

Lake Appreciation Month and Secchi Day on Beaver Lake, Northwest Arkansas

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Connecting source water to tap water

Northwest Arkansas (NWA) is a rapidly growing metroplex where many residents take potable water and source water quality for granted. This story plays out not only in NWA, but around the nation and many other places in the world. In relation to the value of the service, the low price of high-quality potable water that meets or exceeds all regulatory requirements expands the disconnect between source and tap. Lakes are a reflection of their watersheds. Lakes Appreciation Month and Secchi Day on Beaver Lake provide a platform to engage and inform the public about these issues. Many people do not realize where their potable water comes from, or that human activities on land affect water quality at the source. A partnership between like-minded organizations to promote educational and outreach opportunities for the public best utilizes resources and expertise.

Lake Appreciation Month

Beaver Watershed Alliance (BWA) is a nonprofit watershed organization located in NWA that is working to educate the community and protect and restore Beaver Lake and its watershed. In July of 2018, BWA celebrated another successful Lakes Appreciation Month. Beaver Lake is the drinking water source for 1 in 6 Arkansans. The Beaver Lake watershed covers over 3,087 km² of land (Tetra Tech 2012). As part of the BWA mission to raise awareness of watershed concerns, BWA is proud to partner with NALMS to promote Lakes Appreciation, not only for Beaver Lake, but across the state. Each year, BWA and partners submit a request to the Arkansas State Governor asking to proclaim July as Lakes Appreciation

Month. July 2019 marks the eighth year to receive the statewide proclamation. Following are the key points in the proclamation application:

“With over a half-million acres of reservoirs in Arkansas, summer is a great time to encourage all Arkansans to appreciate the lakes of the Natural State by participating in recreational activities such as swimming and boating, taking care of lakes, and enjoying the scenic beauty and benefits provided by them – including drinking water for much of the state. In addition to Lakes Appreciation Month being a time to appreciate lakes, it is a time to think about where communities would be without their water, and the threats facing lakes and reservoirs. These threats include sediment and nutrient loads, population growth, development, and invasive plant and animal species that put stress on waterbodies. The importance of protecting these lakes and reservoirs for future generations is critical to Arkansas’ quality of life, communities, wildlife, and potential for future growth and economic development.”

In July 2018, the BWA led over 17 programs, with more than 120 people participating in stewardship activities, outdoor watershed education and recreation programs, and citizen science programs within the Beaver Lake watershed. A media campaign for Lakes Appreciation Month included a customized commercial aired at gas station pump top advertising and indoor billboards at various locations around the region – the reach was estimated at 335,000 people. Beaver Watershed Alliance also connected with stakeholders

through social media and digital media channels, promoting the month’s activities. Television crews and newspaper reporters attended several events and broadcasted the campaign, increasing outreach efforts for Lakes Appreciation.

The BWA Lakes Appreciation Month activities included taking a group of Girl Scouts paddling 5 miles of the pristine cool waters of the White River, generated from the Beaver Lake Dam (Figure 1). These fun outings provide a great educational opportunity to talk about the White River and its tributaries and the many benefits the dam and Beaver Lake provide NWA. The group also practiced Leave No Trace principles and conducted a river cleanup along the way, removing over 60 pounds of trash. Events targeting youth from underserved communities included: “kayaking 101” around a quiet cove of Beaver Lake, snorkeling in search of underwater aquatic life, and exploring the Hobbs State Park Visitor Center. Many of the program attendees had not experienced an opportunity like that before. Beaver Watershed Alliance spent time discussing with students why the lake was important and what positive, individual actions can be taken to protect water quality. Many of the summer students remarked that they were “definitely coming back to Beaver Lake” and wanted to share it with their families and friends.

Citizen science activities included five Secchi Dip-In events, where BWA staff met volunteers at local lakes to collect Secchi measurements. Secchi data were uploaded to the Secchi Dip-In database using the Lake Observer App and will help BWA and other interested partners monitor water transparency



Figure 1. Lauren Ray, Park Ranger (Interpretation), Upper Buffalo District, Buffalo National River, assists Beaver Watershed Alliance with teaching Leave No Trace principles to NOARK Girl Scout Campers out of Huntsville, AR, before their five-mile float on the White River.

in nearby lakes. This was also a great way to inform volunteers about the annual Secchi Day on Beaver Lake hosted by Beaver Water District (BWD). By leveraging local partnerships and resources, BWA was able to provide these programs at no cost to the public, which is a great incentive to get the community engaged and thinking about watershed appreciation.

