



BEAVER WATER DISTRICT CELEBRATES 50th ANNIVERSARY

Fifty years ago, on Aug. 27, 1959, a circuit court order officially established Beaver Water District. Shortly thereafter, the District executed agreements with the U.S. Army Corps of Engineers for storage for water supply in Beaver Lake sufficient to yield on average 120 million gallons per day. The District also executed agreements with Bentonville, Fayetteville, Rogers and Springdale to pay for storage rights and supply drinking water.

It's interesting to note that few people realize that without Beaver Water District, Beaver Dam would not have been built. The story of how Beaver Lake and Beaver Water District came into being is one worth remembering.



Mary Beth Brooks of Fayetteville, who holds a seat on the Beaver Water District Board of Directors (Washington County), visits with past Board member Walter Turnbow of Springdale during the September 17th board meeting, which centered around recognizing the District's 50th anniversary. (Staff Photo)

"So many of us take water for granted," David Short of Bentonville, President of the Board of Directors, said. "To our benefit and their credit, the individuals who formed Beaver Water District understood that water is precious and necessary for a region's prosperity."

Short and others gathered Sept. 17th during the District's monthly board meeting to recognize the 50th anniversary. Those in attendance included present board members Bill Watkins of Rogers, Chris Weiser of Springdale, Mary Beth Brooks of Fayetteville, and Herb Hawkins of Avoca; past board members Walter Turnbow of Springdale, Curtis Shipley of Fayetteville, and Benny Latimer of Rogers; former Beaver Water District Engineer-Manager Richard Starr; Mayor Lioneld Jordan of Fayetteville, and Mayor Bob McCaslin of Bentonville; Raymond Burns of the Rogers-Lowell Chamber of Commerce, Ed Clifford of the Bentonville Chamber of Commerce, Perry Webb of the Springdale Chamber of Commerce, and Steve Clark of the Fayetteville Chamber of Commerce; Carl Yates of McGoodwin, Williams and Yates; and a handful of District staffers.

Alan D. Fortenberry P.E., CEO of the District, told those present that clean drinking water ensures the continued health of the population of a region.

"Abundant, accessible and affordable water has been the foundation for the ongoing economic vitality of Northwest Arkansas, as well as the high standard of living and quality of life we enjoy. Would there be a thriving food processing

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industry here were it not for Beaver Water District and Beaver Lake? Would other businesses have taken off like they did all those many years ago? It's not very likely."

Larry Lloyd, COO of the District, provided an overview featuring historic photos and more recent depictions of where the District is today. Lloyd said the journey began shortly after World War II, when the Beaver Dam Association formed to promote construction of a dam on the White River southwest of Eureka Springs. By 1954, progress had been made when the U.S. Congress finally authorized dam construction for flood control, hydroelectric power and other beneficial uses. However, the project could not move forward because the Corps of Engineers could not demonstrate a sufficient cost-benefit ratio based on these uses. That's when Arkansas' congressional delegation took decisive action that would change Northwest Arkansas history. These forward-thinking leaders pushed for a national Water Supply Act. Finally, in

1958, this historic act recognized that the federal government needed to play a role in the development of water supplies.

With the stroke of a pen, reauthorization of the construction of Beaver Dam had been accomplished, with the understanding that local interests would pay the additional costs for water supply storage space within reservoir. In the meantime, Arkansas legislators were busy as well. They passed statutes to enable the creation of nonprofit regional water distribution districts. In the case of Beaver Dam, that meant that Beaver Water District was formed to pay for water storage rights in Beaver Lake and, just as important, to pay for building and operating a water intake and water treatment facilities.

