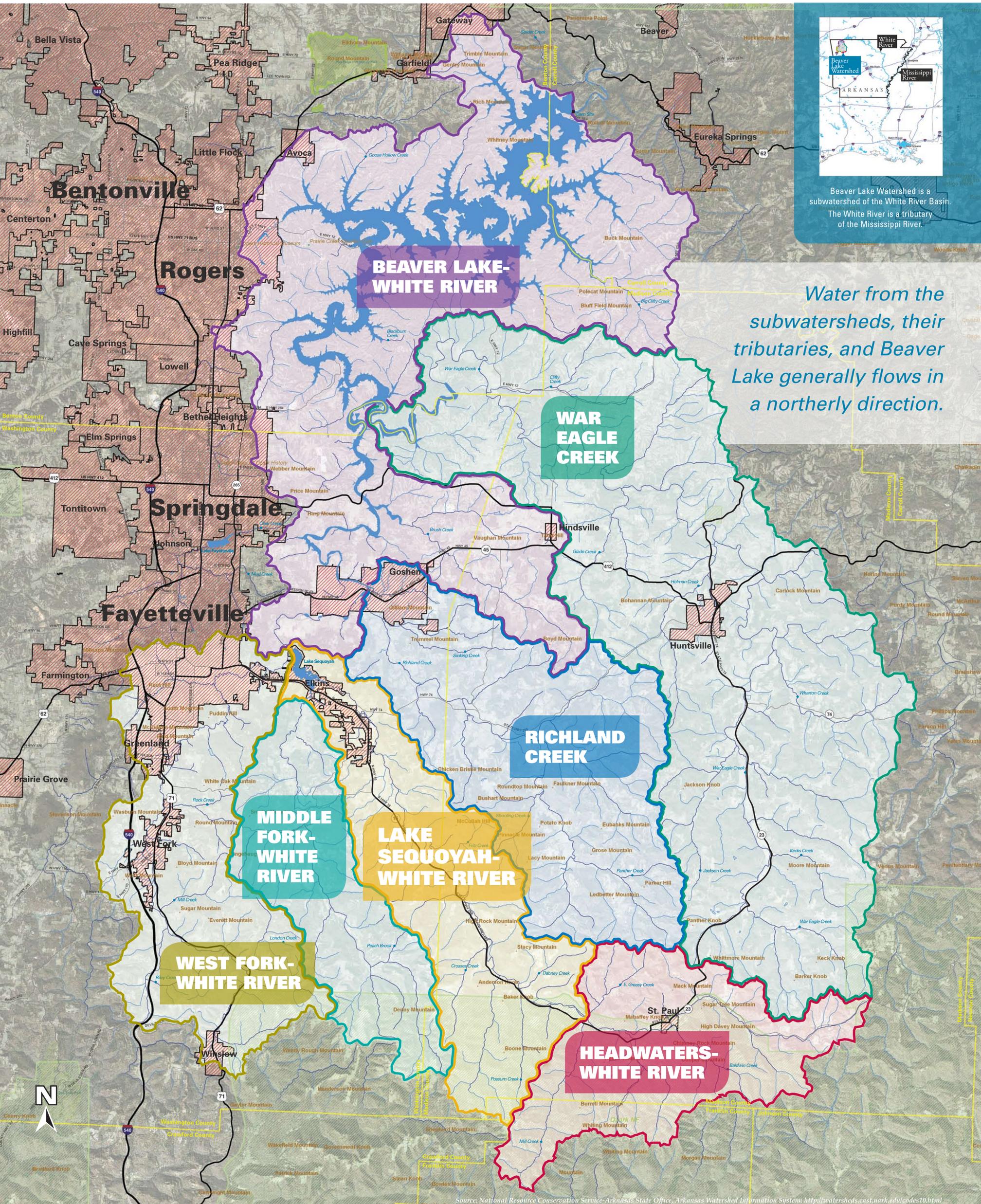


Northwest Arkansas' Beaver Lake Watershed

Beaver Lake Watershed is a subwatershed of the White River basin, which is a subwatershed of the Mississippi River basin.