Secchi Day on Beaver Lake

Understanding the source of one's drinking water is crucial in maintaining that resource for future generations. Without public buy-in, protecting source water against cultural eutrophication would not be possible. Beaver Water District, the wholesale drinking water supplier to more than 350,000 commercial and residential customers in NWA, does not own nor maintain a distribution network. Instead, the four major cities of Bentonville, Rogers, Springdale, and Fayetteville purchase drinking water from BWD to distribute and sell to their customers through each city's independent distribution network. Because commercial and residential water bills are not paid to BWD, residents of NWA may not

understand the link between source water and tap water. Results from BWD's long-range strategic plan surveys suggest that in 2006, only 36 percent of respondents correctly identified BWD as their drinking water supplier, whereas 76 percent

correctly knew the answer to the same question in 2018.

In an effort to garner support from the citizens of NWA toward preserving a safe drinking water source, BWD has initiated a citizen science outreach program entitled "Secchi Day on Beaver Lake." With this citizen science program, we aim to bridge the gap between source and tap. Secchi Day is a citizen science engagement tool, always held on the third Saturday of August, that educates the public about the source of their drinking water and provides water science-based educational activities for kids and adults of all ages (Figure 2). The first Secchi Day was held in 2006 and was intended to mimic a fishing tournament-style activity where participants launched from central locations, collected water quality data and samples, and then returned for a data "weigh-in." In 2006, the inaugural Secchi Day began with \$1,500 of seed money plus in-kind donations, 27 sampling teams, approximately 100 participants, and only one program partner. Fast forward to the 2017 event where funding exceeded \$23,000 plus in-kind donations, 35 sampling teams, 731 participants, 13 program partners, and 21 sponsors were mobilized.

On August 18, 2018, BWD held its 13th annual Secchi Day on Beaver Lake. A total of 712 people participated,



Figure 2. Secchi Day on Beaver Lake - As part of Secchi Day on Beaver Lake, kids can experience hands-on activities that are meant to inspire thought-provoking ideas. Here, kids use a spray bottle to simulate a rain-making event on a Beaver watershed model that helps them understand how pollutants on the landscape can travel to Beaver Lake.

which included 494 attendees and 218 volunteers. Volunteers were comprised of 72 on-lake samplers, and 146 volunteers, including BWD staff, that assisted with a water quality-type science festival held at the Prairie Creek marina. In 2018, 36 on-lake volunteer teams were dispatched from one-of-four launch sites along the 80 km transect (Figure 3). Armed with a Secchi Disk, two 1-litre bottles, and GPS coordinates, volunteers were asked to measure Secchi depths at two different sites, and to collect two samples just below the surface at both sites. In order to minimize sampler error, each of the 35 lake sampling sites were sampled in duplicate by different sampling teams.

Secchi transparency values from every site across the riverine-to-lacustrine continuum were thereafter relayed to BWD personnel at Prairie Creek and displayed on a large data board known as “The Great Wall of Secchi.” By having results displayed in real time, those attending the water science festival could see how the transparency of Beaver Lake changes from the riverine zone (e.g., 0.8 meters), near the White River and War Eagle Creek inflows, to the lacustrine zone (e.g., 7.5 meters) near the Beaver Lake Dam (Figure 4). Meanwhile, collected water samples were then returned to BWD staff to be analyzed at an in-house water quality laboratory. The ability to analyze water quality constituents in-house is why BWD was able to establish such a large-scale event at a reasonable price. One sample, collected in a light-resistant amber colored bottle, was used to evaluate chlorophyll-a concentrations, the second sample, collected in an opaque bottle, was used to evaluate total phosphorus, and total nitrogen. Secchi and chlorophyll-a data were then used to calculate Carlson’s (1977) trophic state index values for each of the 35 sites. These data, along with total phosphorus and total nitrogen data, were later used to build spatial maps of each water quality parameter along the entire transect Beaver Lake. Secchi depth data are also uploaded to the Secchi Dip-in database.

Back at Prairie Creek marina, the home base for Secchi Day on Beaver Lake, more than 30 exhibitors from partner organizations such as NALMS, Beaver Watershed Alliance, Northwest

