

## Beaver Reservoir (Upper White River and Kings River)

Arkansas Department of Energy and Environment Division of Environmental Quality Planning Segment 4K

Hydrologic Unit Code 11010001

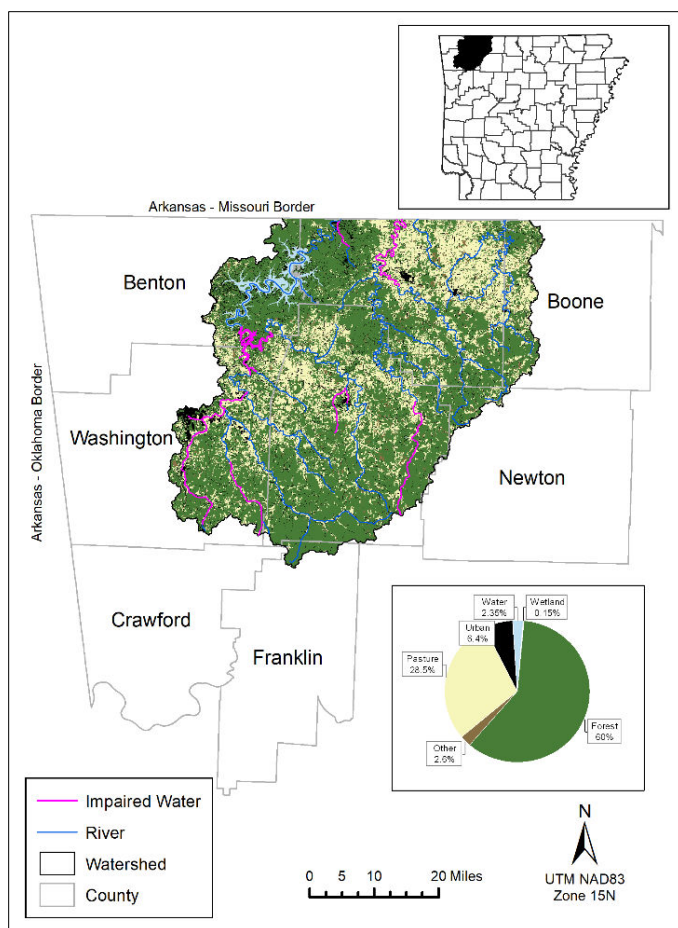
U.S. Environmental Protection Agency-Accepted Watershed Management Plan

### Introduction

Beaver Reservoir Watershed, also known as the Upper White River Watershed, consists of portions of Benton, Washington, Carroll, Madison, Boone, Newton, and Franklin counties in northwest Arkansas. This watershed encompasses a 66-mile reach of the White River and its tributaries, including Beaver Lake, the Kings River and its tributaries, Long Creek and Yocum Creek. Beaver Lake is the primary water supply source for the fastest growing region of Arkansas. Northwest Arkansas (consisting of Benton, Washington, and Madison counties) recently became the 100<sup>th</sup> largest metropolitan area in the United States (Northwest Arkansas Democrat Gazette 2023). Benton and Washington counties are among the highest in Arkansas in population growth, increasing 5.7 percent and 3.8 percent respectively between 2020 and 2022 (Axios NW Arkansas 2023). In 2020, this watershed was home to over 102,000 Arkansans (U.S. Census Bureau 2021). The watershed has been an Arkansas Nonpoint Source Pollution Management Program (Arkansas NPS Program) priority watershed since 1998. Figure 1 shows a map of 2019 land cover in the watershed. Sixty percent of the watershed is forested, and 28.5 percent is pasture.

### Nonpoint Source Pollutants in Beaver Reservoir Watershed

Several waterbodies of the Beaver Reservoir Watershed are listed as water quality impaired in the Arkansas 2018 303(d) List (Figure 1). A total of 153.5 stream miles are listed as impaired, representing 22.4 percent of the total assessed stream miles within the watershed (686.3 miles). In addition, a total of 3,485 acres (12.4 percent) of Beaver Reservoir are listed as impaired. Impaired waterbody uses are support of aquatic life, primary and secondary contact recreation, and drinking water supply. Both point and nonpoint sources of pollution contribute to these impairments. NPS pollutants of concern in this watershed are nitrogen, phosphorus, sediment (turbidity), sulfate, and total dissolved solids. Nonpoint sources of these pollutants in this watershed that are of concern include runoff from development and urban areas, unpaved roads, runoff from pastures, livestock, poultry litter, recreation, poor quality riparian areas, and streambank erosion. Climate change is causing an increase in storm



**Figure 1. Beaver Reservoir Watershed Map**

intensity in Arkansas, which can result in more runoff and erosion, leading to increased pollutant loads to surface waters. Data from monitored springs in the watershed suggest that groundwater is not a significant source of any of the pollutants of concern.

