ultimate long-term goal of statewide surface erosion NPS management is for surface erosion to not be identified as a cause of water quality impairment in Arkansas waters. This can be accomplished by reducing surface erosion through public awareness, education, training, and other voluntary programs. Successful implementation will help maintain or improve water quality and the possibility of waterbodies achieving turbidity and sediment water quality criteria.

More specifically goals that can be achieved within 15 to 20 years include:

- Activities addressed through statewide surface erosion NPS management will not contribute sediment or other pollutants to waterbodies in such amounts as to cause impairment of waters of the state.
- Maintain or increase the use of voluntary BMPs to reduce surface erosion.
- Increase stream stability in priority watersheds.
- Increase protection of high-quality waters.

Short-term objectives are intended to move statewide surface erosion NPS management toward its long-term goals. Surface erosion short-term objectives for 2024-2029 are listed in Table 5.1 with milestones. A summary of progress toward statewide surface erosion NPS management long-term and short-term goals from the 2018-2023 plan is included in Appendix D.

Table 5.1. Statewide surface erosion NPS management short-term objectives for 2024-2029

2024-2029 Objective	Milestones
Unpaved road maintenance training in all NPS priority watersheds	Counties with NPS priority watersheds with training
Initiate unpaved road BMP survey (similar to forestry BMP survey)	Survey initiated or determined infeasible
Survey 100 potential stream barrier project locations identified by Southeastern Aquatic Resources Partnership	Number of stream barrier project locations surveyed  NPS Program funding for stream barrier surveys, removal projects
Unpaved roads erosion survey in at least one new priority watershed	Unpaved roads survey NPS watershed-based project(s)  NPS Program funding for unpaved roads survey
Streambank erosion inventory in at least one new priority watershed	Streambank erosion inventory NPS watershed-based project  NPS Program funding for erosion inventory
Stream restoration project in at least one new priority watershed	Stream restoration NPS watershed-based project  NPS Program funding for stream restoration
Tracking of protected or forested riparian buffer	Tracking strategy in place  Riparian buffer inventories completed
Protection of high-quality waters	Watershed-based projects focused on land acquisition, bank stabilization, or maintaining or improving conditions of high-quality waters

### Statewide Surface Erosion NPS Management Strategies

Statewide surface erosion NPS management utilizes four strategies to achieve the program long-term goals and short-term objectives. One strategy of surface erosion NPS management is to continue the voluntary process whereby federal, state, and local programs cooperate in priority areas of the state where water quality problems related to surface erosion have been identified.

Another strategy is to support education and outreach programs of partners related to reducing surface erosion, e.g., Arkansas Department of Transportation (ARDOT) construction BMPs manual, Arkansas Unpaved Roads Program, Arkansas Watershed Steward Program.

A third strategy is to support and encourage advancement in surface erosion BMPs. Examples include advancements in environmentally sensitive maintenance for dirt and gravel roads, and in streambank and channel restoration.

A fourth strategy is to continue to support and encourage implementation of BMPs that reduce surface erosion. BMPs can reduce the impact of surface erosion sources through preventing erosion, or by trapping eroded material before it reaches surface waters. Some examples are discussed below.

BMPs for unpaved roads, recreational trails, fire lanes, and utility easements are the same as for forestry roads, as described in the Forestry Division BMP manual. Erosion from roads and trails can be reduced through siting them to reduce slope, the use of low-cost water management structures such as broad-based dips and wing-ditches, and the use of culverts. Water velocity is the most critical factor when considering runoff on unpaved roads and trails. Fast-moving water has the potential to scour surfaces and carry more sediment than relatively slower-moving water. Implementation of these BMPs generally serves to decrease water velocity, which allows sediment to fall out before it reaches waterways. The transport of eroded material to surface waters can be reduced by minimizing stream crossings.

Construction site BMPs include retention and detention basins and structures to capture sediment and organic material from runoff (e.g., straw bales, silt fence). Erosion can be reduced by covering exposed soil with mulch or gravel. Revegetation of cleared sites as quickly as possible reduces erosion. Hydro-seeding, mulching, and sodding can promote rapid revegetation of cleared land.

BMPs that can reduce erosion in road-side drainage ditches include converting them to grassed swales and the use of check dams.

Stream restoration has become an increasingly important activity in Arkansas in both the public and private sectors for minimizing NPS pollution. To the extent possible, coordinators incorporate natural channel design techniques to accommodate changes in stream flow to stabilize the channel while maximizing aquatic and terrestrial habitat restoration.

Establishing and protecting riparian buffers along streams helps stabilize streambanks, slows runoff, and filters sediment and other pollutants from runoff entering the channel. Beneficial riparian buffer management can include reducing mowing in riparian areas, planting trees and shrubs, or establishing riparian conservation easements.

## **Statewide Surface Erosion NPS Management Administration**

The Arkansas Department of Agriculture's Natural Resources Division (Natural Resources Division), in collaboration with DEQ, is the lead agency for implementation of efforts to address surface erosion across Arkansas. However, statewide surface erosion NPS management relies on the efforts of many partners. Partners include federal, state, and local agencies that provide expertise through technical assistance, research, and education through outreach programs to landowners. In addition, city and town governments, and state regulatory agencies contribute to this program through administration of rules and regulations. Nonprofit organizations also participate in statewide surface erosion NPS management through education, outreach, and technical assistance. Examples of partners in statewide surface erosion NPS management and their contributions are provided below. Coordination with partners occurs in watershed projects and participation on various state and federal committees and task forces, such as the Arkansas Conservation Partnership Series. Cooperating entities in statewide surface erosion NPS management include:

### **Arkansas Department of Agriculture Divisions**

#### **Natural Resources Division**

Natural Resources Division provides technical assistance for streambank stabilization, sediment reduction projects, and erosion prevention initiatives. Periodically, Natural Resources Division provides training opportunities in the state on stream restoration. In addition, Natural Resources Division



participates in stream barrier removal/remediation projects. In some cases, removing or replacing a stream crossing can improve channel stability and reduce streambank erosion. Natural Resources Division conducted the 2022 Clean Water Needs Survey for Hydromodification to evaluate the need for restoring turbidity impaired streams. The 2019 National Land Cover Dataset was used to identify portions of impaired miles with less than 50 percent vegetation coverage within the 30-meter riparian corridor. A conservative estimate of 234 impaired miles were identified for restoration efforts.

The Arkansas Unpaved Roads Program, managed by Natural Resources Division, provides training to road maintenance professionals on techniques of unpaved road maintenance that minimize surface erosion and associated impacts on water quality.

### **Forestry Division**

In addition to the efforts to minimize NPS pollution from forest land activities discussed in Section 4 of this plan, the Arkansas Department of Agriculture's Forestry Division also provides BMP recommendations to minimize surface erosion from access and haul roads from forest operations in the Best Management Practices for Water Quality Protection manual.

### **Other State Entities**

#### **Arkansas Division of Environmental Quality**

DEQ regulates construction sites of one acre or greater and smaller construction sites that are part of a larger common plan of development (i.e., a subdivision). These regulations require preparation, implementation of stormwater pollution prevention plans, and issuance of a short-term activity authorization permit by DEQ.

DEQ has conducted water quality and biological monitoring studies for stream restoration projects (e.g., tributaries of the Little Red River near Clinton). DEQ also reviews project plans for altering stream channels and must issue a Section 401 water quality certification before the U.S. Army Corps of Engineers (USACE) can issue a Section 404 permit.

#### **Arkansas Department of Transportation**

ARDOT provides training to its contractors and staff on BMPs for construction stormwater and erosion management. NPS-related activities routinely undertaken include geographic information system analysis, updating their state road inventory, wetland impact assessments, and stormwater permitting. ARDOT also offers its employees erosion and sediment control training and has several resources available, including a 2016 Erosion and Sediment Control Design and Construction Manual.

#### **Arkansas Game and Fish Commission**

The Arkansas Game and Fish Commission (AGFC) participates in a variety of projects that can reduce surface erosion, including stream and riparian restorations, and stream barrier removal or remediation. The AGFC Stream Habitat Program, which includes the Stream Teams Program, is a voluntary program that provides education and technical assistance to landowners for stream channel, streambank, and riparian area maintenance and restoration. AGFC has supported a Stream Teams Program in Arkansas since 1996. Stream Teams are groups of volunteers who adopt a stream or other waterbody in the state for the purpose of keeping it clean and healthy. Stream Teams may conduct clean up events, water quality monitoring, and/or benthic surveys.

### **Arkansas Geographic Information System Office**

The Arkansas Geographic Information System (GIS) Office maintains the state database of roads, including unpaved roads, known as the Road Centerline File. Information from several sources is used to update this database, including ARDOT. Updates to this database are published on the Arkansas GIS Office website as updated information becomes available (usually at least once a year).

### **University of Arkansas System Division of Agriculture**

The University of Arkansas System Division of Agriculture Cooperative Extension Service offers education on BMPs that reduce surface erosion and its impacts on water quality through the Arkansas Watershed Steward Program and regional stormwater education programs (e.g., Northwest Arkansas Stormwater Education Program, Southeast Arkansas Stormwater Education Program).

### **Federal Agencies**

#### **U.S. Army Corps of Engineers**

The USACE regulates direct changes of a stream channel. This includes stream restoration and stream barrier remediation projects. Section 404 of the Clean Water Act (CWA) establishes a permit program, administered by the Secretary of the Army, acting through the Chief of Engineers. USACE has the authority to review project plans and issue permits for altering stream channels. Project managers and permit seekers who plan to modify stream channels must work with both the USACE and DEQ to ensure that stream geomorphology and long-term water quality are not negatively altered or impacted. When road construction may affect the quality of a waterbody, Section 404 and 401 permits from the USACE and DEQ may need to be obtained.

#### **Natural Resources Conservation Service**

The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) has provided technical assistance for stream stabilization projects through several programs. The national NRCS office also provides technical assistance with natural channel design for stream restoration. Existing NRCS programs that address stream restoration include the Environmental Quality Incentives Program, Regional Conservation Partnership Program, PL-566 Watershed Program, and Wetland Reserve Easements Partnership.

### **Local Entities**

County judges and their respective road maintenance departments are responsible for construction and maintenance of unpaved roads in unincorporated areas of their counties. Municipalities provide technical assistance, surface erosion assessments, restoration, and education opportunities. County and municipal governments can also pass regulations that encourage or require the use of surface erosion BMPs.

### **Nongovernment Interest Groups**

#### **The Nature Conservancy**

The Nature Conservancy (TNC) is a partner in the Arkansas Unpaved Roads Program and assists with developing and delivering unpaved road maintenance training programs and demonstration projects. TNC also participates in stream restoration projects to address streambank erosion, and in-stream barrier mitigation projects.

## Watershed Conservation Resource Center

The Watershed Conservation Resource Center provides technical and planning assistance with stream restoration and barrier mitigation projects to address streambank erosion. They also provide evaluation and monitoring services for streambank erosion, and evaluation of unpaved road erosion.

### Tracking and Evaluation

Through the five-year period of this plan, statewide surface erosion NPS management can be tracked and evaluated on three levels: short-term inputs, behavioral changes, and long-term outcomes. Tracking and evaluation will be based upon program activities, behavioral changes, and removal of streams from the state 303(d) list.

First, management activities such as the number of participants in education and training programs, number of fact sheets developed, and number of newspaper articles, brochures, or other materials that are distributed can be documented. In addition, Natural Resources Division works to stay abreast of erosion assessments and restoration projects in planning, underway, and completed by several partner organizations. This information is reported in the NPS Program Annual Report. These input measures track effort expended, which is a first and necessary step toward affecting change.

The second level of evaluation focuses on whether management activities result in human behavioral changes (i.e., BMP implementation). Some data are tracked and reported on BMP implementation related to surface erosion outside of agriculture or forestry. For example, TNC and Watershed Conservation Resource Center often report on the extent of stream restoration projects they have completed. There is an opportunity to evaluate behavioral change after training county road crews to reduce erosion from unpaved roads, by conducting a survey of the usage of BMPs for unpaved roads, similar to the forestry BMP survey (see Section 4.4.2). Similarly, follow-up surveys could be considered as a component of erosion control training for construction contractors. Natural Resources Division will require grantees to describe how they will attempt to measure behavioral change in their project requests.

Modeling may be used to estimate sediment reduction from restoration projects. The success of stream and riparian restoration projects in restoring fisheries can be measured through documenting changes in biological communities with various biological assessment protocols and metrics. The extent of intact riparian zone vegetation can be interpreted by GIS analysis of land use and hydrography. Arkansas updates land use coverage approximately every five years, which creates the opportunity for periodic evaluation of riparian zones in priority watersheds.