Beaver Lake is the drinking water source for one in eight Arkansans.



Beaver Lake Watershed is a subwatershed of the White River Basin. The White River is a tributary of the Mississippi River.

Water from the subwatersheds, their tributaries, and Beaver Lake generally flows in a northerly direction.

Source: National Resource Conservation Service-Arkansas State Office, Arkansas Watershed Information System: <http://watersheds.cast.nrsk.edu/codes10.html>

LEGEND

- COUNTIES
- ROADS, HIGHWAYS & INTERSTATES
- NATIONAL FORESTS
- CITIES
- Shiloh Msm
- TATER HILL
- RICHLAND CREEK
- LAKE SEQUOYAH
- DAM SITE

Beaver Lake Watershed

Why is the watershed important?

Northwest Arkansas' quality of life and economic prosperity rely greatly on the health of Beaver Lake and its watershed. Significant issues, such as bacteriological contamination and increasing organics, indicate degradation of the lake. This map provides history and background on the lake and its watershed, as well as information about how existing and developing land uses create the potential for degradation. The map also highlights some strategies and best management practices to address these concerns. Please visit the websites mentioned for additional information. Let's start the dialogue about our watershed now so that we have good quality water in Beaver Lake for years to come.



Bird's eye view of beautiful Beaver Lake
Photo courtesy of Clifton Eoff



Beaver Water District
www.bwdh2o.org

Audubon ARKANSAS
www.ar.audubon.org

Homeowner Best Management Practices

How can you help keep our watershed healthy?

Don't over water your lawn. Cover piles of dirt or mulch being used in landscaping projects. Contact county extension for a free or low-cost soil test and take advantage of fertilizer recommendations.

Plant a rain garden with vegetation that increases infiltration and helps filter pollutants, such as nutrients and metals, from runoff water. Install a rain barrel at your home and collect rainwater to use for lawn and garden watering.

Make sure down spouts on the rain gutters of your house are turned so they discharge onto the lawn, not onto paved surfaces.

Dispose of harmful liquids, such as old paint and pesticides, during a household hazardous waste collection. Don't pour hazardous materials down the drain or the toilet.

Use a commercial car wash that properly recycles and treats wastewater or wash your car on gravel, grass or other permeable surfaces so that the water infiltrates into the ground.

Pump your septic system. Leaking and poorly maintained septic systems release nutrients that can be picked up by storm water and discharged into nearby water bodies.

Collect and dispose of pet waste along with garbage that's going to the landfill.



Photo by Cory Holbert

Bio-Indicators

What species are indicators of watershed health?

The Beaver Lake Watershed is home to a variety of fish species, many of which are indicators of the overall health of the watershed, including the Ozark bass and the Ozark sculpin. The Ozark bass (*Ambloplites constellatus*) is endemic to the White River System in northern Arkansas and southern Missouri, which means it only occurs here. The Ozark Bass is only found in clear, permanently flowing streams with high dissolved oxygen (DO), abundant aquatic vegetation, low turbidity, and silt-free bottom deposits (Robison and Buchanan, "Fishes of Arkansas"). Because it is endemic to the White River system, it can be considered to be a bio-indicator.

ered to be a bio-indicator.

The Ozark madtom (*Noturus albatris*) in Arkansas is known only from the White River system where it is locally abundant in the White River, Black River, and Little Red River. It occurs in clear, swift, moderate to large-size streams with gravel, rubble, or rock bottoms in riffles and rocky pools, according to Robison and Buchanan. Foods consist primarily of aquatic insects, and spawning occurs from June through July. Nests are covered by large flat rocks and are found in heads of riffles or in shallow pools with a current.



Ozark Madtom
Photo by Garold W. Stueggs



Ozark Bass
Photo courtesy of the Native Fish Conservancy

What is a Watershed?

What does it contain?

