

FREE

The Appalachian VOICE

February / March 2018



THIRSTING for CHANGE

In a region rich with water, not everything that comes out of the tap is drinkable



Can We Save the Mighty Hemlock?

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About the Cover

Schoolhouse Falls is a popular waterfall located in North Carolina's Panthertown Valley. In early 2018, a rare week-long span of subfreezing temperatures caused many bodies of water to freeze, leaving the waterfall and plunge basin completely frozen. Cathy Anderson is a nature and portrait photographer from Morganton, N.C., specializing in extreme sports, adventure and landscape photography, and senior portraits. View more of her work at cathyandersonphotography.com.



A note from our executive director

In a testament to the power that Dominion Energy, Virginia's largest corporate political campaign donor, is accustomed to wielding, the state has earned a dubious distinction: "One of the top state regulatory environments for utilities in the U.S.," according to Goldman Sachs.

The key phrase here is *for utilities*. But what's best for these companies' bottom lines is not necessarily best for the rest of us, who are known in utility-speak as "ratepayers." The same goes for the citizens literally standing in the way of massive corporations' quest for continued dominance over energy markets — the farmers, homeowners and small businesses in the paths of the proposed fracked-gas Atlantic Coast and Mountain Valley pipelines.

Monopoly utilities like Virginia's Dominion Energy make large profits by investing billions in electricity generation, transmission and distribution projects, then charging ratepayers to recoup costs, plus a guaranteed rate of return generally between 10 and 13 percent — with virtually no risk.

So it's essential that state utility commissions review every expenditure the company proposes to ensure that it serves the public interest.

But in the face of a changing energy landscape where solar power generated by homeowners and small businesses threatens its business model, and widespread public outrage over the Atlantic Coast Pipeline, Dominion is once again asking the Virginia General Assembly for special favors. It's asking legislators for an end-run around utility commission review, opening the gates to unnecessary projects, increased electricity rates and more big utility profits.

In short, utilities need this kind of special treatment from the government to maintain their excessive profits on the backs of ratepayers. And if Dominion succeeds in obtaining permits to build its controversial \$5 billion pipeline, it plans to use the government's power of eminent domain to condemn the property of landowners along the route who refuse to sell. These extraordinary powers are dangerous if misused, and we rely on our democracy to ensure that they are not.

It's high time for our elected representatives to finally say "no" to utility giants like Dominion when they demand more power over our lives and future for the sake of shareholder profits.

For a just future,

Tom

Tom Cormons, Executive Director



Across Appalachia

Environmental News From Around the Region

Whitewater Releases Approved for Hawks Nest Dam on New River

By Ashley Goodman

Nine days of recreational whitewater releases will be made annually from Hawks Nest Dam. The release days are expected to begin in 2019 and are a new requirement mandated as part of the Federal Energy Regulatory Commission's renewal of Brookfield Renewable Energy Group's license for the dam on Dec. 22.

The 85-year-old dam powers the West Virginia Manufacturing silicon smelting plant in Alloy, W.Va. It diverts water from 5.5 miles of the New River, resulting in low water levels and earning the stretch the nickname "the New River Dries."

The nine days of whitewater releases were among numerous changes required by FERC. Other changes included increased minimal water flow to improve the habitat for aquatic life and a river gauge to provide real-time stream data and forecasts for local outfitters.

FERC also mandated improved public access to the river through renovations such as new restrooms and changing facilities, increased parking and a take-out area near Gauley Bridge.

Although American Whitewater had requested 41 days of whitewater releases, the organization believes "the new license will usher in a new and much better era on the New River Dries," according to a post on their website from January.

Local resort and outfitter Adventures on the Gorge plans to use the new resources to expand options for customers, especially families.

"We're really excited about the releases," says Adventures' Marketing Manager Brian Campbell. "We have to get a lot more opportunities to use the resources at the projected flows to really figure out what the best use for that is. We hope it's a more family friendly Class 3-plus experience that can open up a new opportunity for a shorter, half-day family trip."

Meadows Development in Abingdon Breaks Ground

On Jan. 3, rock blasting began at the Meadows in Abingdon, Va., where a commercial center and public sports complex are being developed, despite persistent local opposition. The Meadows is a 70-acre historic property near Interstate 81 and is adjacent to the Virginia Creeper Trail, a 34.3-mile rail trail that is used by hikers, bikers, runners and horseback riders.

In response to concerns over damage to possible graves on the property, in November 2017, the U.S. Army Corps of Engineers agreed to follow a special procedure to evaluate the effects of the development.

Local grassroots nonprofit group Friends of Abingdon filed a lawsuit against the Abingdon Town Council in January 2016 over the rezoning of the site from agricultural

to commercial. The lawsuit was dismissed by the Virginia Supreme Court, and in September 2017, the court refused the group's petition for an appeal of the dismissal.

Friends of Abingdon formed to halt The Meadows' development, citing environmental, historical, recreational and economic concerns. In addition to the lawsuit, the group supported two new town council members, who were elected in May 2016 to replace members who favored the development.

In December 2015, Food City purchased The Meadows with plans for a new commercial development and town-owned sports complex, which town officials had been discussing for more than 10 years. — Hannah Gillespie

Debate Over ATV Access to West Virginia Wildlife Areas

The Big Game Hunting Association of West Virginia seeks to change current state rules regarding the use of all-terrain vehicles in West Virginia's Wildlife Management Areas, claiming it excludes some hunters, according to MetroNews.

ATV driving on these lands is currently allowed for hunters who cannot walk more than 200 feet. The proposed change

would also allow those with other health concerns to ride into their stand, according to MetroNews.