Over the past five decades, the District has evolved into the second largest drinking water facility in the state of Arkansas. Today, water sells for \$1.20 per thousand gallons (wholesale) to its four customer cities - Fayetteville, Springdale, Rogers, and Bentonville. These cities resell the water to numerous cities and

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(From left) Richard Starr, former Engineer-Manager; Caleb Fort, Reporter; Perry Webb, Springdale Chamber of Commerce; Steve Clark, Fayetteville Chamber of Commerce; Walter Turnbow, past board member; Taddy Nordyke, longtime District employee; and Mayor Lioneld Jordan of Fayetteville attended the September board meeting to recognize the District's 50th anniversary. (Staff Photo)

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communities throughout the region.

The District has come a long way from the modest 10 million gallons a day plant operated in the early years. Today, three plants can produce up to 140 million gallons per day (MGD) of drinking water. In total, the District provides water to more than 250,000 people and industries, or more than 9 percent of Arkansas' population.

Beaver Water District's mission is to serve our customers in the Benton and Washington County area by providing high quality drinking water that meets or exceeds all federal and state regulatory requirements in such quantities as meets their demands and is economically priced consistent with our quality standards. For more information, visit www.bwdh2o.org.

District Plans Pilot Scale Study on Stage 2 DBPs

This past year, Beaver Water District commissioned a study to assess the ability of the District and its customer cities to comply with the Stage 2 Disinfectants and Disinfection Byproduct (DBP) Rule. Black & Veatch presented a summary of the report to the District's Board on Oct. 15, 2009.

DBPs are chemical compounds that form in drinking water when chlorine or other disinfectants react with naturally occurring organic matter in the water. Long-term exposure to high levels of DBPs may pose health risks to the public.

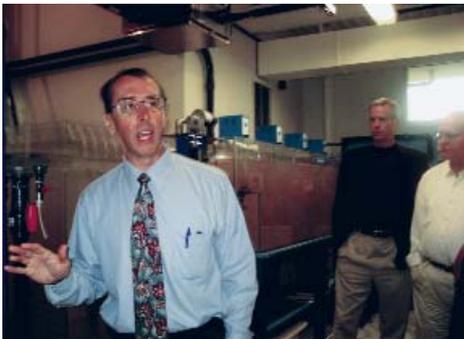
"Beaver Water District is committed

to protecting public health," said Alan D. Fortenberry P.E, CEO of the District. "As a matter of fact, disinfection of drinking water is one of the greatest health achievements of the past century, according to the Centers for Disease Control. We take the production of clean, safe drinking water very seriously. It's a 24/7 job."

According to the Environmental Protection Agency (EPA), the Stage 2 DBP rule is intended to strengthen public health protection. This will be accomplished by requiring maximum contaminant levels (MCLs) as an average at each compliance monitoring location in a system (instead of as a system-wide average as in previous rules) for two groups of DBPs - total trihalomethanes (TTHMs) and five haloacetic acids (HAA5).

Black and Veatch conducted bench-scale testing and computerized hydraulic modeling of the water distribution systems to evaluate the conditions that promote DBP formation. The report suggests potential treatment and distribution system changes that would lead to a reduction in DBP formation in the Beaver Water District plant and in the four cities' distribution systems.

Black and Veatch determined that Beaver Water District should have no



(From left) Bill HagenBurger, Beaver Water District's Plant Engineer, led a tour of the new Pilot Plant on Oct. 15. Those in attendance included Bill Watkins of Rogers, a District Board Member, and Tom McAlister, Superintendent of Rogers Water Utility. (Staff Photo)

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difficulty complying with the Stage 2 HAA5 limits. The study indicated that the District will face some challenges associated with complying with Stage 2 TTHM limits. Suggested potential treatment changes for reduction of TTHMs include, but are not limited to, eliminating pre-chlorination and utilizing potassium permanganate or chlorine dioxide as a pre-oxidant, and/or changing the chemical used for removing the organics from the water.

The report concludes that the primary method of reducing DBP concentration in distribution systems is to reduce water age. This can be achieved by the cities making system improvements or changes to their operating procedures. These include, but are not limited to, completing pipeline loops and reducing pipeline length or dead-end lines to isolated areas; increasing pipeline velocities; and managing storage tank contents to increase turnover and improve mixing.