"watershed" is the area of land that catches rain and snow which drains or seeps into a marsh, stream, river, lake, or groundwater. Tributaries are smaller streams that flow into other larger streams.

Watershed protection is a key piece of the ecosystem puzzle. Watershed preservation encourages proper land use and uniform protection of tributaries within the watershed.

Watersheds contain:

- o Businesses
- o Farms
- o Forests
- o Homes
- o Lakes
- o Pastures
- o Riparian zones
- o Rivers & Streams
- o Wetlands
- o Wildlife



Photo courtesy of Massachusetts Executive Office of Energy and Environmental Affairs

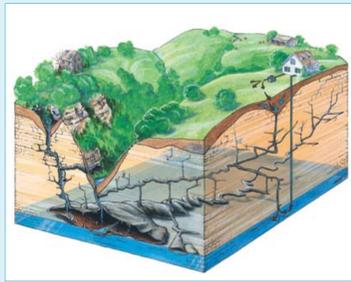
Our Watershed

Eco-location and special attributes

Beaver Lake Watershed encompasses more than 766,026 acres (860 square miles) in Benton, Franklin, Madison, Carroll, and Washington counties. Beaver Lake provides drinking water for one in eight Arkansans, over 350,000 people, serving Northwest Arkansas homes, businesses, and industries.

Beaver Lake is the first of four impoundments on the White River System, followed by Table Rock Lake (in south-central Missouri), Lake Taneycomo, and Bull Shoals Lake (in north-central Arkansas). The White River then flows southeast through the Arkansas Delta before joining the mighty Mississippi River in its course to the Gulf of Mexico.

Spanning the Springfield Plateau and Boston Mountains, the Beaver Lake Watershed has a



Water can move quickly through karst terrain.
Illustration courtesy of Mark Rathel, Missouri Department of Conservation.

Beaver Lake Watershed is a subwatershed of the White River basin, which is a subwatershed of the Mississippi River Basin, which drains 41% of the continental United States.

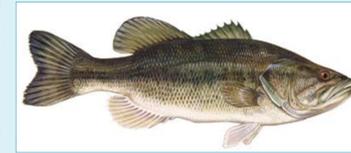
foundation of sandstones, limestones, and shales with soil types corresponding to these parent materials. Regional soils tend to be classified as "poor" in their ability to uptake and process nutrients.

The underground "karst" landscape (caves, seeps, and sinkholes) reinforces the need to take special care when planning how and where to locate septic tanks, neighborhoods, and parking lots. Groundwater movement in karst can cover hundreds of feet in one day, making nearby wells, springs, and unique cave ecosystems particularly susceptible to contamination. What takes place in one part of the watershed has an effect upstream, downstream, and underground.

Beaver Lake Watershed is a subwatershed

of the White River basin, which is a subwatershed of the Mississippi River Basin, which drains 41% of the continental United States.

Beaver Lake is home to many fish species, including the large mouth bass.



Large Mouth Bass
Photo courtesy of the U.S. Bureau of Reclamation

Management Measures for Beaver Lake Watershed

Conversion of Vegetated Landscape to Nonporous Surface

When vegetation is replaced by pavement or rooftops, less water infiltrates or "soaks in" to the soil and more runs off. The result is increased peak flows in ditches and streams and reduced minimum flow during drought, which can lead to erosion and sedimentation. When runoff flows across a vegetated surface, sediment settles and pollutants are removed. Management measures include maintaining adequate open, natural, and green space; encouraging low impact development; encouraging use of porous pavements; reducing street widths; encouraging greenways; and promoting buildings concentrated together (cluster development).

Construction Sites

Construction sites may be a huge source of sediment to streams and the lake. EPA's water quality report states that sediment is the single largest cause of impairment to the waters of the United States. Management measures include implementing, inspecting, and maintaining erosion and sediment control structures in accordance with a Stormwater Pollution Prevention Plan.