### Nonpoint Source Pollution Goals

The long-term goal of the Arkansas NPS Program for Beaver Reservoir Watershed is that all waterbodies support their designated uses. Table 1 lists Arkansas NPS Program short-term (2024-2029) objectives for the Beaver Reservoir Watershed. The program also supports the goals of the Watershed Success Metrics Framework (found at [beaverwatershedalliance.org/watershed-success-metrics-framework/#gf\\_6](https://beaverwatershedalliance.org/watershed-success-metrics-framework/#gf_6)) developed for Beaver Lake Watershed in 2021. Progress toward achieving the objectives is summarized in Table 1 and will be reported in Arkansas NPS Program annual reports which can be found at [agriculture.arkansas.gov/natural-resources/divisions/water-management/nonpoint-source-management/](https://agriculture.arkansas.gov/natural-resources/divisions/water-management/nonpoint-source-management/).

Table 1. Arkansas NPS Program short-term objectives for Beaver Reservoir Watershed

2024-2029 Objective	Tracking Strategy	2018-2023 Progress
Measurably reduce concentrations or loads of pollutants causing water quality impairments	Routine water quality monitoring with load calculations	Assessment of water quality trends 2012-2022 found no trends in total suspended solids (turbidity) or sulfate  Decreasing trends in nutrients were evident at the locations evaluated (Grantz and Haggard 2023)
Social equity in water quality protection and improvement	Number or percent of activities in low income or minority dominated areas  Number or percent impairments in low income or minority dominated areas	Unknown - not a listed objective 2018-2023
Increased resilience of natural systems and society	Routine water quality monitoring and Clean Water Act biennial water quality assessment	Routine water quality sampling and water quality assessments 2018, 2020, and 2022
No new impaired stream reaches, or water quality criteria not being met	Routine water quality monitoring and Clean Water Act biennial water quality assessment	72 miles of impairments added 2016-2018  76 miles of impairments added 2018-2020 (draft)  Five monitoring stations added
2018 impaired stream reaches attain water quality	Routine water quality monitoring and Clean	16.5 miles of West Fork White River delisted for turbidity

standards	Water Act biennial water quality assessment	impairment 2016-2018  1.9 miles White River delisted for sulfate impairment 2018-2020 (draft)
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### Nonpoint Source Pollution Strategy

There are several plans in place to protect and improve water quality in this watershed. These include the Source Water Protection Plan for Beaver Lake (found at <https://www.bwdh2o.org/wp-content/uploads/2022/09/2018-BWD-SWP-Plan.pdf>), Watershed Protection Strategy for Beaver Lake, and Upper White River Watershed Management Plan (found at [agriculture.arkansas.gov/wp-content/uploads/2022/03/UpperWhite-WMP-2004.pdf](https://agriculture.arkansas.gov/wp-content/uploads/2022/03/UpperWhite-WMP-2004.pdf)). There is also a plan used by the Kings River Watershed Partnership which can be found at [kingsriverwatershed.org/publications.html](https://kingsriverwatershed.org/publications.html). These documents identify focus areas for water quality improvement and protection, as well best management practices (BMPs) for reducing NPS pollutants of concern. Stream restoration is a BMP that is credited with significantly improving water quality in the West Fork White River (Howell 2022). The state NPS pollution management strategy for this watershed is to support implementation of the plans already developed for the watershed that address NPS pollution.

### Administration of Nonpoint Source Pollution Management

There is currently no single entity in the Beaver Reservoir Watershed with the authority to implement NPS pollution management. However, there are many active partnerships and watershed groups that are already working together to reduce NPS pollution. H2Ozarks, Kings River Watershed Partnership, Beaver Water District, and Beaver Watershed Alliance have primary responsibility for administering existing watershed plans (Table 2). These organizations work with a variety of partners including state and federal natural resource agencies, the University of Arkansas, county and city governments, state and national interest groups (e.g., Arkansas Farm Bureau, The Nature Conservancy, Arkansas Master Naturalists), other local interest groups (e.g., Northwest Arkansas Land Trust), and contractors (e.g., Watershed Conservation Resource Center). Together these partners provide outreach and education about NPS pollution and its management, assist with implementing BMPs, track implementation of BMPs, and monitor water quality.