The ultimate measure of statewide surface erosion NPS management is whether or not streams impaired due to surface erosion are removed from the 303(d) List of Impaired Waterbodies. Arkansas's 2018 303(d) List of Impaired Waterbodies identifies 75 stream segments, totaling 1,507 miles, that are impaired because of siltation/turbidity from surface erosion. Surface erosion may be a contributing factor for an additional 15 stream segments, totaling 248 miles, that are listed as impaired due to siltation/turbidity. Surface erosion is not identified as a source for any other pollutants on the 2018 303(d) list (DEQ 2020). Figure 5.1 shows miles of stream impairments due to surface erosion identified in the final 2016, final 2018, draft 2020, and draft 2022 303(d) lists.

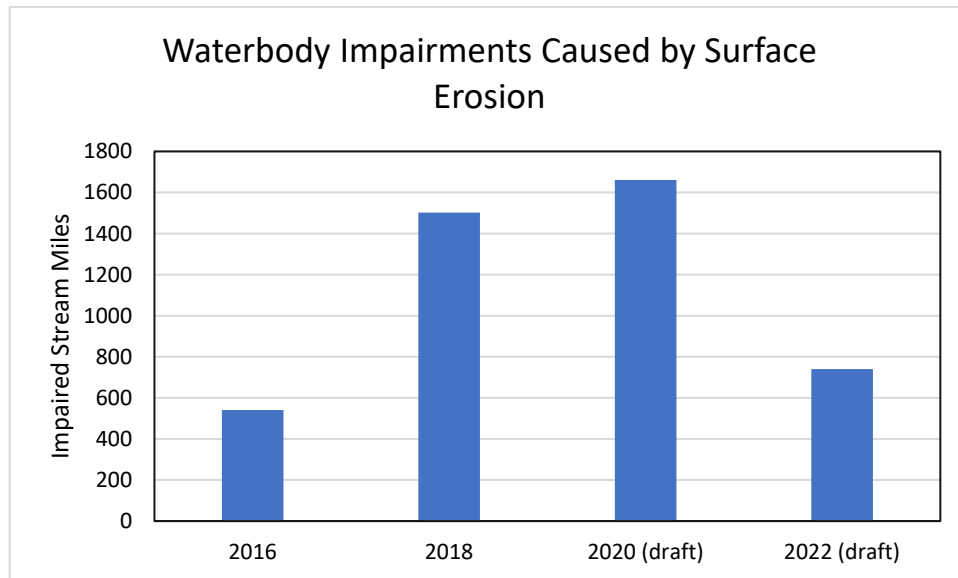


Figure 5.1. Waterbody impairments due to surface erosion identified in recent 303(d) lists (DEQ 2023)

### Funding

The Arkansas Unpaved Roads Program is funded by the Arkansas Unpaved Roads Program Fund, created in 2015 by Act 898 of the Arkansas Legislature. The program assists counties in funding unpaved road projects such as demonstrations, training, promotion, and use of BMPs in construction and maintenance of unpaved roads that may directly impact surface waters. Public entities that own and maintain public roads in Arkansas that are open to public vehicle travel at least eight consecutive weeks a year are eligible to apply for grants. Counties or other road managers can leverage program funding for projects by matching one-to-one with cash or in-kind contributions and be eligible to apply for funding once they have completed an unpaved roads BMP training workshop.

A variety of funding sources are available to supplement NPS Program funding for riparian and stream restoration projects. The Natural Resources Division Wetlands and Riparian Zones Tax Credit Program offers incentives (reduced state taxes) to taxpayers for restoration or protection of riparian zones. AGFC assists with implementation costs for streambank stabilization and riparian restoration through their Stream Habitat Program. Other groups that have provided funding for these projects include conservation districts, NRCS, U.S. Forest Service, Natural Resources Division, TNC, and private foundations.

### References

- Forestry Division. Best Management Practices for Water Quality Protection. <https://www.agriculture.arkansas.gov/wp-content/uploads/2022/01/AR-Best-Management-Practices.pdf>.
- ARDOT. 2016 Erosion and Sediment Control Design and Construction Manual. <https://www.ardot.gov/wp-content/uploads/2021/02/Erosion-and-Sediment-Control-Manual-12-6-16-Current.pdf>.

- . 2020. "Arkansas Road Inventory." Arkansas GIS Office. October 30. Accessed September 2023. <https://gis.arkansas.gov/product/arkansas-road-inventory/>.
- Arkansas Department of Parks, Heritage, and Tourism. 2022. Arkansas Tourism Economic Impact 2021. Little Rock: Arkansas Department of Parks, Heritage, and Tourism.
- Associated General Contractors of America. 2020. "The Economic Impact of Construction in the United States and Arkansas." Associated General Contractors of America. September 23. Accessed November 2023. <https://www.agc.org/sites/default/files/Files/Construction%20Data/AR.pdf>.
- DEQ. 2020. "Final 2018 303(d) List." Arkansas Department of Energy and Environment Division of Environmental Quality. Accessed September 2020. [https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018 303\(d\) list.pdf](https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018%20303(d)%20list.pdf).
- DEQ. 2023. Arkansas's 303(d) List, 305(b) Report, and Assessment Methodology by Year. Accessed October 2023. <https://www.adeq.state.ar.us/water/planning/integrated/303d/list.aspx>.
- Hart, R., Howe, E., & Blankenship, M. 2023. Effects of Climate and Land-Use on Flooding in the Illinois River Basin of Oklahoma and Arkansas. Little Rock: US Army Corps of Engineers. Retrieved from <https://www.swl.usace.army.mil/Missions/Planning/Illinois-River-Flood-Study/Illinois-River-Flood-Study-Documents/>.
- Natural Resources Division. 2022. 2022 Arkansas Nutrient Reduction Strategy (ANRS). strategy, Little Rock: Natural Resources Division. Accessed July 2023. <https://www.agriculture.arkansas.gov/wp-content/uploads/2022/07/2022-7-21-ANRS-FINAL-PUBLISH.pdf>.
- RTI International. 2023. Beaver Lake Watershed Restoration Strategy 2023 Revision. Elkins: Beaver Watershed Alliance.

## Section Six – Statewide Urban Runoff NPS Management

### Introduction

Arkansas's landscape is changing. Some parts of the state are experiencing rapid development. For example, Benton, Madison, and Washington counties in Northwest Arkansas have experienced population increases of 5.7 percent, 5.7 percent, and 3.8 percent, respectively, between 2020 and 2022 (Axios NW Arkansas 2023). As development of the landscape increases, stormwater management problems increase. The water flows off impervious surfaces, such as roads, driveways, rooftops, and sidewalks, into storm drains. These openings along roads and in parking lots connect to pipes that carry the water and pollutants directly to local streams or lakes. Because water cannot soak or percolate through impervious surfaces, there is more stormwater runoff from cities and other developed areas than in forests and fields.

Urban runoff is a category of pollution sources used by the Arkansas Division of Environmental Quality (DEQ) in the state 303(d) List of Impaired Waterbodies. Statewide urban runoff nonpoint source (NPS) management focuses on pollutants that can be generated by households, businesses, and municipalities that are not required to obtain National Pollutant Discharge Elimination System or state water discharge permits, regardless of whether they are in rural or urban areas.

Low impact development (LID) can reduce the impacts of urban runoff by reducing runoff volumes and improving runoff quality. LID practices aim to preserve or recreate natural landscape features and minimize impervious areas to encourage infiltration, evapotranspiration, or usage of stormwater. Examples of LID include rain gardens, bioretention gardens, bioswales, pervious pavement, green roofs, and rain harvesting. Use of LID is increasing in Arkansas, particularly in Central and Northwest Arkansas. Cities in these areas, such as Little Rock, Fayetteville, and Bentonville, have added city ordinances covering the usage of LID.

### Arkansas Urban Runoff NPS

Development and urbanization present many challenges to reducing NPS pollution. One of these challenges is that buildings, pavement, and other impervious areas increase the quantity and velocity of stormwater runoff (i.e., hydromodification), which can destabilize stream channels and lead to in-stream erosion (see Section 5).

The activities that occur in developed areas contribute a variety of potential pollutants to stormwater runoff. Common NPS pollutants associated with urban runoff with the potential to impair water quality in Arkansas include sediment, nutrients, oil and grease, hydrocarbons, organic compounds, pathogens, minerals, organic debris, heavy metals, salt applied to iced roads, and trash. Reducing NPS pollution from urban runoff requires strategic management of hydrology in developed areas and best management practice (BMP) implementation by a variety of stakeholders.

Suspended sediment is the most common pollutant in urban runoff. Sediment in urban runoff can come from surface erosion activities that take place in developed areas, primarily land clearing and construction, and erosion of streambanks, streams, and ditches. For more information about these sediment sources, please see Section 5. Sand applied to roads during icy conditions can also be carried to surface waters as sediment.

Nutrients in urban runoff can come from fertilizer used in landscaping, failing onsite wastewater treatment systems (i.e., septic systems), pet waste, waste from urban wildlife, fallen leaves and lawn clippings, illicit discharges, sanitary sewer overflows, and atmospheric deposition.

Oil and grease in urban runoff can come from vehicles, heavy equipment, railroads, illicit discharges, improper disposal of used motor or cooking oil, and food trash. Oil and grease from vehicles can collect on roads and parking lots and then be washed into surface waters by runoff.

Hydrocarbons in urban runoff, e.g., petroleum, can come from vehicles, improper storage of fuel, or accidental spills at vehicle fueling stations or fuel storage and sales facilities. Hydrocarbons from vehicles can collect on roads and parking lots and then be washed into surface waters by runoff.

Organic compounds, such as paint or other household chemicals, can be exposed to runoff through improper storage or disposal.

Pathogens in urban runoff can come from failing onsite wastewater treatment systems, pet waste, illicit discharges, sanitary sewer overflows, and waste from urban wildlife.

Minerals in urban runoff can come from fertilizers used in landscaping, de-icing salts, fuel, atmospheric deposition, vehicle leaks, washing of vehicles or buildings, illicit discharges, failing on-site wastewater treatment systems, and combined sewer overflows.

In addition to being a source of nutrients, organic debris such as lawn clippings, fallen leaves, pet and wildlife waste, and litter can reduce oxygen levels in surface waters as they decompose. These materials come from improper disposal or management of landscaping and animal waste and litter.

Heavy metals in urban runoff can come from vehicles, atmospheric deposition, or illicit discharges.

### Emerging NPS Issues in Arkansas Urban Runoff

Developed areas can be sources of contaminants of emerging concern. Contaminants of emerging concern that can be in urban runoff include personal care products, microplastics, and pharmaceuticals.

Changes in climatic conditions are affecting hydrology of developed areas. As developed areas experience more frequent or greater magnitude flooding, there are greater chances for pollutants and trash to be transported to surface waters. More intense rain events increase instability of stream channels and hydromodification impacts from impervious areas. Recent studies in Northwest Arkansas concluded that increased precipitation above historic normal have the potential to cause greater increases in NPS pollutant loads than increases in development (Hart, Howe, & Blankenship 2023; RTI International 2023).

*Table 6.1. Statewide urban runoff NPS management short-term objectives for 2024-2029*

2024-2029 Objective	Milestones
Increase outreach to historically underserved communities	Gather demographic information about watershed-based project participants
Develop or expand projects that provide co-benefits to water quality, wildlife, and climate resiliency of Arkansas communities	Number of watershed-based projects with co-benefit elements  Number of BMPs implemented that contribute to climate resiliency of communities

Support Arkansas Nutrient Reduction Strategy marketing, messaging, and implementation	<p>Number of advertisements and level of participation in nutrient reduction related programs in developed areas</p> <p>Number of projects funded through Gulf Hypoxia Program with quantifiable reduction in nutrient loss from developed areas</p>
---	--

## Statewide Urban Runoff NPS Management Goals and Objectives

The ultimate long-term goal of statewide urban runoff NPS management is that urban runoff will never be identified as contributing to impairment of the waters of the state. Statewide urban runoff NPS management goals that can be achieved within the next 10 to 15 years are:

- The number of waterbodies listed as impaired due to urban runoff is fewer than on the 2018 Arkansas 303(d) list.
- Increase awareness and use of urban runoff BMPs, incorporating social equity, and improving resilience of urban areas.

Short-term objectives are intended to move statewide urban runoff NPS management toward its long-term goals. Short-term objectives for 2024-2029 are listed in Table 6.1 with milestones. Progress toward these objectives will be reported in the NPS Annual Report. A summary of progress toward statewide urban runoff NPS management long-term and short-term goals from the 2018-2023 plan is included in Appendix D.

## Statewide Urban Runoff NPS Management Strategies

Statewide urban runoff NPS management utilizes three strategies to achieve long-term goal and short-term objectives. One strategy is to support education and outreach programs of partners related to reducing pollution in urban runoff. This includes information, education, and public awareness programs that address management of household chemicals. Examples of outreach programs used in Arkansas communities include decorating or marking storm drains and stream clean up events. The Arkansas Watershed Steward Program also addresses urban runoff NPS concerns.