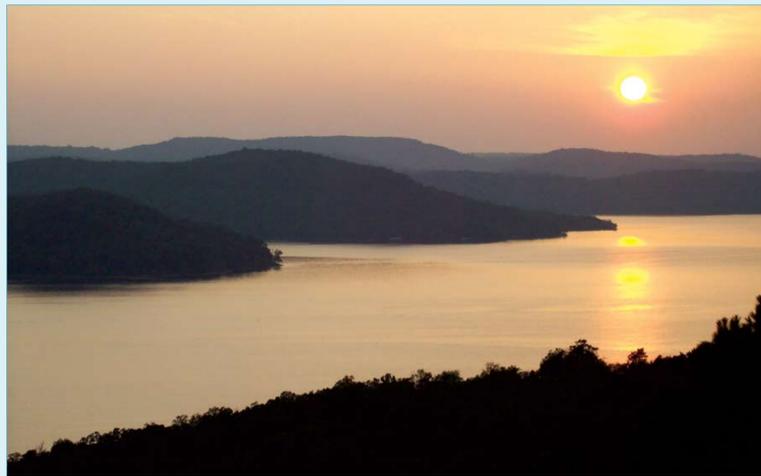


Photo by Cory Holbert



into ground water, street and parking lot sweeping, illegal discharge detection and elimination, prevention of over fertilization of lawns, hazardous waste collection, and municipal housekeeping.

Urban Nonpoint Source Pollution

Runoff from suburban and urban areas is a significant source of pollutants to our waters. These pollutants include oil and grease, pathogens, and excessive nutrients. Management measures for these areas include maintaining community green space, stormwater detention and treatment, increasing infiltration of rain



Removal of Riparian Areas

A riparian area is a vegetated ecosystem through which energy, materials, and water pass. A healthy riparian area contributes to self-regulation by waterways. Loss of riparian areas in the watershed leads to more contaminants in runoff which are not filtered by the plants and soils and therefore cleaned before reaching the waterways. Management measures include leaving native vegetation in place on banks and maintaining fencing to keep livestock away from banks.



measures should minimize loss of vegetative cover and dissipate concentrated flow as quickly as possible.

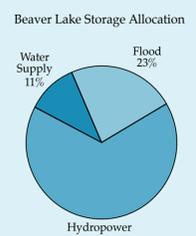
measures should minimize loss of vegetative cover and dissipate concentrated flow as quickly as possible.

Beaver Lake Storage Allocation

Who pays to use Beaver Lake?

The U.S. Army Corps of Engineers divides the lake into pools. The U.S. Congress allocates storage space within these pools. The flood control pool is from an elevation of 1130 feet, where water is spilling over the dam, to 1120.43 feet. The conservation pool, where the Corps likes to operate the lake, is from an elevation of 1120.43 feet down to an elevation of 1077 and it has a total of 937,000 acre feet of storage. The water stored in the conservation pool is paid for by hydroelectric power (Southwestern Power Administration) and the four drinking water

suppliers on Beaver Lake. The drinking water suppliers have a combined allocation of approximately 187,000 acre feet and the SWPA controls the remainder. (An acre-foot of water is a volume equal to an area of one acre flooded to a depth of one foot.)



The water stored in the conservation pool is paid for by hydroelectric power (Southwestern Power Administration) and the four drinking water suppliers on Beaver Lake.

Who Controls Beaver Lake?

U.S. Army Corps of Engineers

By law, the U.S. Army Corps of Engineers has management control of Beaver Lake. There are three authorized uses of the lake which are flood control, power generation, and municipal water supply.

Of the three authorized uses of the lake, the federal government paid for that portion of the lake allocated for flood control (see pie chart to the left). The power generation portion of the lake is paid for by Southwestern Power Administration, who in turn sells inexpensive hydroelectric power throughout the Midwest. The municipal water supply portion of the lake is paid for by Beaver Water District and three other regional water suppliers. The Arkansas Department of Environmental Quality establishes and regulates water quality standards for Beaver Lake.