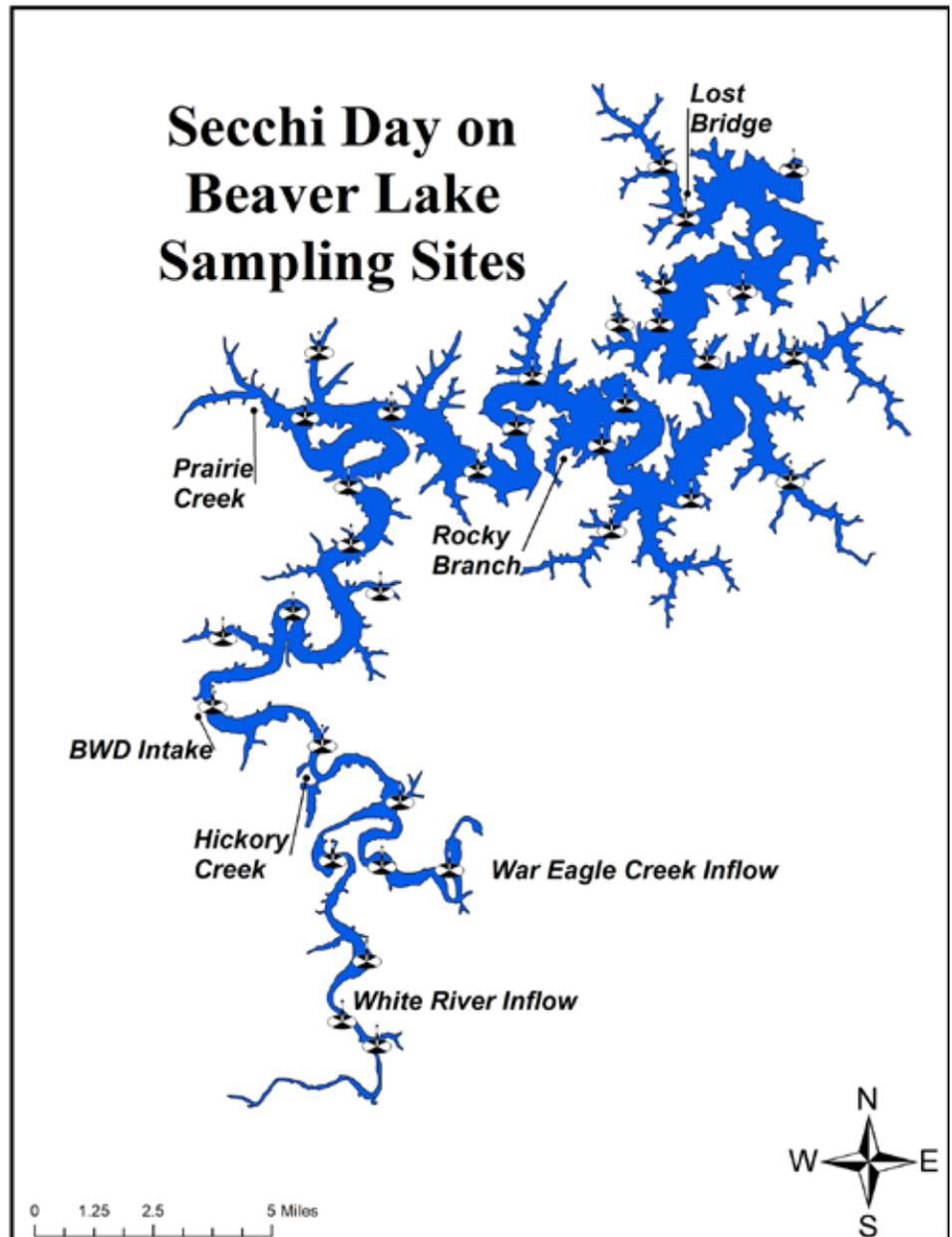


Figure 3. Map showing location of Secchi Disk readings on Beaver Lake.

Arkansas Land Trust, Arkansas Master Naturalists, University of Arkansas Division of Agriculture Research and Extension, USGS, and many others, held hands-on activities meant to inform about water quality and ecology of Beaver Lake and the surrounding watershed. Past activities have included viewing diatoms through a microscope, making their own take home Secchi disk, taking a kayak test drive, rain barrel building workshops, water fun fact scavenger hunts, and many more. Since 2015, Secchi Day organizers have diversified the event through outreach to the Latino and Marshallese communities of NWA. This effort is

made possible by partnerships with local Spanish-speaking radio stations such as La Zeta Radio and reaching out to local Latino and Marshallese organizers such as One Community. Highlighted features of such cultural outreach have resulted in Marshallese dance troops and crafts being featured at Secchi Day on Beaver Lake. This effort, along with outreach material printed in three languages, ensures that underserved communities in NWA are included in the education effort.

The partnership between BWA and BWD is working toward the common goal of source water protection through activities such as Lakes Appreciation