Another strategy is to support state regulations and local ordinances that reduce pollutants in urban runoff. Some Arkansas cities have ordinances related to disposal of pet and yard waste and swimming pool drainage. Fayetteville has enacted a streamside ordinance to protect and restore the benefits of riparian buffers within the city limits. Under state law, Northwest Arkansas has been designated as a Nutrient Surplus Area. Applications of poultry litter, sewage sludge, or commercial fertilizer on more than 2.5 acres in this area require a nutrient management plan, training, and certification.

Another strategy is to encourage and support voluntary use of BMPs that reduce runoff or improve the water quality of runoff from paved roads and developed areas. Information about stormwater BMPs is available on the University of Arkansas System Division of Agriculture (UADA) Cooperative Extension Service Stormwater Education Program website. Examples of BMPs that target Arkansas sources of urban runoff NPS pollutants are highlighted below.



- Community programs for collection and proper disposal of household hazardous chemicals have been successful in eliminating hazardous chemicals from entering the environment. Promotion and continuation of existing programs, and development of new programs, are necessary for the successful prevention of water quality degradation resulting from household chemicals and fertilizers.
- Good housekeeping practices at businesses reduce exposure of trash and chemicals to runoff. Stormwater Pollution Prevention Plans specify the practices appropriate to reduce NPS pollution at commercial facilities. These include practices like spill prevention and clean up, and storage of materials under cover so they are not exposed to rain.
- Street sweeping removes sediment, trash, metals, microplastics, and other pollutants from streets, so they are not picked up by runoff and carried to surface waters.
- Good vehicle maintenance prevents leaks of oil, fuel, and other chemicals onto streets and parking areas that can then be picked up by runoff and carried to surface waters.
- Careful and appropriate use of fertilizers. This can include using soil test results to guide the appropriate use of fertilizers.
- Proper clean up and disposal of pet waste.
- Installation of low impact development practices and green infrastructure. These practices restore a more natural hydrology to developed areas, reducing stormwater runoff volume, and the NPS pollutants in runoff. Examples include rain gardens, porous pavers, rain barrels, and vegetated filter strips.
- Identification and removal of illicit discharges to stormwater collection systems or surface water bodies.
- Proper maintenance of septic systems, and repair or replacement of failing septic systems.

### **Statewide Urban Runoff NPS Management Administration**

DEQ and the Arkansas Department of Health (ADH) are co-leads of statewide urban runoff NPS management. DEQ administers the permitting program for municipal separate storm sewer system (MS4) permits. The MS4 program addresses the same NPS pollutants and sources as the Statewide Urban Runoff NPS Program. ADH promulgates rules for onsite wastewater treatment systems in Arkansas and provides guidance and information for septic system installers and owners. However, statewide urban runoff NPS management still relies on the efforts of multiple partners. Partners include federal, state, and local agencies that provide expertise through technical assistance, and education through outreach programs to landowners. In addition, state and local regulatory agencies contribute to this program through administration of rules and regulations that reduce pollutants in urban runoff. Universities and nonprofit organizations also participate in statewide urban runoff NPS management through education, outreach, research, and technical assistance. Examples of partners in statewide urban runoff NPS management and their contributions are provided below. Coordination with partners occurs in watershed-based projects and participation on various local, state, and federal committees and task forces, such as the Arkansas Pollution Control and Ecology Commission. Cooperating entities in statewide urban runoff NPS management include:

## Arkansas Department of Agriculture Divisions

### **Natural Resources Division**

Several of the Arkansas Department of Agriculture's Natural Resources Division (Natural Resources Division) programs and rules outside of the NPS Program contribute to management of urban runoff NPS. These include the Nutrient Management Program, which includes training and certification for nutrient management planners and applicators, and the Arkansas Nutrient Reduction Strategy.

### **Forestry Division**

The Arkansas Department of Agriculture's Forestry Division Urban and Community Forestry Program provides technical assistance to promote forest and tree stewardship in communities. Activities supported by this program have the potential to decrease urban runoff and pollutants in urban runoff.

## Other State Entities

### **University of Arkansas System Division of Agriculture**

The UADA Cooperative Extension Service develops and delivers research-based regional stormwater education, training programs, and materials. This includes information on responsible lawn maintenance. The Cooperative Extension Service is also the primary provider of training through the Arkansas Watershed Steward Program.

### **Arkansas Game and Fish Commission**

Through the Stream Habitat Program, the Arkansas Game and Fish Commission can provide technical assistance with water quality monitoring in developed areas.

### **Arkansas Division of Environmental Quality**

Other DEQ programs that contribute to reducing NPS pollution in urban runoff include air emissions regulations and monitoring (reduce atmospheric deposition), hazardous and solid waste programs, and sewer overflows tracking.

### **Arkansas Department of Transportation**

The Arkansas Department of Transportation is responsible for maintenance of the state highway system and associated drainage systems.

## Federal Agencies

### **U.S. Environmental Protection Agency**

The U.S. Environmental Protection Agency (EPA) provides a variety of resources related to reducing NPS in urban runoff. These resources are available on the EPA website under the topics of green infrastructure, prevention and monitoring stormwater pollution, and septic systems.

## Local Entities

City governments provide services that can reduce urban runoff pollutants, including street sweeping, household hazardous waste collection programs, and yard waste collection and disposal. They can promulgate ordinances that improve runoff water quality, such as the streamside buffer ordinance of the

City of Fayetteville, ordinances that address disposal of pet wastes, and programs that encourage low impact development practices. Many also have education and outreach programs related to protecting and improving runoff water quality.

### Tracking and Evaluation

Statewide urban runoff NPS management can be tracked and evaluated on three levels: short-term inputs, intermediate processes, and long-term outcomes. Tracking and evaluation will be based upon program activities, behavioral changes, and removal of streams from the state 303(d) list.

Short-term inputs are tracked through management activities, e.g., how many education and training programs were held and how many participated, how many fact sheets were developed, how many newspaper articles were published, how many clean-up events were held and how many participated. Tracking these inputs provides a measure of effort expended, which is a first and necessary step toward affecting change.

The second level of tracking and evaluation focuses on whether management activities result in behavioral changes. Behavioral changes can be quantified through tracking implementation of low impact development or other BMPs, number of nutrient applicator certifications, number of failing septic systems repaired or replaced, or through surveys. Hazardous waste collection programs can be evaluated by the volume or mass of hazardous waste collected. As part of training programs, it is important to incorporate surveys and tests in workshops for professionals and community members to assess participants' efforts to prevent urban runoff from contributing to the pollution of waterbodies. Educational programs concerning runoff from business and household chemicals and fertilizers can be evaluated by the agencies conducting the education programs through attendance logs and attendee post-program evaluations.

The final level of evaluation is to measure whether streams are removed from the 303(d) List of Impaired Waterbodies. DEQ identifies urban runoff as a source of pollutants in its 2018 303(d) List of Impaired Waterbodies. The most recent EPA-approved 303(d) list for Arkansas identifies a total of 53.2 stream miles as impaired due to urban runoff (DEQ 2020). Figure 6.1 shows the miles of stream impairments due to urban runoff identified in the final 2016, final 2018, draft 2020, and draft 2022 303(d) lists.

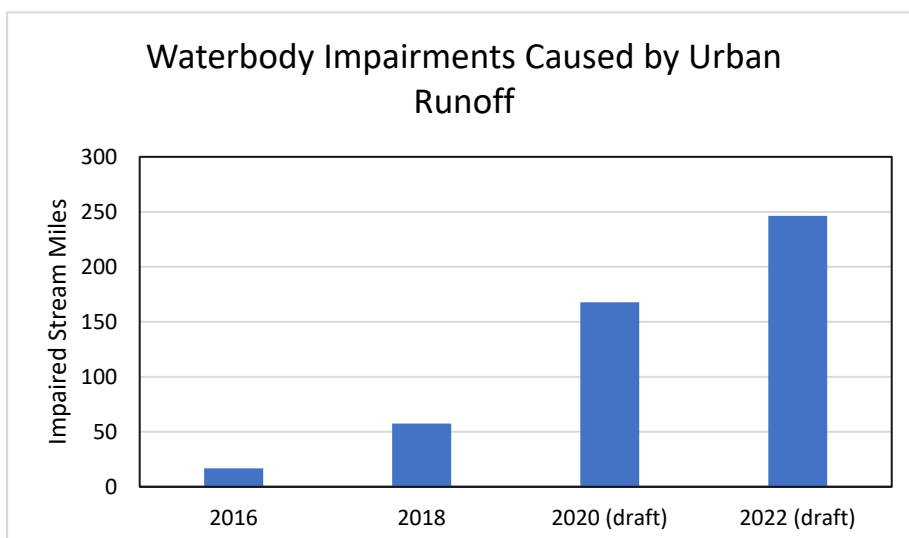


Figure 6.1. Miles of stream impairments due to urban runoff identified in recent 303(d) lists (DEQ 2023)

## Funding

Implementation of urban runoff BMPs is often funded by communities, developers, businesses, or property managers. In addition to the Arkansas NPS Program, state sources of funding assistance for green infrastructure urban runoff BMPs include the Natural Resources Division Wetland & Riparian Zones Tax Credit Program and the Forestry Division Urban and Community Forestry Grant Program. There are also some regional programs currently active in Arkansas that provide funding assistance to individuals for repairing or replacing failing septic systems. Community parks and recreation projects, for which funding assistance is available, can also be designed to include elements that act as urban runoff BMPs. EPA's Green Infrastructure Funding Opportunities website includes a list of federal sources of funding assistance that can be used for green infrastructure projects.

## References

- Axios NW Arkansas, 2023: <https://www.axios.com/local/nw-arkansas/2023/04/07/northwest-arkansas-population-growth-outpace>.
- Conwayarkansas.gov: Soft Engineering for Healthier Ecosystems: Low Impact Development at Markham Square. <https://conwayarkansas.gov/news/low-impact-development-at-markham-square/>.
- DEQ. 2020. "Final 2018 303(d) List." Arkansas Department of Energy and Environment Division of Environmental Quality. Accessed September 2020. [https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018 303\(d\) list.pdf](https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018%20303(d)%20list.pdf).
- DEQ. 2023. Arkansas's 303(d) List, 305(b) Report, and Assessment Methodology by Year. Accessed October 2023. <https://www.adeq.state.ar.us/water/planning/integrated/303d/list.aspx>.
- EPA. Green Infrastructure Funding Opportunities. <https://www.epa.gov/green-infrastructure/green-infrastructure-funding-opportunities>.
- EPA. NPDES Stormwater Program. <https://www.epa.gov/npdes/npdes-stormwater-program>.
- EPA. Septic Systems. <https://www.epa.gov/septic>.
- Hart, R., Howe, E., & Blankenship, M. (2023). *Effects of Climate and Land-Use on Flooding in the Illinois River Basin of Oklahoma and Arkansas*. Little Rock: US Army Corps of Engineers. Retrieved from <https://www.swl.usace.army.mil/Missions/Planning/Illinois-River-Flood-Study/Illinois-River-Flood-Study-Documents/>.
- Natural Resources Division. Arkansas Nutrient Reduction Strategy. <https://www.agriculture.arkansas.gov/natural-resources/divisions/water-management/arkansas-nutrient-reduction-strategy/>.
- RTI International. (2023). *Beaver Lake Watershed Restoration Strategy 2023 Revision*. Elkins: Beaver Watershed Alliance.
- Ryburn, Stacy. (2018) Arkansas Democrat Gazette. Green Parking Lots Becoming More Commonplace in Northwest Arkansas, Elsewhere. <https://www.arkansasonline.com/news/2018/sep/09/green-parking-lots-becoming-more-common/>.
- University of Arkansas. Division of Agriculture. Cooperative Extension Service. Arkansas Stormwater Education Program. <https://www.uaex.uada.edu/environment-nature/water/stormwater/default.aspx>.