Table 2. Primary administration responsibility for existing U.S. Environmental Protection Agency (EPA)-accepted watershed management plans

Organization	Plan
Beaver Watershed Alliance	Beaver Lake Watershed Protection Strategy
Beaver Water District	Beaver Lake Source Water Protection Plan
H2Ozarks	Upper White River Watershed Management Plan

### Nonpoint Source Pollution Management Tracking and Monitoring

NPS pollution management is tracked and evaluated at three levels: education and outreach activities, behavioral and/or opinion changes, and water quality. Many of the organizations active in this watershed track and report their education and outreach activities, including those related to NPS pollution. In several cases, these activities are listed in annual reports (e.g., Arkansas NPS Program and Beaver Watershed Alliance), in newsletters (e.g., Beaver Water District and H2Ozarks), and on websites and social media.

Behavioral changes can be tracked by implementation of BMPs and opinion polls. Many of the organizations active in this watershed track implementation of BMPs through their programs, including, the Arkansas Department of Agriculture's Natural Resources Division (NRD), U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), Beaver Watershed Alliance, Beaver Water District, and H2Ozarks. This information is listed in their annual reports and on their websites. The Beaver Watershed Alliance is using repeating opinion polls to monitor changes in opinion in the Beaver Lake Watershed.

Water quality monitoring data will be used to evaluate the effectiveness of NPS pollution management activities in the Beaver Reservoir Watershed. The Arkansas Department of Energy and Environment Division of Environmental Quality (DEQ), U.S. Geological Survey, University of Arkansas Water Resources Center, H2Ozarks, and the Beaver Water District maintain water quality monitoring stations within the watershed. DEQ uses data from all of these sources in their biennial evaluation of water quality.

### **Nonpoint Source Pollution Management Support and Funding**

Technical information and assistance with implementing BMPs to reduce NPS pollution is available from multiple sources, including local county conservation districts, NRD, NRCS, University of Arkansas System Division of Agriculture Cooperative Extension Service, Arkansas Game and Fish Commission (AGFC), Beaver Water District, and other interest groups active in this watershed. There are a number of programs available in the Beaver Reservoir Watershed that can provide funding assistance for BMPs that reduce NPS pollution. Listings of sources of technical and financial assistance with NPS pollution BMPs are available in the watershed management plans listed above. Technical and financial assistance can also be obtained by contacting AGFC, Beaver Water District, Beaver Watershed Alliance, H2Ozarks, Northwest Arkansas Land Trust, county conservation districts, or county extension offices.

### **References**

- Arkansas NPS Program: <https://www.agriculture.arkansas.gov/natural-resources/divisions/water-management/nonpoint-source-management/>.
- Axios NW Arkansas, 2023: <https://www.axios.com/local/nw-arkansas/2023/04/07/northwest-arkansas-population-growth-outpace>.
- 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).
- Beaver Lake Source Water Protection Plan: <https://www.bwdh2o.org/wp-content/uploads/2022/09/2018-BWD-SWP-Plan.pdf>.
- Beaver Lake Watershed Protection Strategy: in preparation. Contact Beaver Watershed Alliance.
- Beaver Lake Watershed Success Metrics Framework:  
[https://www.beaverwatershedalliance.org/watershed-success-metrics-framework/#gf\\_6](https://www.beaverwatershedalliance.org/watershed-success-metrics-framework/#gf_6).
- Beaver Water District: <https://www.bwdh2o.org/>.
- Beaver Watershed Alliance: <https://www.beaverwatershedalliance.org/>.
- Grantz, Erin M, and Brian E Haggard. 2023. *Constituent Loads and Trends in the Upper White River Basin: A Nonpoint Source Management Program Priority Watersheds*. MSC 395, Fayetteville: University

of Arkansas Division of Agriculture Arkansas Water Resources Center.H2Ozarks:  
<https://h2ozarks.org/>.

Howell, Savannah. 2022. *Arkansas Nonpoint Source Success Story: Restoration Projects Reduce Sediment in West Fork White River*. success story, Washington DC: US Environmental Protection Agency. Accessed January 2023. [https://www.epa.gov/system/files/documents/2022-08/AR\\_West%20Fork%20White%20River\\_2050\\_508.pdf](https://www.epa.gov/system/files/documents/2022-08/AR_West%20Fork%20White%20River_2050_508.pdf).Kings River Watershed Management Plan: <http://www.kingsriverwatershed.org/publications.html>.

Northwest Arkansas Democrat Gazette, 2023:  
<https://www.nwaonline.com/news/2023/may/29/northwest-arkansas-breaks-into-nations-top-100/>.

Upper White River Watershed Management Plan: in preparation. Contact NRD.

US Census Bureau. 2021. "Block Groups - 2020 Census." *Arkansas GIS Office*. August 21. Accessed June 2023. <https://gis.arkansas.gov/product/block-groups-2020-census/>.