Systems will begin the first year of compliance monitoring for the Stage 2 DBP Rule between 2012 and 2016. Systems must be in compliance with the Stage 2 DBP rule MCLs at the end of a full year of monitoring.

The District and the customer cities — Fayetteville, Springdale, Rogers, and Bentonville — are cooperating to address Stage 2 DBP Rule compliance challenges.

"We are in the first stages of conducting a pilot scale study to evaluate options — including eliminating pre-chlorination and alternating pre-oxidants and coagulants — in our new pilot plant," said Bill HagenBurger, Plant Engineer for the District. "Once we have some results, we can assign dollar amounts to treatment options.

"In the meantime, the cities will further investigate options provided by this study, confirm that sites conform to the Stage 2 DBP Rule, and put dollar values to options to reduce water age. With this information in hand, we can work with the cities and internally at the District to make decisions about what steps we will take to address the Stage 2 DBP rule."

For information, visit www.epa.gov/safewater/disinfection/stage2/basicinformation.html#one.

You may download a Fact Sheet on the Stage 2 DBP Rule and Beaver Water District's plans from the District's website at www.bwdh2o.org.



Beaver Water District's new Pilot Plant will enable the District to conduct a pilot scale study to evaluate treatment options. (Staff Photo)

Citizen Scientists Help Monitor Beaver Lake Water Quality During Secchi Day

According to sampling and measurements conducted on Aug. 29 by 32 teams of volunteer citizen scientists at 34 sampling points, the water quality of Beaver Lake in 2009 compares well with results from sampling and measurements from the past three years of data. More than 200 people participated in the 4th Annual Secchi Day (pronounced like "Becky"). The event is co-sponsored each year by Beaver Water District, Audubon Arkansas, the U.S. Army Corps of Engineers-Beaver Lake, the U.S. Geological Survey, and the University of Arkansas Cooperative Extension Service.

Secchi depth is a measure of water transparency that involves lowering a black and white disk into the water and recording the measurement when the disk is no longer visible. Deeper depths indicate water that is clearer than shallower depths. In addition to Secchi depth readings, volunteers also collect water samples that are tested by Beaver Water District's lab.

"As usual, the measurements show we have good water quality in the northern portion of Beaver Lake, nearer the dam and poorer water quality upstream, which is what you would expect. That's because water quality in large, manmade reservoirs improves as the water moves downstream and sediment and pollutants settle out," said Dr. Robert Morgan, Manager of Environmental Quality for the District.

Secchi measurements this year ranged from less than one meter (a little over three feet) in the White River arm of the lake to more than 5.8 meters in the area of the Beaver Dam.

"The transparency of water is related to the concentration of particles, either organic, such as algae, or inorganic, such

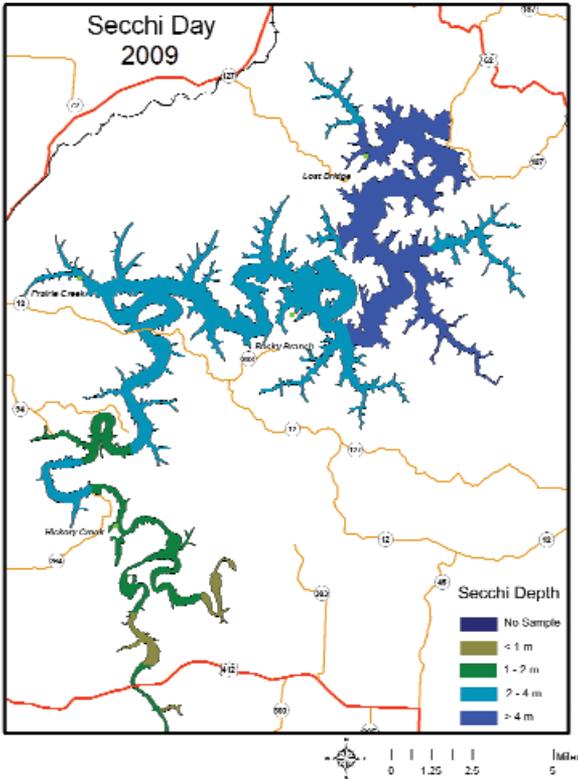
as sediment," Morgan explained. "During most years, sediment has settled out of the water by August so transparency is mostly related to algae on Secchi Day. A shallow Secchi depth measurement indicates more algae in the water. Algal growth is not a health concern at this time in Beaver Lake, but it can lead to taste and odor in drinking water."