## Appendix A – NPS Plan Stakeholder Group

Representatives from the following organizations participated in preparation of the 2024-2029 NPS Plan:

- Agriculture Council of Arkansas
- Arkansas Association of Conservation District Employees
- Arkansas Association of Conservation Districts
- Arkansas Canoe Club
- Arkansas Department of Agriculture
- Arkansas Department of Energy and Environment
- Arkansas Department of Health
- Arkansas Department of Parks, Heritage, and Tourism
- Arkansas Department of Transportation
- Arkansas Division of Environmental Quality
- Arkansas Environmental Federation
- Arkansas Farm Bureau
- Arkansas Forestry Association
- Arkansas Game and Fish Commission
- Arkansas Homebuyers Association
- Arkansas Livestock and Poultry Division
- Arkansas Municipal League
- Arkansas Natural Heritage Commission
- Arkansas Office of the Governor
- Arkansas Oil and Gas Commission
- Arkansas Pork Producers Association
- Arkansas Public Policy Panel
- Arkansas River Valley Resource and Development Council
- Arkansas Rural Water Association
- Arkansas State Plant Board
- Arkansas State University
- Arkansas Tech University
- Arkansas Water Resources Center
- Associated General Contractors of Arkansas
- Association of Arkansas Counties
- Audubon Arkansas
- Baxter County Conservation District
- Beaver Water District
- Beaver Watershed Alliance
- Boone County Conservation District
- Buffalo River Watershed Alliance
- Cattails Environmental, LLC
- Central Arkansas Water
- City of Fort Smith
- City of Little Rock
- Crooked Creek Conservation District
- Cross County Conservation District
- East Arkansas Planning and Development District
- Equilibrium
- Friends of Fourche Creek
- Friends of North Fork/White River
- Friends of the Ouachita Trail
- FTN Associates, Ltd.
- Fulton County Conservation District
- GBMc & Associates
- H2Ozarks
- Illinois River Watershed Partnership
- Kings River Watershed Group
- Lake Conway Homeowners Association
- Lake Fayetteville Watershed Partnership
- League of Women Voters of Arkansas
- Leatherwood Creek Watershed
- Little Red River Action Team
- Lower Little River Watershed Coalition
- McGeorge Construction
- National Park Service
- Natural Resources Division
- Northwest Arkansas Resource Conservation and Development Council
- Ouachita Watch League
- Ozark Foothills Resource Conservation and Development Council
- Plum Creek Timber Company
- Scott County Organization to Protect the Environment
- Southwest Arkansas Planning and Development District
- Southwest Arkansas Resource Conservation and Development Council
- Springdale Water Utilities

- St. Francis County Conservation District
- Streamworks Mitigation Services
- The Nature Conservancy
- The Ozark Society
- The Poultry Federation
- U.S. Army Corps of Engineers
- U.S. Department of Agriculture Farm Service Agency
- U.S. Department of Agriculture Forest Service
- U.S. Department of Agriculture Natural Resources Conservation Service
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Geological Survey
- University of Arkansas
- University of Arkansas at Little Rock
- University of Arkansas at Monticello
- University of Arkansas at Pine Bluff
- University of Arkansas for Medical Sciences
- University of Arkansas System Division of Agriculture Cooperative Extension Service
- University of Arkansas System Division of Agriculture Public Policy Center
- University of Arkansas Watershed Research and Education Center
- University of Central Arkansas
- Upper White River Basin Foundation
- Watershed Conservation Resource Center
- West Center Arkansas Planning and Development District
- West Fork-White River Watershed
- Western Arkansas Planning and Development District
- White County Conservation District
- White River Planning and Development District

## Appendix B – Risk Matrix Report

## Appendix C – List of Federal Lands

Area	Designation	Federal Agency
Little Rock Air Force Base	Air Force	Department of Defense
Eaker Air Force Base (closed)	Air Force	Department of Defense
Pine Bluff Arsenal	Army	Department of Defense
Fort Chaffee (closed)	Army	Department of Defense
Camp Joseph T. Robinson	Army	Department of Defense
Ozark Lake	Army Corps of Engineers	Department of Defense
Nimrod Lake	Army Corps of Engineers	Department of Defense
Millwood Lake	Army Corps of Engineers	Department of Defense
Lake Ouachita	Army Corps of Engineers	Department of Defense
Lake Greeson	Army Corps of Engineers	Department of Defense
Greers Ferry Lake	Army Corps of Engineers	Department of Defense
Gillham Lake	Army Corps of Engineers	Department of Defense
Dierks Reservoir	Army Corps of Engineers	Department of Defense
DeQueen Reservoir	Army Corps of Engineers	Department of Defense
DeGray Lake	Army Corps of Engineers	Department of Defense
Dardanelle Lake	Army Corps of Engineers	Department of Defense
Cache River Mitigation Project	Army Corps of Engineers	Department of Defense
Blue Mountain Lake	Army Corps of Engineers	Department of Defense
Beaver Lake	Army Corps of Engineers	Department of Defense
Table Rock Lake	Army Corps of Engineers	Department of Defense
Norfork Lake	Army Corps of Engineers	Department of Defense
Bull Shoals Lake	Army Corps of Engineers	Department of Defense
Saint Francis National Forest	National Forest	Forest Service
Ozark National Forest	National Forest	Forest Service
Ouachita National Forest	National Forest	Forest Service
Arkansas Post National Memorial	National Memorial	National Park Service
Pea Ridge National Military Park	National Military Park	National Park Service
Hot Springs National Park	National Park	National Park Service
Buffalo National River	National River	National Park Service
White River National Wildlife Refuge	National Wildlife Refuge	Fish and Wildlife Service
Wapanocca National Wildlife Refuge	National Wildlife Refuge	Fish and Wildlife Service
Pond Creek National Wildlife Refuge	National Wildlife Refuge	Fish and Wildlife Service
Overflow National Wildlife Refuge	National Wildlife Refuge	Fish and Wildlife Service
Holla Bend National Wildlife Refuge	National Wildlife Refuge	Fish and Wildlife Service
Felsenthal National Wildlife Refuge	National Wildlife Refuge	Fish and Wildlife Service



<b>Area</b>	<b>Designation</b>	<b>Federal Agency</b>
Cache River National Wildlife Refuge	National Wildlife Refuge	Fish and Wildlife Service
Big Lake National Wildlife Refuge	National Wildlife Refuge	Fish and Wildlife Service
Bald Knob National Wildlife Refuge	National Wildlife Refuge	Fish and Wildlife Service
Upper Buffalo Wilderness	National Wilderness	Forest Service/National Park Service
Richland Creek Wilderness	National Wilderness	Forest Service
Poteau Mountain Wilderness	National Wilderness	Forest Service
Leatherwood Wilderness	National Wilderness	Forest Service
Hurricane Creek Wilderness	National Wilderness	Forest Service
Flatside Wilderness	National Wilderness	Forest Service
East Fork Wilderness	National Wilderness	Forest Service
Dry Creek Wilderness	National Wilderness	Forest Service
Caney Creek Wilderness	National Wilderness	Forest Service
Buffalo National River Wilderness	National Wilderness	National Park Service
Big Lake Wilderness	National Wilderness	Fish and Wildlife Service
Black Fork Mountain Wilderness	National Wilderness	Forest Service

## Appendix D – Progress Towards 2018-2023 Goals

**Table D-1: Program-wide short-term objectives**

2018-2023 Objective	Progress
As resources allow, continue to make available competitive grants on an annual basis for statewide programs and watershed-based implementation projects, giving emphasis to priority watersheds that are consistent with goals and objectives in this plan.	2018-2023: \$18,893,952 in 319 grants awarded, three watershed management plans approved by EPA, and three watershed management plan updates initiated.
Give preference to implementation projects that defensibly target sub-watersheds, thus improving the opportunity to achieve measurable improvements in the timeframe of this plan.	Evaluated and re-assessed project workplan scoring criteria to prioritize projects which implemented conservation practices at the sub-basin scale.
Continue to focus on increasing implementation of BMPs and other related behavioral changes that have the cumulative effect of improving water quality.	2018-2023: \$1,473,709 in 319 grants awarded for education and outreach projects.
Continue to improve mechanisms for tracking, measuring, and reporting implementation of BMPs.	Arkansas Nutrient Reduction Program nutrient reduction tracking tool developed, which includes quantifying agriculture BMP implementation.
Continue to strengthen education, outreach, and involvement activities to move individuals and businesses from awareness to advocacy.	Updated the Arkansas Watershed Steward Handbook in 2022.  39 Watershed Stewardship training programs conducted in 2018-2023.  73 outreach and education watershed-based projects funded with 182 events hosted in 2018-2023.
Update the Qualitative Risk Assessment Matrix as appropriate or within six months after DEQ publishes a draft list of impaired waterbodies.	Risk matrix was updated in 2022.
Continue to review DEQ’s draft list of impaired waterbodies to determine the potential to develop EPA success stories.	East and West Fork Point Remove success story published in 2019.  West Fork White River success story published in 2022.
Continue to develop local capacity of local watershed groups to effect behavioral change, giving emphasis to priority watersheds.	New local watershed group in Poteau River priority watershed initiated in 2022.  Continued support of the Saline River Watershed Alliance’s work to participate in the update of the Upper Saline River Watershed Management Plan.
Continue to promote the development of watershed management plans and update and	2018-2023: Three new watershed management plans were approved by EPA, and three

<b>2018-2023 Objective</b>	<b>Progress</b>
refine existing ones as appropriate.	watershed management plan updates were initiated.
Strengthen existing and develop new working partnerships among cooperating entities in order to better leverage limited resources available to improve water quality.	Arkansas Stream Heritage Partnership formed in 2018.  Arkansas Oklahoma 2018 memorandum of agreement for protection of Illinois River water quality.
Foster improved sharing of data, GIS layers, assessments, research and other analytic tools that will enable improved targeting of NPS resources by all cooperating entities.	Updated websites for the Nonpoint Source Pollution Program, Wetland and Riparian Tax Credit, Arkansas Unpaved Road Program, and Arkansas Nutrient Reduction Strategy.  Released newly developed Nutrient Reduction Viewer and Great Lakes to Gulf-Arkansas Water Quality Data Portal.
Promote and support strengthened cooperation at the state and local levels to more effectively and efficiently target and coordinate resources to improve water quality.	Coordinated participation in annual Nonpoint Source Program annual meeting through co-hosting with Arkansas Water Resources Center, Arkansas Forest and Drinking Water Collaborative, Illinois River Watershed Partnership, and Beaver Watershed Alliance.  Staff continue to routinely participate in NRCS Water Quality and Source Water Protection Sub-Committee, Arkansas Harmful Algae Bloom Workgroup, and many other communitive working groups.
Work within the framework of the Arkansas Water Plan to enhance the NPS Management Program and seek to obtain increased non-federal funding.	In August 2023, Governor Sanders announced through Executive Order 23-27 that the Arkansas Department of Agriculture’s Natural Resources Division shall undertake a comprehensive analysis of the State’s needs from the 2014 Arkansas Water Plan.  Work continues to leverage private, state, and federal dollars to expand NPS Management Program impact on the state’s water quality.

**Table D-2: Statewide agriculture NPS Program short-term goals for 2018-2023**

2018-2023 Goal	Progress
Utilize NRCS land management practices on highly erodible land such as riparian areas.	Riparian areas are scored higher when selecting 319 projects.  Determine sediment load reductions through GRTS.
Have 90 percent of poultry and livestock growers operate within the conditions of a nutrient management plan (NMP) prepared by a certified nutrient planner.	Within Arkansas’s Nutrient Surplus Area all poultry and livestock producers are required to maintain and implement a nutrient management plan. While outside of the Nutrient Surplus Area NMP’s are voluntary. Natural Resources Division is evaluating the percentage of voluntary plans per the number of registered producers moving forward. Natural Resources Division staff will work with the Livestock and Poultry Division as the Poultry Feeding Operation registration was moved in 2023.
Establish a detectable trend toward reduced nutrient loading for selected streams within NSAs as a result of implementation of NMPs.	The Arkansas Nutrient Reduction Strategy prioritization methodology included site-specific trend analysis for 14 water quality monitoring stations in the Nutrient Surplus Area. While difficult to ascertain the direct water quality benefits from the implementation of nutrient management plans, water quality trends for these sites indicate that for total nitrogen concentrations three of the fourteen are decreasing, eight are increasing, and three indicate no change. For total phosphorus concentrations, six sites are decreasing, three increasing, and the remainder indicate no change.
Develop effective BMPs for management of identified chemical-resistant weeds or pests and the use of chemicals for control.	After consideration, we have concluded that this is not a NPS goal.
Promote soil health and cover crops in animal and row crop agriculture.	One project, 17-700, included cover crop demonstration during 2018-2023.  Forage and biomass planting were part of eight demonstration projects in 2018-2023 (16-200, 16-300, 16-400, 16-900, 17-800, 19-1000, 20-300, 20-400).

