THE SOURCE

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Cheevers Named Top Farm Family

When he's not managing day-to-day plant operations at Beaver Water District, Stacy Cheevers, along with help from his dedicated family, spends his free time herding beef cattle, baling hay, mending fences, and monitoring broiler flocks on his farm in the Middle Fork-White River watershed of Washington County.

Cheevers is Plant Manager for the District, where he's worked for 18 years. He is responsible for a staff of more than 30 in the operations, maintenance, and electrical/instrumentation departments. His responsibilities include overseeing water treatment procedures and insuring water quality requirements are met or exceeded at all times.

With this in mind, it isn't difficult to understand why Cheevers brings a unique understanding of best management practices to the table when he's wearing his "farmer" hat. After all, he knows firsthand about the challenges of treating Beaver Lake water to make it into high quality drinking water.

When asked what he's done on his farm to protect the environment and conserve soil, water and energy, Cheevers said, "We've implemented the utilization of alum as a litter amendment to reduce the amount of soluble phosphorous in our soil where we apply litter. We also use best management practices such as not allowing the livestock to water directly from the river, observing buffer strips around the river and unrolling hay bales to prevent foliage loss and erosion."

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U.S. Rep. John Boozman (left) poses with Lauren, Joyce and Stacy Cheevers at their farm near Elkins.

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In addition, Cheevers invested in building a stacking shed, where litter can be stored safely from the elements until it is land applied as fertilizer. This protects water resources; if the litter isn't stored properly, it can get wet and seep into the groundwater and into the watershed, which drains into Beaver Lake.

On June 4 in recognition of outstanding farming practices, Cheevers and the Cheevers' family — wife Joyce, and daughters Lauren, Alicia, and Ashdon— received the honor of being selected Washington County's 2008 Farm Family of the Year. For 62 years, the Arkansas Farm Family of the Year Program has been honoring farm families all across the state for achievements in agriculture.

The Cheevers' farm is located four miles south of Elkins on Harris Community Road. They operate 1,008 acres with 300 acres in hay production and 300 beef/calf pairs and 270,000 broilers per year. They market crops and livestock primarily through the local sale barn. Cheevers said his future goals include implementing a spraying regimen, implementing a rotational grazing program, and reducing average cow size in order to become more efficient.

"Farm life is a great way to unwind from every day stresses and a wonderful place to raise children," Cheevers said. "I enjoy my job at the District, but it's another world on the farm."

His future expansion plans include adding 100 additional cows to the herd and constructing two more poultry houses. Cheevers began farming by helping his wife's grandfather on his farm. "He was a lifelong farmer and he was looking for someone to pass his knowledge along to," Cheevers said. "He provided us the opportunity to run a few cows on his place to get us started. He was my mentor and taught me a great deal about cattle and farming."

When Cheevers is at work and the youngest daughter, Lauren, is at school, Joyce is busy looking after the two poultry houses and staying on top of such details as feeding and monitoring temperature in the houses. She enjoys the work, she said, and the hours are flexible, which means she often is able to attend Lauren's important school functions and have more free "mother" time while also earning a good income.

Daughter Lauren plays an important role in the day to day operations of the farm, too.

"I help mom out in the poultry houses, and I like being involved in 4-H with my animals," Lauren said. "I help Dad when he mows hay. I usually ride in the tractor with him and I'm his official cow checker. We go and make sure we don't have cows that are lost or new babies."

Lauren said what she loves most about living on a farm is being with all the animals. "When I get older, I want to be a vet," she said.

Lauren has a collection of critters including several horses, a show goat named Charlie, her own cattle, and four dogs — a four-month-old award-winning Welsh Corgi named Daisy, two blue heelers named Bear and Bandit, and a red heeler named Cloe.

She's a busy young lady who serves as president of her 4-H club and shows cattle on local and district levels. She won numerous awards and honors at the latest Washington County Fair. She also is a Washington County 4-H Council officer. Her sister Alicia attends beauty college in Springdale. Sister Ashdon is a student at the University of Arkansas.

Cheevers is a member of the Washington County Farm Bureau, the Arkansas Cattleman's Association, the National Cattlemen's Beef Association, the American Angus Association, and the American Water Works Association.

Show Me The Money!

The drinking water business embodies a central contradiction. On the one hand, water is a precious resource and customers are urged to care enough not to waste water. This is known as water conservation. On the other hand, water utilities rely on water sales for operating revenue. In Beaver Water District's case, that's the only funding allowed by law.