Photo courtesy of Clifton Eoff

The State of the Bird

Caring for the canary in the coal mine

Many of Arkansas' most common and beloved birds are declining. Over the last 40 years, some widespread species have decreased by over 60%. These dramatic declines are attributed to the loss of healthy grasslands, forests, and wetlands from multiple environmental threats such as urban sprawl, energy development, the spread of industrialized agriculture, and global warming.

All birds are like canaries in a coal mine; they are indicators of environmental health. The decline of once common birds tells us that our environment is not as healthy as it once was. But because these birds are still widespread, it is not too late to do something about it.

The two species showcased here are found in the Beaver Lake Watershed but are declining across Arkansas. Learn what you can do to help.

Baltimore Orioles (*Icterus galbula*) are often seen singing, feeding, and nesting in open woodlands, wooded edges, and wooded riparian areas, yet their numbers have declined by 81%. Protect these birds and your environment by keeping riparian areas forested, managing pesticide drift so it doesn't kill trees bordering fields, and supporting sustainable forestry practices.

The Prothonotary, pronounced "pro-thon-atary," (*Protonotaria citrea*) Warbler, locally known as the "swamp canary," lives in wooded wetlands, river bottoms, and sloughs across the state. Populations have declined by 85% due to loss of bottomland hardwood forests, changes to hydrology caused by stream channelization, and removal of dead trees that provide nest cavities. Ensure that future generations enjoy this bird by protecting riparian areas from logging and pesticides, enrolling marginal farmland in the Wetland Reserve Program, and leaving dead trees where they stand.



Photo courtesy of Robert Herron



Photo courtesy of Robert Herron

History of Beaver Lake

Beaver Lake's role in our region's prosperity

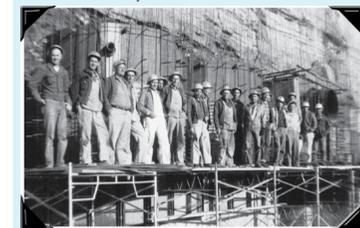
Nearly 50 years ago, visionary community leaders got together to discuss the need for a long-term supply of clean, safe water for Northwest Arkansas. These citizens worked to establish Beaver Lake Reservoir. Beaver Water District was created to pay for the drinking water supply allocation of the lake. The dam that created Beaver Reservoir and the first water treatment plant were completed in the mid-1960s. Today, there are four water utilities operating on Beaver Lake and one in eight Arkansans gets his or her drinking water from Beaver Lake.

As historian C. Fred Williams notes, "The presence of Beaver Lake has definitely proven to be an essential component of the region's prosperity, but the effort it took and the individuals involved in securing this irreplaceable resource are often overlooked or forgotten. ... the dam might never have been built except for another purpose - perhaps the most important of all - the development of a long-range water supply for Northwest Arkansas." (Source: "Arkansas Independent and Proud: An Illustrated History," 2002).

Laws needed to be changed so that the water supply would be considered a "designated use." The federal Water Supply Act, passed in 1958, made development of water supplies a national concern. Beaver Dam could be built, as long as local interests paid for the additional construction cost and agreed to utilize the water. Arkansas lawmakers approved statutes authorizing nonprofit regional water districts; and leaders in Washington and Benton counties, including Mr. Joe M. Steele, pulled together to form Beaver Water District to ensure financial resources were available for the task.



Cutline: Beaver Water District Board members (from left) Jerome McRoy, Hardy Croxton, Clayton Little, and Joe M. Steele pose for photo on Dec. 4, 1971, during the Open House for the Joe M. Steele Water Treatment Plant, the first water treatment plant utilizing water from Beaver Lake.
Photo courtesy of Beaver Water District



Crew building the intake for pulling raw water to be treated for drinking water by Beaver Water District, 1966.
Photo courtesy of Beaver Water District

Like their forbearers, members of the Northwest Arkansas Council - a private, nonprofit organization comprised of civic and business leaders - recently took the lead in a regional effort to preserve Beaver Lake. The Council hired a national watershed consultant to facilitate the development of consensus-driven policies and activities by a group of stakeholders with direct interest in the watershed to develop watershed protection policies.