**Table D-3: Statewide agriculture NPS Program objectives for 2018-2023**

2018-2023 Objective	Progress
Continue to encourage and provide technical assistance for the development of conservation plans, nutrient management plans, and implementation of BMPs through wide-ranging education and outreach programs. Continue to recruit and train more technical service providers to meet the demand for technical assistance and to develop conservation plans and nutrient management plans.	As appropriate, Natural Resources Division will work with local conversation districts to develop on-farm conservation plans for producers through Title X Cost-Share projects. Additionally, as appropriate, Natural Resources Division may provide technical assistance directly to local producers for conservation plan implementation.
Identify measures and analyze factors that influence behavior change to effectively target education and outreach programs as well as other incentives.	NRCS is conducting Conservation Practice Adoption Motivations Surveys.
Develop tools that enable measurement of the combined effects of implementing multiple water quality BMPs in farming systems and assess their effectiveness at a watershed or sub-watershed level.	Information unavailable
Utilize and potentially expand on the USDA assessment tool for use by agricultural producers for decision making on management systems related to water quality protection.	Information unavailable
Identify additional sources of funding for projects that demonstrate systematic approaches that enable farmers to achieve multiple goals (e.g., conserve water supply and protect water quality while achieving profitability goals).	Information unavailable
Improve the availability and access to information on land use at the watershed and sub-watershed levels to better identify areas for potential implementation projects. While maintaining mandated confidentiality, make available information on the types, extent, and distribution of land uses, BMPs in use, riparian buffers, and total acres enrolled in conservation programs.	Information compiled as part of nutrient reduction program. Arkansas Nutrient Reduction Viewer initiated in 2022.
Seek additional sources of funding to increase and improve the effectiveness of technical assistance for planning resource management and for the implementation of BMPs, with emphasis on NSAs.	Information unavailable
Coordinate conservation planning to take full advantage of financial incentives or assistance programs from state, federal, and private entities. Examples include riparian habitat	Information unavailable

2018-2023 Objective	Progress
improvement, Agricultural Conservation Easement Program’s Wetlands Reserve Easement Program, Conservation Reserve Program, Wetland and Riparian Zone Tax Credit Program (through Natural Resources Division), and other programs.	
Continue to focus on BMP implementation to improve erosion control, sediment retention, irrigation efficiency, and nutrient management on agricultural lands. As appropriate, direct technical assistance to landowners, giving emphasis to developing new conservation plans and riparian areas, especially those that connect, enhance, or expand established riparian corridors.	Six Title X Cost-Share projects implemented a suite of 15 conservation practices, including over 300,000 linear feet of exclusion fencing and almost 39,00 linear feet of irrigation pipeline for alternative water sources. Estimated annual phosphorus load reduction is 15,000 lbs. and over 14,000 lbs. of sediment.
Continue to provide and improve outreach, education, and training promoting BMP implementation using demonstrations, workshops, conferences, on-site visits, and one-on-one consultations as appropriate and resources allow.	Updated the Arkansas Watershed Steward Handbook in 2022.  39 Watershed Stewardship training programs conducted in 2018-2023.
Continue to provide technical assistance and make available financial assistance to agricultural operations where cost-share is a component of approved Section 319(h) implementation projects.	Supported six Title X Cost-Share projects: 19-600 Boone Co., 19-1000 Fulton Co., 20-300 Baxter Co., 20-400 Marion Co., 21-600 Fulton Co., and 22-600 St. Francis Co.
Work with major integrators and farm workers as well as landowners to encourage input from and cooperation with nutrient management planning and implementation.	Information unavailable
Promote nutrient planning for farms that are below the threshold for classification as a Confined Animal Feeding Operation (CAFO) with dry manure.	Information unavailable
Expand education for poultry producers with a special focus on the role that the producer plays in the big picture of NPS pollution management (e.g., the relationship between biological processes and agricultural production processes as they relate to water quality).	Information unavailable
Provide educational and technical assistance to support full implementation of nutrient application rules promulgated by Natural Resources Division.	Information unavailable
Continue to promote positive relationships between state and federal agencies and	Information unavailable

<b>2018-2023 Objective</b>	<b>Progress</b>
agricultural producers in order to cultivate open communication and an environment of trust.	

**Table D-4: Statewide forestry NPS Program objectives for 2018-2023**

2018-2023 Objective	Progress
Develop additional mechanisms for delivering BMP implementation training targeted at private non-industrial landowners.	Arkansas Watershed Steward Handbook (2022)
Place BMP outreach and training programs aimed at private non-industrial forest landowners in the broader economic context on the assumption that landowners will better manage a resource they value.	Arkansas Forest Stewardship Program
Continue to partner with the Forestry Division and its Forest Practices Committee as well as the Arkansas Timber Producers Association to deliver and evaluate the effectiveness of BMP training to effect behavioral change as measured by BMP implementation, training, and technologies.	Arkansas Forestry Best Management Practices for Water Quality Protection (updated 2018, 2021)
Continue to promote incentives for landowners and/or loggers to increase voluntary BMP implementation. Review options to increase landowner incentives to adopt BMPs.	Forestry Division Minority Outreach Program
Continue to improve the quality of BMP implementation monitoring (e.g., increasing the sample size to improve the validity of subgroup results, identifying sites in riparian areas, and investigating alternatives to better identify harvest sites).	Information unavailable
Continue assessing the effectiveness of forestry BMPs to protect Arkansas water quality (e.g., reduce sedimentation), building on ongoing evaluation and recognizing that such assessment is a long-term, ongoing process. Consider conducting special assessments of high-quality headwater streams using synoptic surveys or other methods as resources allow.	Arkansas Forestry Best Management Practices for Water Quality Protection (updated 2018, 2021)
Continue to review new research as it becomes available to re-evaluate Forestry Division BMP guidelines, involving both scientists and stakeholders in the dialogue, and update BMP guidelines as appropriate.	Arkansas Forestry Best Management Practices for Water Quality Protection (updated 2018, 2021)
The state will participate in and support regional forest conferences, workshops, or outreach trainings when appropriate.	Information unavailable
Provide or support specialized technical assistance, outreach, supplies, and equipment when needed to address NPS issues related to silvicultural activities and deemed appropriate by the Forestry Division and Natural Resources	Information unavailable



<b>2018-2023 Objective</b>	<b>Progress</b>
Division. Request for “specialized” services or equipment will be evaluated by the Forestry Division and Natural Resources Division on a case-by-case basis.	
During or after catastrophic events, appropriate assessment will be conducted as to how water quality has been affected. BMP implementation(s) will be prioritized when appropriate to maintain water quality.	Information unavailable

**Table D-5: Statewide surface erosion NPS Program objectives for 2018-2023**

2018-2023 Objective	Progress
<b>Paved* and Unpaved Roads</b>	
Partner with various local and watershed entities to compile and analyze current road conditions and usage, providing information on the number of miles of unpaved roads, surface materials, stream crossings, and road density using analysis of existing data, survey of county officials, and other methods.	<p>Started in 2018, the Arkansas Stream Heritage Partnership utilizing the Southeast Aquatic Resources Partnership Culvert Assessment has inventoried over 1,000 stream barriers and crossings.</p> <p>Arkansas Road Inventory updated regularly by Arkansas Department of Transportation (ARDOT).</p>
Review available construction and maintenance BMP manuals for low-volume and unpaved roads. Update and modify manuals as necessary and make available to county road crews and others upon request.	Arkansas Unpaved Roads Program training materials updated in 2019.
Use construction and maintenance BMP manual for low-volume and unpaved roads for targeted education programs for county judges, quorum courts, maintenance workers, and other interested county/city personnel on pollution prevention for rural roads.	64 counties (85%) are current with unpaved road maintenance training with a total of 3,357 individuals trained.
Continue to collaborate with ARDOT to ensure compliance with environmental laws, regulations, and policies.	Information unavailable
Continue to collaborate with ARDOT, which maintains a manual of BMPs for road construction stormwater management and provides training to its contractors and staff on BMPs.	ARDOT Statewide Storm Water Management Program document updated in 2019 with new and enhanced BMPs.
Continue to ensure that Road Construction (RC) is not identified as the cause of any impairments according to the most current 303(d) List of Impaired Waterbodies.	Road construction is not a pollution source designation used in the Arkansas 303(d) list.
<b>Construction Activities</b>	
Continue to revise, as necessary, BMP manuals to address prevention, management, and maintenance of runoff from surface erosion, including construction.	Construction BMPs established as part of municipal stormwater programs. No statewide general construction BMP manual.
Support delivery of BMP information to the Arkansas Rural Services and The Nature Conservancy through the Arkansas County Judges Association,	Program was moved from Arkansas Rural Services to Natural Resources Division in 2019. Natural Resources Division is still working with all partners to update BMP information as appropriate.

2018-2023 Objective	Progress
municipalities, and state and federal agency programs to disseminate surface erosion BMPs and information through a variety of means (such as distribution of the surface erosion manual, training workshops, website content, and demonstration projects).	
<b>Hydromodification</b>	
Seek new sources of funding, leverage existing funding, and promote increased cooperation aimed at shifting focus from bank stabilization to reach restoration.	Work with partners to apply for a minimum of one external grant opportunity per year (e.g., America the Beautiful Challenge).
Continue to implement a watershed-based assessment protocol and BMPs for streambank erosion as funds allow.	Eight stream restoration projects implemented in 2018-2023, restoring 2.25 miles of streams/streambanks and three acres of wetlands. Projects included: 17-900, 20-600, 20-900, 20-1500, 21-500, 22-300, 22-600, and 22-1200.
Prioritize stream reaches and sites for restoration within priority watersheds as funds allow.	Streambank erosion inventories and monitoring during 2018-2023 in Illinois River and Beaver Reservoir priority watersheds.
Develop and promote education programs for landowners concerning streamside and lakeside property management to reduce sources of NPS pollution.	<i>Arkansas Watershed Steward Handbook</i> updated in 2022.  39 Watershed Stewardship training programs conducted in 2018-2023.
Develop and promote education programs for landowners and developers concerning proper stream corridor management and for professionals concerning stream corridor restoration practices.	<i>Arkansas Watershed Steward Handbook</i> updated in 2022.  73 outreach and education watershed-based projects funded with 182 events hosted in 2018-2023.
Promote tax credits, cost-share, and other incentive programs that are available for riparian zone and stream corridor restoration projects and conservation easements.	Riparian tax credits for 26 miles of restored riparian zones, stream corridors, and/or conservation easements in 2018-2023.
Improve coordination of existing data among cooperating entities. Current data available to help with understanding and addressing this problem include gauging stations/flow data for many streams; DEQ West Fork White River Watershed Assessment Report, which provides local erosion prediction curves for streambanks; area rainfall data; GIS data;	Natural Resources Division continues to support partnership efforts throughout priority watersheds. Results of partner efforts include a successful EPA-approved success story for the de-listing of 16.5 miles of the West Fork White River for turbidity.

2018-2023 Objective	Progress
USFS hydrological data; The Nature Conservancy flow model; regional discharge curves for the Ozark and Ouachita mountain areas; and DEQ and The Nature Conservancy ecoregional assessments.	
As funds allow, develop data and conduct analysis to fill information gaps. Examples include (1) geological survey of groundwater, (2) fish and macroinvertebrate data and changes over time, (3) regional erosion prediction curves and streambank erosion potential data, (4) regional discharge curves for the Delta, Arkansas River Valley, and Gulf Coastal Plains areas, (5) evaluation of riparian areas within critical watersheds, (6) change in stream length over time, and (7) sediment transport data throughout the state.	No updates

\* Paved roads were included in the Surface Erosion section of the 2018-2023 NPS Plan. Paved roads are addressed in the Urban Runoff Section of the 2024-2029 NPS Plan.