"It's a two-edged sword. We build multi-million dollar treatment plants to meet a maximum daily demand based on the population served and projected demands and growth trends. In the case of northwest Arkansas, the highest demand is predicated on the peak that occurs on a hot day in the summer," explained Alan D. Fortenberry P.E., Chief Executive Officer of Beaver Water District.

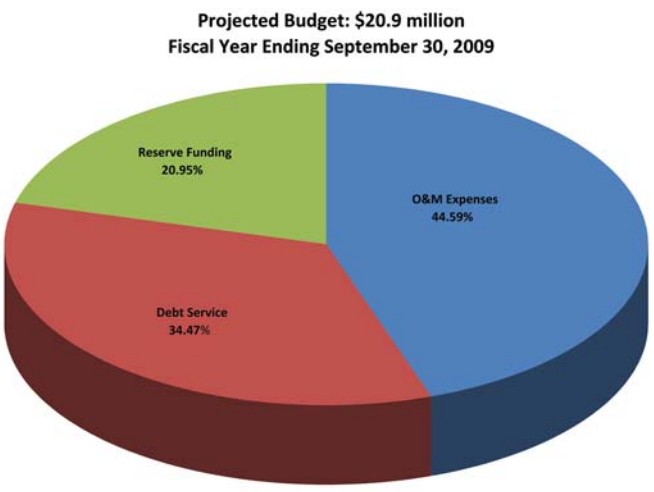
"When we plan our annual budget, we make an estimate about how much water we think we'll sell to our four customer cities." he said. "Sometimes we hit the mark, and sometimes we don't. So far this year, we've had more rainfall than is typical, so we're selling less water."

Water sales are down 4.5 percent while chemical prices have been on the rise; however, there's no need to worry about paying the bills, he said.

"Contrary to erroneous reports in the media, we're not taking money out of reserves to operate," Fortenberry said. "We are able to pay operating expenses, and we have some left over to put into reserve funds, just not the amount we expected. We are $1.79 million short of funding our reserves to the level we had planned. At our board meeting on Aug. 21, we proposed that any shortfall in funding of reserves this year be made up in future years."

Beaver Water District has several categories of reserve funds.

The depreciation fund is mandated by bond covenants with the minimum amount required of $1 million and is therefore a restricted fund. Additions to that fund beyond the $1 million level are not allowed by the District's Revenue Bond Trust Indenture. Therefore, the replacement and refurbishment fund was established to allow the District to plan and save for the actual replacement costs of depreciated items of equipment and structures within the plant. Interest from the depreciation fund is transferred to the replacement and refurbishment fund in order to maintain the depreciation fund at the required $1 million level.



The storage space fund was established to provide the District's share of any major repairs that might be required to Beaver Dam by the U.S. Army Corps of Engineers. The Board of

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Directors capped this fund at $4 million and authorized the transfer of all interest accrued annually to the watershed management fund.

The watershed management fund was created to deal with the anticipated costs related to the protection of the water quality in Beaver Lake. Costs related to riparian easements and a joint funding agreement with the Northwest Arkansas Council for the development of a watershed management plan are the primary anticipated expenditures from this fund. This is a non-restricted fund.

Expansion reserve and construction funds are used for major items of expenditure. In the upcoming fiscal year, this fund will help pay for the construction costs related to the Steele plant renovation, construction of the new administration building, and procurement of right of way for the western corridor project.

Secchi Day 2008:

Clarity of Lake Impacted by Spring Storms

By Robert Morgan, Ph.D.

In spite of heavy rain and threatening thunderstorms, 29 citizen science teams ventured out onto Beaver Lake on Aug. 23 during the third annual Secchi Day on Beaver Lake to collect data on water clarity and nutrient and chlorophyll concentrations.

Secchi Day is a citizen science and public education event sponsored by Beaver Water District, Audubon Arkansas, and the U.S. Army Corps of Engineers-Beaver Lake. According to Mary Smith of Audubon Arkansas, about 275 people, including the scientists, volunteers and interested members of the public, participated in the event.

A Secchi disk is an 8-inch diameter plate colored black and white. Secchi depth is the distance below the surface of the water that the Secchi disk can be seen. Thirty sample sites had been identified on the lake for sampling during Secchi day. Secchi depth is measured at each site by two different teams and the results averaged. Considering all 30 sites, the average Secchi depth of Beaver Lake was 2.3 meters or about 7.5 feet (1 meter equals 3.28 feet). The minimum Secchi depth was 1.2 meters. The maximum was 3.4 meters. As expected, the headwaters were less clear than the water nearer the dam.