Morgan said water transparency also may be related to weather conditions. Flooding causes lots of sediment to flow from tributaries into the lake. Increased sediment may also cause clarity of the water to decrease. For example, in 2008 Northwest Arkansas experienced two significant floods in the spring during which the flood gates at Beaver Dam were opened. The greatest Secchi depth recorded that year was 3.4 meters, more than 2 meters less than this year's maximum. That makes sense, considering the fact that total rainfall for 2008 was almost 11 inches above average.

Each year, Beaver Water District's lab technicians measure chlorophyll *a*, total phosphorous, and nitrate in each of the water samples. Chlorophyll *a* is a pigment in algae that is used to measure the density of the algal population in water. This year, the lake had chlorophyll *a* concentrations ranging from greater than 20 parts per billion in the headwaters of the lake to less than 3 parts per billion near the dam, which illustrates the gradient of water quality through the reservoir. Studies indicate that the potential for taste and odor events increases dramatically when chlorophyll *a* concentration reaches about 10 parts per billion. Phosphorous and nitrate are both nutrients that promote algal growth.

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As would be expected, the lake exhibited decreasing total phosphorous concentrations as samples moved from the headwaters of the White River to Beaver Dam. Nitrate concentrations increased from the headwaters to the dam as they have the past three years.

"Phosphorus from fertilizer and other sources attaches to soil particles. Storm water runoff carries with it a lot of soil particles and phosphorous. This is what is meant by the term 'non-point source water pollution,' " Morgan said. "We want to reduce the amount of phosphorous that is entering Beaver Lake. We all need to understand that each of us contributes to pollution entering the lake. We all need to take responsibility for the actions we take that negatively impact the lake."

Water quality is impacted by many human activities, including fertilizer runoff from lawns, erosion from unpaved county roads, and erosion from stream banks. Where residents have cleared stream side vegetation (also known as riparian buffers) it is easier for the banks to erode. Eroding banks contribute sediment to the stream and degrade the water quality.

"All of these activities can negatively impact water clarity and water quality in Beaver Lake," he said. "The District and its partners in Secchi Day are committed to educating the community about best management practices that will curb impacts from these activities and protect the lake's water quality. After all, Beaver Lake is our drinking water. And abundant, quality drinking water is necessary for good health. It's also essential for a strong economic base and for quality of life for Northwest Arkansans."

Citizen scientists are the heart and soul when it comes to the success of Secchi Day, Morgan added.

"It simply wouldn't be possible for one or two people to get this many measurements in one day," he said. "I don't have enough lab technicians to get it done in the time frame of a day. With the public's help, we will have a whole decade of annual snapshots of Beaver Lake by 2015. This long-term data collection will allow us to evaluate trends in Beaver Lake. And it will be in large measure because we had an interested citizenry that cared about helping us monitor their drinking water source."

Michelle Viney, Conservation Program Manager for Audubon Arkansas, agrees.

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Morgan Elected to North American Lake Management Society Board



Dr. Robert Morgan, Manager of Environmental Quality for Beaver Water District, was elected to represent Region VI on the Board of Directors of the North American Lake Management Society (NALMS)

during the organization's annual meeting held Oct. 27-31 in Hartford, Conn. Region VI includes NALMS members from Arkansas, Texas, Oklahoma, Louisiana, New Mexico, and Mexico.