**Table D-6: Statewide urban runoff NPS Program objectives for 2018-2023**

2018-2023 Objective	Progress
Work with ADH to increase awareness of funding sources available for repairing malfunctioning or improperly installed septic systems.	Since 2018, Natural Resources Division has established three watershed-specific septic remediation programs, in the Illinois River, Beaver Reservoir, and Buffalo River watersheds. As of July 2023, a total of \$2,600,000 has been authorized for providing financial assistance to homeowners. A total of 124 septic remediation projects have been completed to date.
As resources allow, cooperatively assist other state and federal agencies, groups, or organizations to assess the impact of household and business use of fertilizers, pesticides, and other common products that do not require permits but can affect water quality. Knowledge gained may be utilized to develop information materials, target outreach and awareness programs, and promote the use of appropriate BMPs.	Natural Resources Division partnered with the Arkansas Department of Agriculture’s Plant Industries Division for project 21-800 “Abandoned/Outdated Agricultural Pesticide Collection and Disposal”. The project resulted in 14 collection events across 27 counties, which included four NPS priority watersheds. In total, 405,205 pounds of unwanted pesticides were collected.
Encourage cooperating entities like solid waste districts to work together to maintain a shared library of BMPs that is readily accessible to households, municipalities, employers, and others for the use, handling, storage, and disposal of chemicals, oils and greases, cleaning agents, adhesives, lawn products, etc.	Information unavailable
As resources allow, continue to develop, and implement targeted education programs for specific products and high-impact audiences (e.g., fertilizer and pesticide use, storage, handling, and disposal for street and road crews, public utilities, golf course managers, and independent lawn maintenance crews).	These include the Nutrient Management Program, which includes training and certification for nutrient management planners and applicators as well as the Poultry Feeding Operation Registration Program.
Promote broad-based education programs aimed at increasing awareness and disseminating BMPs to urban and rural households and businesses (e.g., HOME*A*SYST, URBAN*A*SYST).	Participated in update of the Arkansas Watershed Steward Handbook that was completed in 2022.  Home*A*SYST and Urban*A*SYST programs are no longer active.
Encourage the development or modification of applicable programs to implement a household and business hazardous waste and chemical collection program.	Information unavailable

**Table D-7: Progress made on Bayou Bartholomew watershed objectives 2018-2023**

2018-2023 Objective	Progress
Continue to develop support for implementation of the nine-element plan among potential cooperating entities and the general public.	Information unavailable
Provide technical and financial assistance to local cooperating entities to implement the nine-element plan as resources allow.	Water quality monitoring projects 13-400 and 17-400.
As resources allow, use remote sensing and GIS analysis to identify sub-watersheds where extensive assessment is needed. Conduct targeted geomorphological and bioassessment to identify and target implementation of streambank stabilization projects for high impact sites (e.g., a geomorphologic study of logjams and assess beaver populations to determine their impact on streambank erosion and other studies).	Information unavailable
Continue to refine models as new data becomes available to represent sediment and nutrient loads in the watershed and instream processes to enable prioritization of implementation projects in sub-watersheds.	None
Continue to focus on BMP implementation to improve conservation practices for erosion control, sediment retention, irrigation management, and nutrient management on row crop, animal agriculture, and forest land. As appropriate, direct technical assistance to landowners in targeted watersheds giving emphasis to developing new conservation plans and areas that connect established riparian corridors.	No 319 grants for BMP implementation in this watershed in 2018-2023.
Continue to provide and improve extensive education and training to promote BMP implementation (e.g., risk management, demonstrations to acquaint landowners and municipalities with the conservation practices most effective in reducing runoff, sediment detachment and transport including, but not limited to, no-till, conservation till, ridge till, pipe drop outlets, riparian zone management, and wetland restoration).	Information unavailable
Continue to encourage landowners to establish riparian buffer strips, grass drainage ways, stabilize streambanks, and restore riparian areas.	Information unavailable
Continue to secure conservation easements	Information unavailable

2018-2023 Objective	Progress
through donations, as the opportunity arises, in an effort to protect lands along Bayou Bartholomew and its tributaries from development that would result in further NPS pollution.	
Continue to increase public awareness and provide education to build support for citizen action to improve water quality in the watershed.	In 2019, Arkansas PBS released “Bayou Bartholomew, the World’s Longest Bayou”.
Build constituency for improved water quality by increasing volunteerism and promoting recreational use of the river (e.g., recruiting volunteers for cleanups, streambank restoration and other activities utilizing the Arkansas Stream Team program and other conservation groups as well as increasing public recreational access to the river with trails and boat ramps).	Clean up event held in 2018.  In 2020, Exploring Arkansas episode highlighted Bayou Bartholomew Nature Trail in Pine Bluff.
Encourage county and municipal elected officials as well as contractors, homebuilders, and consulting engineers to participate in construction and urban education programs to improve stormwater management.	Information unavailable
Coordinate conservation planning within a watershed area to take full advantage of cost-share programs for riparian habitat improvement, the Wetland Reserve Program (WRP), the Conservation Reserve Program (CRP), the Wetland and Riparian Zone Tax Credit Program (through Natural Resources Division), and other programs.	Information unavailable
Continue aquatic life assessments to assess response of waterbodies to NPS control measures as resources allow.	Information unavailable
Continue to provide public education on proper application, storage, and disposal of pesticides, regulations, and potential hazards of misuse (e.g., encourage use of FARM*A*SYST and HOME*A*SYST programs to assess potential pollution hazards).	FARM*A*SYST and HOME*A*SYST programs are no longer active. There is no water quality data available that indicate pesticides are a water quality issue here.
Continue to provide education to rural homeowners and builders on proper construction and maintenance of onsite waste disposal systems.	Information unavailable
Continue to provide technical assistance and make available financial assistance to agricultural operations where cost-share is a component of approved 319(h) implementation projects.	Information unavailable





**Table D-8. Progress made on Beaver Reservoir watershed objectives 2018-2023**

2018-2023 Objective	Progress
Continue to develop support for implementation of the nine-element plan among potential cooperating entities and the general public.	Watershed management plan update initiated in 2022. Four public meetings held in 2023. One 319 project in 2018-2023: 19-1400.
Provide technical and financial assistance to local cooperating entities to implement the nine-element plan as resources allow.	Two 319 projects in 2018-2023: 15-900, 19-1400. Water quality monitoring projects: 15-400, 19-1100, and 22-800.
Promote and support strengthening of local capacity to implement the nine-element plan. Encourage local review of a range of options to identify the most effective institutional mechanism to lead/coordinate its implementation.	Watershed management plan in progress. One 319 project in 2018-2023: 16-500.
Identify sub-watersheds where more extensive assessment is needed. Conduct targeted geomorphological and bioassessment to identify and target high impact restoration sites (e.g., streambank stabilization projects). Promote use of riparian tax credits and other cost-sharing programs to fund restoration projects and develop conservation easements.	Streambank erosion study West Fork White River completed in 2021 with priority sites identified. Streambank erosion studies ongoing in other sub-watersheds of the Beaver Lake drainage.  Arkansas Land Trust projects currently protect 1,305 acres (since 2012).
Continue to refine models as new data becomes available to represent sediment and nutrient loads in the watershed, instream processes, and lake response to enable prioritization of implementation projects in sub-watersheds.	SWAT model updates in 2023. RTI Waterfall model in 2022.
Continue to encourage the development of comprehensive nutrient management plans (CNMPs) or nutrient management plans (NMPs), provide technical assistance, and make available financial assistance to animal agricultural operations where cost-share is a component of approved implementation projects.	West Fork Regional Conservation Partnership Project (2016-2021) and War Eagle Creek Watershed Regional Conservation Partnership Project (2023-2027).
Continue and strengthen ongoing comprehensive education and training programs to help poultry and livestock producers meet the requirements of new Natural Resources Division poultry litter and nutrient application regulations and DEQ confined animal feeding operations (CAFO) regulations.	Information unavailable
Continue to develop and provide coordinated, comprehensive education for city planners, elected officials, developers, contractors, property owners, and others using workshops, print and electronic materials, demonstration projects, and other methods on topics such as	One 319 outreach-education project in 2018-2023: 19-1400. 319 outreach-education and demonstration project in 2017-2021: 17-1000; 319 outreach-education and demonstration project in 2021-2023: 20-500; 319 outreach-

2018-2023 Objective	Progress
stormwater pollution prevention plans, proper installation and maintenance of erosion and sediment control, planning tools to improve storm water management (e.g., low impact development (LID), greenways, cluster development), and other related topics.	education and demonstration project in 2022-2025: 22-500.
Cooperate with and support the efforts of local nonprofit organizations, municipalities, and other cooperating entities to develop and deliver a coordinated water quality education program with a local emphasis.	One 319 outreach-education project in 2018-2023: 19-1400.
Identify groups for targeted education on specific high-impact activities (e.g., develop fact sheets for boaters about proper waste disposal and the impact of that at boat ramps and marinas; provide training to county elected officials, road departments, and property owners associations on how to reduce erosion from rural roads; or provide education to homebuilders, developers, and homeowners on methods and activities to reduce NPS pollution).	One 319 outreach-education project in 2018-2023: 19-1400.
Carry out comprehensive information and education program quality for community leaders, including mayors, county judges, quorum courts, planning boards and commissions, conservation district directors, and others. Emphasize the need to protect water and the benefits of clean water for the economy, quality of life, and the environment.	One 319 outreach-education project in 2018-2023: 19-1400.  319 outreach-education program for Smart Growth for Source Water Protection in 2022-2025: 22-500.
Identify severe erosion sites at rural road crossings and work with county government to develop and implement erosion control plans for high impact sites (e.g., promote use of conservation district hydromulcher for treatment).	269 stream crossings have been evaluated for impacts to aquatic organisms.
Encourage development of urban forestry projects in municipalities within the watershed.	Information unavailable
Continue to provide training to earth-moving contractors and their employees, public works department employees, county employees, and others regarding operation and maintenance of construction and post-construction BMPs through the partnership with the Northwest Arkansas Regional Planning Commission and the University of Arkansas System Division of Agriculture Cooperative Extension Service in	Information unavailable

<b>2018-2023 Objective</b>	<b>Progress</b>
order to help them meet the requirements of EPA Phase II stormwater regulations for construction and municipal separate storm sewer systems (MS4s).	
Review tax code to determine possible mechanisms to use tax incentives for water quality BMP implementation in nutrient surplus areas, especially for practices that minimize the direct impact of cattle on streams.	Information unavailable
Work with elementary and secondary school teachers to develop teaching modules regarding water quality protection and conservation that meet curriculum requirements of the Arkansas Department of Education.	Information unavailable
Build constituency for improved water quality by increasing volunteerism for cleanups, streambank restoration, and other activities utilizing the Arkansas Stream Team program and other conservation groups, conducting water awareness days, building working relationships with groups that represent recreational users, (e.g., bird watchers, paddlers, hunters, etc.) and other means.	Information unavailable
Continue to promote LID and retrofit as applicable to reduce NPS pollution.	Information unavailable

**Table D-9: Progress made on Cache River priority watershed objectives 2018-2023**

2018-2023 Objective	Progress
Continue to develop support for implementation of the nine-element plan among potential cooperating entities and the general public.	Information unavailable
Provide technical and financial assistance to local cooperating entities to implement the nine-element plan as resources allow.	Water quality monitoring projects:16-800, 17-200, and 19-500.
As resources allow, use remote sensing and GIS analysis to identify sub-watersheds where more extensive assessment is needed. Conduct targeted geomorphological and bioassessment to identify and target implementation of streambank stabilization projects for high-impact sites (e.g., a geomorphologic study of logjams and assess beaver populations to determine their impact on streambank erosion and other studies).	Information unavailable
Continue to develop models to represent sediment and nutrient loads in the watershed and instream processes to enable prioritization of implementation projects in sub-watersheds.	Information unavailable
Continue to focus on BMP implementation to improve conservation practices for erosion control, sediment retention, irrigation management, and nutrient management on row crop, animal agriculture, and forestland. As appropriate, direct technical assistance to landowners in targeted watersheds giving emphasis to developing new conservation plans and areas that connect established riparian corridors.	No 319 grants for watershed implementation projects in 2018-2023.
Continue to provide and improve extensive education and training to promote BMP implementation (e.g., risk management, demonstrations to acquaint landowners and municipalities with the conservation practices most effective in reducing runoff, sediment detachment, and transport including, but not limited to, no-till, conservation till, ridge till, pipe drop outlets, riparian zone management, and wetland restoration).	No education and outreach 319 projects in 2018-2023.
Continue to encourage landowners to establish riparian buffer strips, grass drainage ways, stabilize streambanks, and restore riparian areas.	No 319 grants for watershed implementation projects in 2018-2023.
Continue to secure conservation easements through donations as the opportunity arises in an	Information unavailable

2018-2023 Objective	Progress
effort to protect lands along the Cache River and its tributaries from development that would result in further NPS pollution.	
Continue to increase public awareness and provide education to build support for citizen action to improve water quality in the watershed.	No education and outreach 319 projects in 2018-2023.
Build constituency for improved water quality by increasing volunteerism and promoting recreational use of the river (e.g., recruiting volunteers for cleanups, streambank restoration, and other activities utilizing the Arkansas Stream Team program and other conservation groups as well as increasing public recreational access to the river with trails and boat ramps).	Information unavailable
Encourage county and municipal elected officials as well as contractors, homebuilders, and consulting engineers to participate in construction and urban education programs to improve stormwater management.	Information unavailable
Coordinate conservation planning within a watershed area to take full advantage of cost-share programs for riparian habitat improvement, such as WRP, CRP, Natural Resources Division's Wetland and Riparian Zone Tax Credit Program, and other programs.	Information unavailable
Continue aquatic life assessments to assess response of waterbodies to NPS control measures as resources allow.	Information unavailable
Continue to provide public education on proper application, storage and disposal of pesticides, regulations, and potential hazards of misuse (e.g., encourage use of FARM*A*SYST and HOME*A*SYST programs to assess potential pollution hazards).	<p>FARM*A*SYST and HOME*A*SYST programs are no longer active.</p> <p>There is no data available that indicate pesticides are a water quality issue here.</p>
Continue to provide education to rural homeowners and builders on proper construction and maintenance of onsite waste disposal systems.	Information unavailable
Continue to provide technical assistance to make available financial assistance to agricultural operations where cost-share is a component of approved 319(h) implementation projects.	Information unavailable