In 2006 and 2007, the overall average Secchi depths were 3.2 meters and 2.9 meters respectively. Secchi depths in 2008 were significantly less than either of the previous years. The overall average, however, doesn't really give a clear picture of Beaver Lake. The headwaters region of the lake, which is south of Hwy. 12, is typically less clear than the lower lake nearer to the Dam. In the headwaters region, these data are the same. Secchi depths for 2006, 2007 and 2008 were 1.6, 1.7, and 1.6 meters respectively. On the other hand, the lake north of Hwy. 12 for 2008 was much less clear than earlier years. Secchi depths for 2006 and 2007 in this region were 4.3 and 3.7 meters respectively. For 2008, the depth was only 2.8 meters. The maximum clarity for 2008 was 3.4 meters. The all time maximum over the three years of data was 5.9 meters. Statistically, it can be stated with more than 99% confidence that the Secchi depth north of Hwy. 12 was less in 2008 than in previous years.

The reduced clarity of Beaver Lake in 2008 is a clear example of the impact

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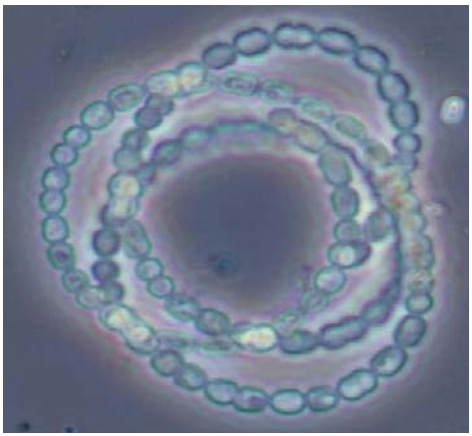
of storm events on water quality in the lake. During March, an extreme storm in the lake's watershed caused the lake to fill to the top of the flood pool. Flood gates were opened because of the rising water level. Then in April, a second extreme storm occurred. The lake was already filled to the brim so the flood gates were opened and remained open for several days. The result was that sediment that usually settles out south of Hwy. 12 flowed all the way downstream to the dam. The plume of sediment could actually be seen moving through the lake in satellite photographs. With that sediment came a huge mass of nutrients, nitrogen, and phosphorus into this normally nutrient poor portion of the lake. As the sediment settled out allowing sunlight to reach into the water, algae grew rapidly creating the green color that is present in the lower lake this year and reducing clarity.

The lack of clarity in Beaver Lake during 2008 is most likely an anomaly caused by the two extreme storms in the spring. Hopefully over the next several months, the algae will die off and the lower lake will be restored to its previous excellent clarity. The results from 2008 do however serve as a reminder of what can happen if nutrients and other pollutants are not adequately managed within our watershed and lake.

(Editor's Note: Robert Morgan, Ph.D., is Manager of Environmental Quality for Beaver Water District.)

During March and April, extreme storms in the lake's watershed caused the lake to fill to the top of the flood pool. Flood gates were opened and remained open for several days. Sediment that usually settles out south of Hwy. 12 flowed all the way downstream to the dam; the plume of sediment - including a huge mass of nutrients, nitrogen and phosphorous -- could be seen moving through the lake in satellite photographs. As sediment settled out allowing sunlight to reach into the water, algae grew rapidly creating the green color that is present in the lower lake this year and reducing clarity. (Photograph courtesy of Miranda Viney.)

Taste and Odor Evaluation Presented to District's Board



Blue-green algae releases MIB, an organic compound that causes unpleasant taste and odor in potable water.

About once a year, residents of Northwest Arkansas notice a funny taste and smell in the drinking water coming from their taps. The good news is that the water is safe to drink and this is a purely aesthetic issue. However, it is an issue of concern for Beaver Water District.

Historically, the District has experienced earthy and musty tastes and odors in its raw water pulled from the water intake near Hickory Creek on Beaver Lake during September and October. The peak generally occurs about two weeks following the onset and has an average duration of two months.

The dominant taste and odor compound that is responsible is 2-methylisoborneol or MIB, an organic compound released by blue-green algae, as part of their normal life cycle, into the raw water supply. The release causes unpleasant taste and odor in potable water. The taste and odor threshold for MIB is 5 parts per trillion.

"We use a powdered activated carbon (PAC) feed system to diminish the taste and odor," Alan D. Fortenberry P.E., CEO of Beaver Water District, said. "But our PAC system doesn't have the capacity to effectively reduce the peak concentrations of MIB. MIB can be detected at levels as low as 5 parts per trillion. Some people may not notice any taste and odor until the levels are much higher. Others may never notice it. To put this in perspective, imagine pouring 2.5 gallons of MIB into Beaver Lake and mixing it up. That's all it takes to reach 5 parts per trillion in the lake. The point is that it doesn't take very much."