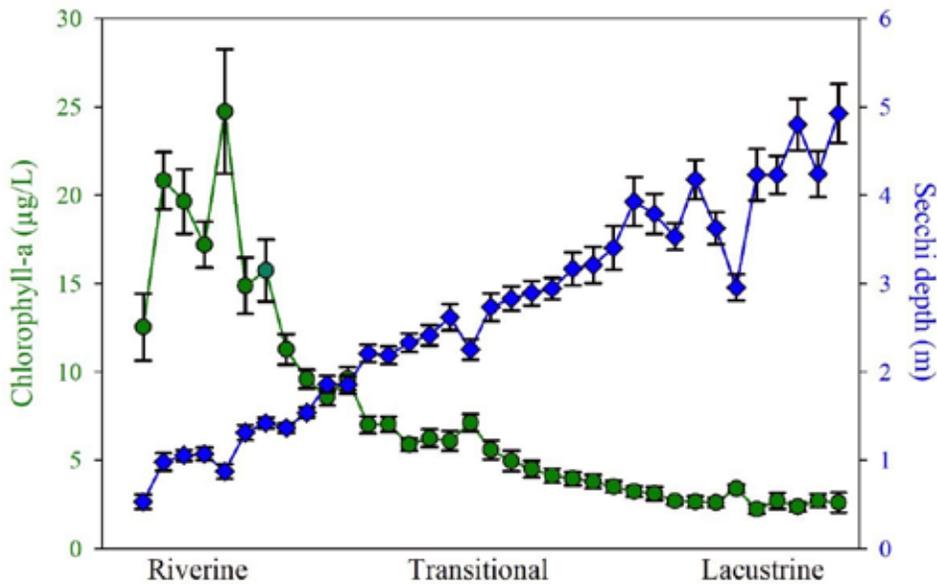


Figure 4. Changing transparency of Beaver Lake from the riverine zone (e.g., 0.8 meters), near the White River and War Eagle Creek inflows, to the lacustrine zone (e.g., 7.5 meters) near the Beaver Lake Dam.

Month, the Secchi Dip-in, and Secchi Day on Beaver Lake. Whether for flood control, hydropower generation, domestic drinking water supply, or recreation such as fishing, swimming, or boating, preserving this finite resource is imperative for the health of citizens and the growth of NWA. Together, BWA and BWD are proud to work in tandem to serve and educate the community. Beaver Watershed Alliance and Beaver Water District appreciates and thanks all partners, sponsors, and volunteers who made Lakes Appreciation Month and Secchi Day on Beaver Lake successful programs.

To learn more, check us out on Facebook or either organizations websites:

- Beaver Watershed Alliance – www.beaverwatershedalliance.org
- Beaver Water District – www.bwdh2o.org

References

- Carlson, R.E. 1977. A trophic state index for lakes. *Limnol. Oceanogr.* 22: 361-368.
- Tetra Tech. 2012. Beaver Lake Watershed Protection Strategy. May 2012 Revision. [Online] Available at <https://www.beaverwatershedalliance.org/> (Verified 1 October 2018).

Matthew Rich, an environmental specialist with Beaver Water District, received his BS and MS degrees from the University of Arkansas. Between his time as a bachelor's and master's student, he spent time as a research associate and lab manager at the Louisiana Universities Marine Consortium (LUMCON) researching the effects of oiling to Louisiana marshes, as well as annual hypoxia in the northern Gulf of Mexico. Currently, he works on source water protection issues, along with citizen science engagement efforts like Secchi Day on Beaver Lake. He enjoys spending time in the woods and canoeing with Gus, his English Bulldog.



Becky Roark joined the Beaver Watershed Alliance in December 2016. She holds a B.S. in Landscape Architecture from the University of Arkansas. She has worked within the water quality and conservation fields since 2010, helping to develop the *Low Impact Development Manual – A Design Manual for Urban Areas*, while interning at the U of A Community Design Center, she served as an Americorps Volunteer with the University of Arkansas Office of



Sustainability and has designed and installed over 75 rain gardens in both the Beaver Lake and Illinois River Watershed, helping to increase green infrastructure technologies for this region. Becky is passionate about watershed protection, education and the preservation of natural areas, serves on the Fayetteville Natural Heritage Board, enjoys kayaking and bass fishing, and spending time with her two children, Luke and Abby. Becky can be reached at becky@beaverwatershedalliance.org or by phone at 479-750-8007.

Brad Huffines

an environmental specialist with Beaver Water District, received his BS and MS degrees from the University of Arkansas. He holds Water Treatment, Water Distribution, Wastewater Treatment, and Industrial Wastewater Treatment licenses in the state of Arkansas. Brad serves on the Arkansas HABS workgroup and the Arkansas Forestry and Drinking Water Collaborative steering committees.



UPCOMING IN LAKELINE –

LAKELINE WINTER 2019:

“Emerging Contaminants” is the theme of the winter issue of *LakeLine*.

Articles will cover a range of contaminants, regulatory frameworks surrounding emerging contaminants, monitoring programs, and more. We will be accepting articles through

December 1, 2019 for the winter issue.

LAKELINE SPRING 2020:

“Lake Browning” will be the theme of the spring *LakeLine*.

The issue will include an overview of lake browning caused by increased dissolved organic carbon content in surface waters, and the chemical, biological and ecological implications of browning.