**Table D-10: Progress made on the Illinois River priority watershed objectives 2018-2023**

2018-2023 Objective	Progress
Continue to develop support for implementation of the nine-element plan among potential cooperating entities and the general public.	Watershed management plan update initiated in 2021.  Four public meetings in 2023.
Provide technical and financial assistance to local cooperating entities to implement the nine-element plan as resources allow.	Water quality monitoring projects: 15-400, 19-1100, and 22-800.
Promote and support strengthening of local capacity to implement the nine-element plan, encouraging local review of a range of options to identify the most effective institutional mechanism to lead implementation.	Information unavailable
Use remote sensing and Geographical Information System (GIS) analysis to identify sub-watersheds where more extensive assessment is needed. Conduct targeted geomorphological and streambank stabilization projects for high-impact sites. Promote use of riparian tax credits and cost-sharing programs to fund restoration projects and develop conservation easements.	No 319 projects for this work in 2018-2022.  Partners conducted streambank erosion monitoring and stream restoration projects in 2018-2022.
Continue to develop models to represent sediment and nutrient loads in the watershed, instream processes, and lake response to enable prioritization of implementation projects in sub-watersheds.	SWAT model prepared and calibrated in 2022-2023.
Continue to encourage the development of comprehensive nutrient management plans (CNMPs) or nutrient management plans (NMPs), provide technical assistance, and make available financial assistance to animal agricultural operations where cost-share is a component of approved implementation projects.	Information unavailable
Continue and strengthen ongoing comprehensive education and training programs to help poultry and livestock producers meet the requirements of new Natural Resources Division poultry litter and nutrient application regulations and the new DEQ confined animal feeding operations (CAFO) regulations.	Information unavailable
Continue to develop and provide coordinated, comprehensive education for city planners, elected officials, developers, contractors, property owners, and others using workshops, print and electronic materials, demonstration projects, and other methods on topics such as	Project 15-900, Murphy Pond Project (2019), Project 19-1400  NPS Pollution Prevention through Direct Outreach and Digital Media (2020), Green

2018-2023 Objective	Progress
stormwater pollution prevention plans, proper installation and maintenance of erosion and sediment control, planning tools to improve stormwater management (e.g., low impact development, greenways, cluster development), and other related topics.	Infrastructure and Low Impact Development Conference (2021). IRWP green infrastructure and low impact development program launched in 2022.
Cooperate with and support the efforts of local nonprofit organizations, municipalities, and other cooperating entities to develop and deliver a coordinated environmental education program with a local emphasis.	NPS Pollution Prevention through Direct Outreach and Digital Media (2020), Green Infrastructure and Low Impact Development Conference (2021).
Identify groups for targeted education on specific high impact activities (e.g., develop and post fact sheets for boaters on proper waste disposal and the potential impact at boat ramps and marinas; provide training to county elected officials, road departments, and property owners associations on how to reduce erosion from rural roads; or provide education to homebuilders, developers, and homeowners on methods and activities to reduce NPS pollution) as resources allow.	Septic Remediation Program.
Identify severe erosion sites at rural road crossings and work with county government to develop and implement erosion control plans for high impact sites (e.g., promote use of conservation district hydromulcher for treatment).	Thirteen potential project sites identified by Arkansas Stream Heritage Partnership.
Encourage development of urban forestry projects in municipalities within the watershed.	Information unavailable
Carry out comprehensive information and education program quality for community leaders, including mayors, county judges, quorum courts, planning boards and commissions, conservation district directors, and others. Emphasize the need to protect water and the benefits of clean water for the economy, quality of life, and the environment.	Blue Cities Blue Neighborhoods Program (2021-2022)
Continue to provide training to earth-moving contractors and their employees, public works department employees, county employees, and others regarding operation and maintenance of construction BMPs through partnership with the Northwest Arkansas Regional Planning Commission and the University of Arkansas System Division of Agriculture Cooperative Extension Service in order to help them meet the	Information unavailable

<b>2018-2023 Objective</b>	<b>Progress</b>
requirements of EPA Phase II stormwater regulations for construction and municipal separate storm sewer systems.	
Review tax code to determine possible mechanisms to use tax incentives for water quality BMP implementation in nutrient surplus areas, especially for practices that minimize the direct impact of cattle on streams.	Information unavailable
Work with elementary and secondary school teachers to develop teaching modules regarding water quality protection and conservation that meet curriculum requirements of the Arkansas Department of Education.	Illinois River Watershed Partnership Youth Education Program
Investigate the use of the Clean Water Revolving Loan Fund for alternative onsite wastewater systems.	Illinois River Watershed Partnership Septic Tank Remediation Pilot Program initiated in 2021.
Build constituency for improved water quality by increasing volunteerism for cleanups and streambank restoration, and other activities utilizing the Arkansas Stream Team program and other conservation groups, conducting water awareness days, building working relationships with groups that represent recreational users (e.g., birdwatchers, paddlers, hunters, etc.), and other means.	Illinois River Watershed Partnership Recreation Stewardship Program initiated in 2022.



**Table D-11: Progress made on Lake Conway – Point Remove priority watershed objectives 2018-2023**

2018-2023 Objective	Progress
Continue development of the nine-element plan until EPA approval is obtained.	Watershed management plan in development (initiated prior to 2018).
Continue to develop support for implementation of the nine-element plan among potential cooperating entities and the general public.	Watershed management plan under development.
Provide technical and financial assistance to local cooperating entities to implement the nine-element plan as resources allow.	Water quality monitoring projects: 15-300 and 19-900
As resources allow, use remote sensing and Geographical Information System (GIS) analysis to identify sub-watersheds where more extensive assessment is needed. Conduct targeted geomorphological and bioassessment to identify and target implementation of streambank stabilization projects for high impact sites (e.g., a geomorphological study of logjams and assess beaver population to determine their impact on streambank erosion and other studies).	Information unavailable
Continue to refine models as new data become available to represent sediment and nutrient loads in the watershed and instream processes to enable prioritization of implementation projects in sub-watersheds.	Information unavailable
Continue to focus on BMP implementation to improve conservation practices for erosion control, sediment retention, irrigation management, and nutrient management on row crop, animal agriculture, and forest land. As appropriate, direct technical assistance to landowners in targeted watersheds giving emphasis to developing new conservation plans and areas that connect established riparian corridors.	No 319 grants for BMP implementation projects in this watershed in 2018-2023.
Continue to provide and improve extensive education and training to promote BMP implementation (e.g., risk management, demonstrations to acquaint landowners and municipalities with conservation practices most effective in reducing runoff, sediment detachment, and transport; including, but not limited to, no-till, conservation till, ridge till, pipe drop outlets, riparian zone management, and wetland restoration).	Information unavailable

2018-2023 Objective	Progress
Continue to encourage landowners to establish riparian buffer strips, grass drainage ways, stabilize streambanks, and restore riparian areas.	Information unavailable
Continue to secure conservation easements through donations as the opportunity arises in an effort to protect lands along the Arkansas River and its tributaries from development that would result in further NPS pollution.	Information unavailable
Continue to increase public awareness and provide education to build support for citizen action to improve water quality in the watershed.	Markham Square low impact development project
Build constituency for improved water quality by increasing volunteerism and promoting recreational use of the river (e.g., recruiting volunteers for cleanups, streambank restoration, and other activities utilizing the Arkansas Stream Team program and other conservation groups as well as increasing public recreational access to the river with trails and boat ramps).	Information unavailable
Encourage county and municipal elected officials as well as contractors, homebuilders, and consulting engineers to participate in construction and urban education programs to improve stormwater management.	Information unavailable
Coordinate conservation planning within a watershed area to take full advantage of cost-share programs for riparian habitat improvement such as the Wetland Reserve Program (WRP), the Conservation Reserve Program (CRP), the Wetland and Riparian Zone Tax Credit Program (through Natural Resources Division), and other programs.	Information unavailable
Continue aquatic life assessments to assess response of waterbodies to NPS pollution control measures as resources allow.	NPS success story in 2019
Continue to provide public education on proper application, storage and disposal of pesticides, regulations, and potential hazards of misuse (e.g., encourage use of FARM*A*SYST and HOME*A*SYST programs to assess potential pollution hazards).	FARM*A*SYST and HOME*A*SYST programs are no longer active.  Data does not indicate that pesticides are a water quality problem.
Continue to provide education to rural homeowners and builders on proper construction and maintenance of onsite waste disposal systems.	Information unavailable

<b>2018-2023 Objective</b>	<b>Progress</b>
Continue to provide technical assistance and make available financial assistance to agricultural operations where cost-share is a component of approved 319(h) implementation projects.	Information unavailable

**Table D-12: Progress made on L'Anguille River priority watershed objectives 2018-2023**

2018-2023 Objective	Progress
Continue to develop support for implementation of the nine-element plan among potential cooperating entities and the general public.	Initiated update of 2005 nine-element plan in 2018.
Provide technical and financial assistance to local cooperating entities to implement the nine-element plan as resources allow.	<p>Technical and financial assistance provided in 2018-2022 through projects 14-500 and 15-700.</p> <p>Water quality monitoring provided in 2018-2022 through project 15-200.</p>
As resources allow, use remote sensing and GIS analysis to identify sub-watersheds where a more extensive assessment is needed. Conduct targeted geomorphological and bioassessment to identify and target implementation of streambank stabilization projects for high impact sites (e.g., a geomorphological study of logjams and assess beaver populations to determine their impact on streambank erosion and other studies).	Information unavailable
Continue to refine models as new data become available to represent sediment and nutrient loads in the watershed and instream processes to enable prioritization of implementation projects in sub-watersheds.	Information unavailable
Consider obtaining conservation easements through donations as the opportunity arises in an effort to protect lands along the L'Anguille and its tributaries from development that would result in further NPS pollution.	Information unavailable
Continue to increase public awareness and provide education to build support for citizen action to improve water quality in the watershed.	Information unavailable
Build constituency for improved water quality by increasing volunteerism and promoting recreational use of the river (e.g., recruiting volunteers for cleanups and streambank restoration, and other activities utilizing the Arkansas Stream Team program and other conservation groups as well as increasing public recreational access to the river with trails and boat ramps).	Information unavailable
Encourage county and municipal elected officials as well as contractors, homebuilders, and consulting engineers to participate in construction and urban education programs to improve stormwater management.	Information unavailable

<b>2018-2023 Objective</b>	<b>Progress</b>
Coordinate conservation planning within a watershed area to take full advantage of cost-share programs for riparian habitat improvement such as the WRP, CRP, Natural Resources Division's Wetland and Riparian Zone Tax Credit Program, and other programs.	Information unavailable
Continue to provide public education on proper application, storage and disposal of pesticides, regulations and potential hazards of misuse (e.g., encourage use of FARM*A*SYST and HOME*A*SYST programs to assess potential pollution hazards).	FARM*A*SYST and HOME*A*SYST programs are no longer active.  Data does not indicate that pesticides are a water quality concern.
Continue to provide education to rural homeowners and builders on proper construction and maintenance of onsite waste disposal systems.	Information unavailable
Continue to provide technical assistance and make available financial assistance to agricultural operations where cost-share is a component of approved 319(h) implementation projects.	Project 14-500

**Table D-13: Progress made on Lower Little River priority watershed objectives 2018-2023**

2018-2023 Objective	Progress
Continue to develop support for implementation of the nine-element plan among potential cooperating entities and the general public.	Information unavailable
Provide technical and financial assistance to local cooperating entities to implement the nine-element plan as resources allow.	Project 14-400 for water quality monitoring Little River Ditches
Conduct targeted geomorphological and bioassessment to identify and target implementation of streambank stabilization projects for high impact sites.	Information unavailable
Continue to develop models to represent sediment and nutrient loads in the watershed and instream processes to enable prioritization of implementation projects in sub-watersheds.	Information unavailable
Continue to focus on BMP implementation to improve conservation practices for erosion control, sediment retention, irrigation management, and nutrient management on row crop, animal agriculture, and forest land.	No 319 grants for BMP implementation projects in this watershed in 2018-2023
Continue to provide and improve extensive education and training to promote BMP implementation.	Information unavailable
Continue to increase public awareness and provide education to build support for citizen action to improve water quality in the watershed.	Information unavailable
Encourage county and municipal elected officials as well as contractors, homebuilders, and consulting engineers to participate in construction and urban education programs to improve stormwater management.	Information unavailable
Continue to provide public education on proper application, storage and disposal of pesticides, regulations and potential hazards of misuse (e.g., encourage use of FARM*A*SYST and HOME*A*SYST programs to assess potential pollution hazards).	FARM*A*SYST and HOME*A*SYST programs are no longer active.  Data does not indicate that pesticides are a water quality concern.
Continue to provide technical assistance and make available financial assistance to agricultural operations where cost-share is a component of approved 319(h) implementation projects.	Information unavailable
Continue to support water quality and biological monitoring in this watershed.	Project 14-400 for water quality monitoring Little River Ditches.