The District contracted with Black & Veatch to do a preliminary evaluation of four viable taste and odor control options: PAC, granular activated carbon (GAC), ozonation, and ultraviolet (UV) with hydrogen peroxide. On May 7, Black and Veatch presented its report to the District. The report presented the advantages and disadvantages and order of magnitude costs for each of the options. Based on the high costs of GAC, only PAC, ozonation, and UV with hydrogen peroxide were recommended for more detailed evaluation.

To better develop the equipment sizing and costs of the alternatives, Black and Veatch performed bench-scale testing. Raw water from Beaver Lake was spiked with MIB and geosmin, dosed with different concentrations of PAC and ozone, and the removal measured. This data was used to develop the design dosage of PAC or ozone to reduce the MIB concentration to less than the detec-

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tion limit. Another raw sample was sent to a UV manufacturer's laboratory to better develop their equipment sizing.

"The District will continue to study taste and odor issues and look for ways to minimize the impact of MIB on our customers' drinking water," Fortenberry said. "In the meantime, we encourage our customers to remember that this is not a health issue."

Based on the bench-scale testing, options for implementing each of the alternatives into the District's three treatment plants were developed. One option for each of the alternatives was then selected to develop order of magnitude capital costs, operation and maintenance costs, and the impact of the wholesale rate. A non-financial evaluation of each alternative was performed that scored and ranked alternatives based on criteria of taste and odor reliability, operations, maintenance, capital cost, and operations and maintenance costs.

Conclusions and recommendations from the study include:

♦ Ozonation was very effective for reducing MIB and geosmin. An ozone dose of 2 mg/l resulted in 80 percent removal of MIB and 88 percent removal of geosmin.

♦ The combination of PAC and ozonation is recommended to reliably control taste and odors. While slightly more expensive than ozone alone, the multiple barriers would provide better flexibility for operations to control the peak concentrations during taste and odor events. This alternative is also the most cost effective should the event duration increase beyond the normal two months.

♦ Further testing of ozone should be conducted to optimize the ozone dose, determine if pre-ozonation or intermediate ozonation are more cost-effective, and determine the most effective combination of PAC pretreatment and ozonation.

♦ After the testing, a conceptual design report for ozonation should be conducted to refine the approach and costs developed to further evaluate the details of integrating the ozonation process into the plant.

♦ PAC and ozonation had capital costs of $42.2 million, annual operation and maintenance costs of $790,000, and a wholesale rate impact of $0.32 per 1000 gallons. The wholesale rate is an average over the study period; the actual rate may be higher.

♦ If the cost is only applied to residential customers, the wholesale rate impact could be as high as $0.42 per 1000 gallons. With an average household usage of 6,000 gallons per month, the average bill would increase by approximately $2.50 per month.

"The District will continue to study taste and odor issues and look for ways to minimize the impact of MIB on our customers' drinking water," Fortenberry said. "In the meantime, we encourage our customers to remember that this is not a health issue. The water that leaves our plant meets all standards and is safe to drink. If the taste of the water is of concern to a customer, then we suggest chilling the water before drinking and/or installing a carbon filter at the tap."

Bates named Director of Human Resources

Pat Bates

Pat Bates of Bella Vista "got her feet wet" in the water business when she joined volunteers who turned out for Secchi Day on Beaver Lake at Prairie Creek on Aug. 23. While helping to fill reusable Beaver Water District "Got Tap?" bottles with chilled tap water, she had the opportunity to network and review exhibits about source water protection, clarity and raw water quality, best management practices, and watershed protection. She also participated in a guided boat tour that included a Secchi dip demonstration, as well as a rain barrel building workshop.

Then on Aug. 25, Bates reported for her first day of work as Beaver Water District's Director of Human Resources. Bates' central task will be to support the District's leadership in matters related to general human resource management and state and federal regulatory compliance. Her responsibilities will include compensation and benefits administration, training and development, development of policies and procedures, implementation of human resources programs, recruiting and staffing, and performance management systems.

Bates is a graduate of Fort Hays State University, Hays, Kan. She holds a bachelor's degree in business administration with an accounting major. Most recently, she worked 10 years as Human Resources Manager at Outdoor Cap Company, Inc., in Bentonville. She also worked for Hudson Foods, Inc., Advance Title Services, and Kennedy & Coe, CPA.

Bates has her Professional in Human Resources Certification. She is a member of the Society of Human Resources Managers, Northwest Arkansas Human Resources Association, Northwest Community College Corporate Learning Workforce Advisory Committee, and the Northwest Arkansas Chapter of the American Society of Training and Development.

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