NALMS was founded in 1980 at the third gathering of lake scientists in Portland, Maine. The purpose of the society is to forge partnerships among citizens, scientists, and professionals to foster the management and protection of lakes and reservoirs for today and tomorrow.

"NALMS is a unique professional society in that it caters to a broad range of involvement including academics, consultants, service providers, lake managers and citizen stakeholder groups," Morgan said. "Bringing these groups together improves lake management across the board. NALMS also has a top quality peer reviewed journal on lake management. Of the journals that I receive, Lake & Reservoir Management is the one that I typically read cover to cover. NALMS also provides material for more general readership and educational materials for the general public. By serving on the NALMS board, I have an opportunity to network with leaders in the field of lake management thereby improving my expertise. I also have a chance to make some

impact on the field myself."

Morgan added that Region VI is basically the south central portion of the United States, where there is an abundance of artificial reservoirs and few "lakes" in the technical sense, with the exception of "prairie pot-holes" in West Texas and Oklahoma and oxbows along the larger rivers.

"Reservoirs behave distinctly differently from natural lakes," he explained. "Because they are man-made systems, there's potential for directly managing the hydrodynamics. With our abundance of reservoirs, lake managers in this region have different needs than those with natural lakes. Making our needs known at the national level helps us secure research funding and helps assure that appropriate materials are available for local managers."

In explaining his goals, Morgan said that currently in Region VI, there are only 38 NALMS members and one affiliate organization.

"Now, given the importance of reservoirs to the region, I believe those numbers can be increased," he said. "My goal as regional director is to increase the awareness of NALMS among kindred organizations in the region and to increase regional membership. Organizing an Arkansas-based affiliate would be super. I also want to encourage researchers in the region to consider the Lake & Reservoir Management journal as a source for publishing. Our researchers in this area have a lot of knowledge about reservoir systems that needs to be spread around the country."

For more information about NALMS, visit www.nalms.org.

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"We were very excited to see this many people getting outside, enjoying the lake, and participating in the hands-on activities of the event. Over the past four years, we've been able to grow and keep participation at about 200-plus people on the day of the event. In addition to hands-on sampling and measurement activities, Secchi Day offers watershed residents educational exhibits and networking opportunities. It's a way for families and children to rally together to ensure that Beaver Lake continues to thrive for years to come."

Viney added that a new activity this year was the opportunity to build and take home rain barrels; 29 people registered, built barrels, and are now capturing and using rain water instead of allowing it to rush off their property unused.

"This is a great way to reuse rain water and divert it so that it soaks into the ground where you live, rather than letting it potentially carry sediment with phosphorous and other nutrients into tributaries that then flow into Beaver Lake," she said. "Getting involved like this and doing

something that allows you to have a personal impact helps people invest in keeping Beaver Lake clean. It promotes awareness about how important Beaver Lake is for the health and economic welfare of Northwest Arkansas."

As it stands today, Beaver Lake water quality is good, but it will take education and people changing behaviors and practices to make sure the water quality stays as good tomorrow as it is today.

"Any scientist will tell you that to be good stewards of our source water, we have to keep an eye on the lake so that we know how it changes over time," Morgan said. "Only by collecting this and other data can we make a good analysis of the lake's condition."

A more detailed report and maps concerning Secchi Day 2009 may be accessed via the Beaver Water District website at www.bwdh2o.org. Next year's event will be held on Aug. 21, 2010. For more information and a photographic slide show set to music, visit www.bwdh2o.org.

Landscaping Earns Design Award



On Sept. 26, Beaver Water District received an Award of Merit recognizing excellence in landscape design at the new Administration Center. The award was presented by the Arkansas Chapter of the American Society of Landscape Architects. Dave Roberts ASLA of Crafton, Tull and Sparks provided the landscape design for the project. (Photo courtesy of Jim Ulmer of McGoodwin, Williams and Yates.)