**Table D-14: Progress made on Lower Ouachita - Smackover priority watershed objectives 2018-2023**

2018-2023 Objective	Progress
Continue development of the nine-element plan until EPA approval is obtained.	Watershed management plan started in 2021.
Continue to develop support for implementation of the nine-element plan among potential cooperating entities and the general public.	Information unavailable
Provide technical and financial assistance to local cooperating entities to implement the nine-element plan as resources allow.	Water quality monitoring conducted in 2018-2022 through projects 16-1000 and 21-1000.
As resources allow, use remote sensing and GIS analysis to identify sub-watersheds where more extensive assessment is needed. Conduct targeted geomorphological and bioassessment to identify and target implementation of streambank stabilization projects for high impact sites (e.g., a geomorphological study of logjams and assess beaver populations to determine their impact on streambank erosion and other studies).	Information unavailable
Continue to develop models to represent sediment and nutrient loads in the watershed and instream processes to enable prioritization of implementation projects in sub-watersheds.	Information unavailable
Continue to focus on BMP implementation to improve conservation practices for erosion control, sediment retention, irrigation management, and nutrient management on row crop, animal agriculture, and forest land. As appropriate, direct technical assistance to landowners in targeted watersheds, giving emphasis to developing new conservation plans and areas that connect established riparian corridors.	No 319 grants for BMP implementation projects in this watershed in 2018-2023.
Continue to provide and improve extensive education and training to promote BMP implementation (e.g., risk management, demonstrations to acquaint landowners and municipalities with the conservation practices most effective in reducing runoff, sediment detachment and transport, including but not limited to, no-till, conservation till, ridge till, pipe drop outlets, riparian zone management, and wetland restoration).	Information unavailable
Continue to encourage landowners to establish riparian buffer strips, grass drainage ways, stabilize streambanks, and restore riparian areas.	Information unavailable

2018-2023 Objective	Progress
Continue to secure conservation easements through donations as the opportunity arises in an effort to protect lands along the Arkansas River and its tributaries from development that would result in further NPS pollution.	Information unavailable
Continue to increase public awareness and provide education to build support for citizen action to improve water quality in the watershed.	Arkansas Silviculture Best Management Practices Outreach Project – forestry BMP surveys in 2018 and 2022
Build constituency for improved water quality by increasing volunteerism and promoting recreational use of the river (e.g., recruiting volunteers for cleanups, streambank restoration, and other activities utilizing the Arkansas Stream Team program and other conservation groups as well as increasing public recreational access to the river with trails and boat ramps).	Information unavailable
Encourage county and municipal elected officials as well as contractors, homebuilders, and consulting engineers to participate in construction and urban education programs to improve stormwater management.	Information unavailable
Coordinate conservation planning within a watershed area to take full advantage of cost-share programs for riparian habitat improvement such as WRP, CRP, Natural Resources Division’s Wetland and Riparian Zone Tax Credit Program, and other programs.	Information unavailable
Continue aquatic life assessments to assess response of waterbodies to NPS control measures as resources allow.	DEQ macroinvertebrate survey in 2021 on North Bayou
Continue to provide public education on proper application, storage and disposal of pesticides, regulations, and potential hazards of misuse (e.g., encourage use of FARM*A*SYST and HOME*A*SYST programs to assess potential pollution hazards).	FARM*A*SYST and HOME*A*SYST programs are no longer active.  Data does not indicate that pesticides are a water quality concern.
Continue to provide education to rural homeowners and builders on proper construction and maintenance of onsite waste disposal systems.	Information unavailable
Continue to provide technical assistance and make available financial assistance to agricultural operations where cost-share is a component of approved 319(h) implementation projects.	Information unavailable



**Table D-15: Progress made on Poteau River priority watershed objectives 2018-2023**

2018-2023 Objective	Progress
Begin development of a nine-element plan.	Watershed management plan completed in December 2022. Accepted by EPA in 2023.
Begin to develop support for implementation of the nine-element plan among potential cooperating entities and the general public.	Poteau River Watershed stakeholder group formed in 2021.
Provide technical and financial assistance to local cooperating entities to implement the nine-element plan as resources allow.	Water quality monitoring in 2018-2023 conducted through projects 16-1100 and 17-300.
Begin to develop local institutional capacity to implement the nine-element plan (e.g., local watershed groups).	Poteau River Watershed stakeholder group formed in 2021.
As resources allow, identify sub-watersheds where more extensive assessment is needed. Conduct targeted geomorphological and biological assessment to identify and target high impact restoration projects (e.g., streambank stabilization).	Assessments conducted as part of development of watershed management plan.
Continue to strengthen models to represent sediment and nutrient loads in the watershed and instream processes to enable prioritization of implementation projects in sub-watersheds.	SWAT model developed as part of watershed management plan.
Promote BMP implementation to improve conservation practices for erosion control, sediment retention, and nutrient management on lands used for row crop, animal agriculture, as well as timber production. As appropriate, direct technical assistance to landowners in targeted sub-watersheds giving emphasis to developing new conservation plans.	Project 17-800
Continue to promote the development of comprehensive nutrient management plans (CNMPs) or nutrient management plans (NMPs).	Farm plans developed as part of project 17-800.
Continue and strengthen ongoing comprehensive education and training programs to help poultry and livestock producers meet the requirements of DEQ's confined animal feeding operation (CAFO) regulations.	Information unavailable
Encourage landowners to establish riparian buffer strips, grass drainage ways, stabilize streambanks, and restore riparian areas.	Information unavailable
Consider obtaining conservation easements through donations as the opportunity arises in an effort to protect lands along the Poteau River and its tributaries from development that would result in further NPS pollution.	Information unavailable

2018-2023 Objective	Progress
Increase public awareness and provide education to build support for citizen action to improve water quality in the watershed.	Two public meetings held as part of watershed management plan development.
Build constituency for improved water quality by promoting volunteerism and recreational use of the river (e.g., recruiting volunteers for cleanups, streambank restoration, and other activities utilizing the Arkansas Stream Team program and other conservation groups.)	Information unavailable
Coordinate conservation planning within a watershed area to take full advantage of cost-share programs for riparian habitat improvement such as the Wetland Reserve Program (WRP), the Conservation Reserve Program (CRP), and Wetland and Riparian Zone Tax Credit Program (through Natural Resources Division).	Information unavailable
Continue to provide public education on proper application, storage and disposal of pesticides, regulations, and potential hazards of misuse (e.g., encourage use of FARM*A*SYST, URBAN*A*SYST and HOME*A*SYST programs to assess potential pollution hazards).	FARM*A*SYST, URBAN*A*SYST, and HOME*A*SYST programs are no longer active.  Data does not indicate that pesticides are a water quality concern.
Continue to provide education to rural homeowners and builders on proper construction and maintenance of onsite waste disposal systems.	Information unavailable
Continue to provide technical assistance and make available financial assistance to agricultural operations where cost-share is a component of approved 319(h) implementation projects.	Cost-share project 17-800

**Table D-16: Progress made on Strawberry River priority watershed objectives 2018-2023**

2018-2023 Objective	Progress
Continue to develop support for implementation of nine-element plan among potential cooperating entities and the general public.	Information unavailable
Provide technical and financial assistance to local cooperating entities to implement the nine-element plan as resources allow.	Projects 15-1100, 16-400, 16-900 for BMPs, and 16-700 for water quality monitoring
As resources allow, use remote sensing and GIS analysis to identify sub-watersheds where more extensive assessment is needed. Conduct targeted geomorphological and bioassessment to identify and target implementation of streambank stabilization projects for high impact sites (e.g., a geomorphological study of logjams and assess beaver populations to determine their impact on streambank erosion and other studies).	Information unavailable
Continue to develop models to represent sediment and nutrient loads in the watershed and instream.	Information unavailable
Continue to focus on BMP implementation to improve conservation practices for erosion control, sediment retention, irrigation management, and nutrient management on row crop and animal agriculture and forest land. As appropriate, direct technical assistance to landowners in targeted watersheds giving emphasis to developing new conservation plans and areas that connect established riparian corridors.	BMP projects 15-1100, 16-400, and 16-900
Continue to provide and improve extensive education and training to promote BMP implementation (e.g., risk management, demonstrations to acquaint landowners and municipalities with the conservation practices most effective in reducing runoff, sediment detachment and transport, including but not limited to, no-till, conservation till, ridge till, pipe drop outlets, riparian zone management, and wetland restoration).	Information unavailable
Continue to encourage landowners to establish riparian buffer strips, grass drainage ways, stabilize streambanks, and restore riparian areas.	Information unavailable
Continue to secure conservation easements through donations as the opportunity arises in an effort to protect lands along the Strawberry River	Information unavailable

2018-2023 Objective	Progress
and its tributaries from development that would result in further NPS pollution.	
Continue to increase public awareness and provide education to build support for citizen action to improve water quality in the watershed.	Outreach as part of project 15-1100
Build constituency for improved water quality by increasing volunteerism and promoting recreational use of the river (e.g., recruiting volunteers for cleanups, streambank restoration, and other activities utilizing the Arkansas Stream Team program and other conservation groups as well as increasing public recreational access to the river with trails and boat ramps).	Information unavailable
Encourage county and municipal elected officials as well as contractors, homebuilders, and consulting engineers to participate in construction and urban education programs to improve stormwater management.	Information unavailable
Coordinate conservation planning within a watershed area to take full advantage of cost-share programs for riparian habitat improvement such as WRP, CRP, Natural Resources Division's Wetland and Riparian Zone Tax Credit Program, and other programs.	Information unavailable
Continue aquatic life assessments to assess response of waterbodies to NPS control measures as resources allow.	Information unavailable
Continue to provide public education on proper application, storage and disposal of pesticides, regulations, and potential hazards of misuse (e.g., encourage use of FARM*A*SYST and HOME*A*SYST programs to assess potential pollution hazards).	<p>FARM*A*SYST and HOME*A*SYST programs are no longer active.</p> <p>Data does not indicate that pesticides are a water quality concern.</p>
Continue to provide education to rural homeowners and builders on proper construction and maintenance of onsite waste disposal systems.	Information unavailable
Continue to provide technical assistance and make available financial assistance to agricultural operations where cost-share is a component of approved 319(h) implementation projects.	Information unavailable

**Table D-17: Progress made on Upper Saline River priority watershed objectives 2018-2023**

2018-2023 Objective	Progress
Develop support for implementation of the nine-element plan among potential cooperating entities and the general public.	Watershed management plan update initiated in 2023.  One public meeting in 2023.
Provide technical and financial assistance to local cooperating entities to implement the nine-element plan as resources allow.	Water quality monitoring conducted in 2018-2023 through projects 15-1800 and 20-1000.
As resources allow, use remote sensing and GIS analysis to identify sub-watersheds where more extensive assessment is needed. Conduct targeted geomorphological and bioassessment to identify and target implementation of streambank stabilization projects for high impact sites (e.g., a geomorphological study of logjams and assess beaver populations to determine their impact on streambank erosion and other studies).	Information unavailable
Promote BMP implementation to improve conservation practices for erosion control, sediment retention, and nutrient management on lands used for row crop and animal agriculture as well as timber production. As appropriate, direct technical assistance to landowners in targeted watersheds giving emphasis to developing new conservation plans.	No 319 grants for BMP implementation active in this watershed in 2018-2023.
Encourage county, municipal, and property owner association elected officials as well as contractors, homebuilders, and consulting engineers to participate in construction and urban education programs to improve stormwater management, erosion control, and other conservation and pollution prevention measures.	Information unavailable
Encourage landowners to establish riparian buffer strips, grass drainage ways, stabilize streambanks, restore riparian areas, and maintain SMZs.	Arkansas Silviculture Best Management Practices Outreach Project – forestry BMP surveys in 2018 and 2022
Consider obtaining conservation easements as opportunities arise.	information unavailable
As resources allow, promote and support outreach and education within the watershed relative to water quality and NPS.	Arkansas Silviculture Best Management Practices Outreach Project – forestry BMP surveys in 2018 and 2022
Build constituency for improved water quality by promoting volunteerism and recreational use of the river (e.g., recruiting volunteers for cleanups,	Information unavailable

2018-2023 Objective	Progress
streambank restoration, and other activities utilizing the Arkansas Stream Team program and other conservation groups).	
Encourage plans for alternative irrigation water supply and supplemental stream augmentation, including off-stream storage of surplus flow.	Information unavailable
Continue to provide public education on proper application, storage and disposal of pesticides, regulations, and potential hazards of misuse (e.g., encourage use of FARM*A*SYST and HOME*A*SYST programs to assess potential pollution hazards).	<p>FARM*A*SYST and HOME*A*SYST programs are no longer active.</p> <p>Data does not indicate that pesticides are a water quality issue.</p>
Continue to provide technical assistance and make available financial assistance to agricultural operations where cost-share is a component of approved 319(h) implementation projects.	Information unavailable