Local opponents of the proposal cite concerns that broadening ATV access would lead to people cruising around, damaging the land and disturbing hunters and the newly reintroduced elk population. — Hannah Gillespie

By the Numbers: New Public Lands

By Hannah Gillespie

In late 2017 and early 2018, these parks gained new territory thanks to land trust organizations and other donors.

956: Acres to be transferred to Justin P. Wilson Cumberland Trail State Park in Tennessee through a partnership with the nonprofit organization Tennessee Parks and Greenways Foundation. The land, located on the biologically rich Cumberland Plateau, is home to eight caves and several rare species.

955: Acres to be transferred to Jones Gap State Park in South Carolina by

nonprofit organization The Nature Conservancy. The property's flat land will enhance visitor accessibility.

753: Acres to be added to DuPont State Recreational Forest in North Carolina from a private landowner donation through nonprofit organization The Conservation Fund. The property will be open to the public for recreation.

283: Acres to be acquired for the future Oak Hill Needleseye Boulder Park in West Virginia through a partnership with the West Virginia Land Trust. This park will feature rock climbing, hiking trails and mountain biking.

Proposed Changes to WNC Hunting Seasons

In December, the North Carolina Wildlife Resources Commission proposed changes to hunting seasons for bear and white-tailed deer in the Western North Carolina mountains. The changes, which can be viewed on the NCWRC website, would allow bear and deer hunting seasons to overlap and allow longer periods of hunting with guns.

"The proposals are based on biologi-

cal data, will aid the deer population and improve hunter satisfaction," Mike Carraway, a wildlife biologist with the state Wildlife Commission, told the Citizen-Times.

Following a January public comment period, in February wildlife commissioners will determine whether to adopt the proposals and put them into effect on Aug. 1, 2018. — Hannah Gillespie

GET INVOLVED environmental & cultural events

Energy Efficiency Task Force Volunteer Nights

Feb. 7, 21 and March 7, 6-8 p.m. Help the Appalachian Voices Energy Savings Team spread the word about decreasing energy waste and promoting energy equity across the region. Boone, N.C. Call (828) 262-1500 or visit appvoices.org/volunteer

Moral March and HKonj People's Assembly

Feb. 10. The Historic Thousands on Jones Street People's Assembly Coalition, made up of North Carolina NAACP groups and other social justice organizations, will march in Raleigh, N.C. Visit naacpnc.org/hkonj-peoples-assembly-coalition/

The Rumble Bouldering Comp

Feb. 16-18. Join other climbers at the Rumbling Bald climbing area for a weekend of competitive bouldering. \$45 adults, \$20 kids. Lake Lure, N.C. Email info@carolinaclimbers.org or visit carolinaclimbers.org/rumble

Elk Viewing Tour

Weekends Feb. 17-March 11. Ride along with a Jenny Wiley State Resort Park tour to see the growing elk population. \$15-30. Prestonsburg, Ky. To register, call (606) 889-1790 or visit tinyurl.com/KYEIkTours

Woods & Wildlife Conference

Feb. 24, 8:30 a.m.- 4:30 p.m. Attend a variety of breakout sessions on topics like forest pollinators and selling timber at this

statewide conference. \$45, \$80 per couple. Culpeper, Va. Call (540) 231-6391 or visit tinyurl.com/wildlife-conference

Cardboard & Duct Tape Sled Racing

Feb. 24. Build your best sled out of cardboard and duct tape, then race it down the Blackwater Falls State Park sled run! \$1 per sled. Davis, W.Va. Call (304) 259-5216 or visit tinyurl.com/CorrugatedSled

Monarch Butterfly Conservation

Feb. 25, 2 p.m. Learn about the challenges faced by the monarch butterfly and what you can do to aid in its conservation at the West Virginia Botanic Garden. \$15 non-members, \$5 members. Morgantown, W.Va. Call (304) 322-2093 or register at tinyurl.com/wvbg-monarch

Appalachian Mtn Photo Competition

March 2-23: Vote online for your favorite submission to the 15th annual Appalachian Mountain Photography Competition. Exhibit is open through June 2 at the Turchin Center for the Visual Arts in Boone, N.C. Call (828) 262-2475 or vote at apmntphotocomp.org

Virgina CO2 Rule Public Hearings

March 7, 8, 12, 14, 15 and 19. Public hearings over Virginia's proposed rule to limit carbon dioxide emissions will be held in Abingdon, Roanoke, Virginia Beach, Harrisonburg, Woodbridge and Richmond, respectively. Call (804) 698-4426 or visit tinyurl.com/VAOCO2Hearings

See more at appvoices.org/calendar

60th Annual Highland Maple Festival

March 10-11, 17-18. Celebrate the tapping of the maple trees with two weekends of live entertainment, food and arts and crafts shows. \$3 admission for some venues. Monterey, Va. Call (540) 468-2550 or visit highlandcounty.org/events/maple-festival

Spring Pools Institute

March 27-31. Attendees will learn about and explore the wetlands of the western Virginia highlands, and the proposed Atlantic Coast Pipeline's potential impact. \$385, register by March 20. Clifton Forge, Va. For information or to register, contact Michael Hayslett at VAvernalpools@gmail.com

Water Justice Summit

June 1-2. Save the date! Individuals from communities whose water is adversely impacted by industry and government can mingle, learn about each other's struggles for clean water and explore opportunities for mutual aid. Blacksburg, Va. Check appvoices.org for more info in the coming months.

CORRECTION: In our Dec. 2017/Jan. 2018 piece Section Hiking the Art Loeb Trail, the author had a campfire in the Shining Rock Wilderness Area, which is not allowed. The Appalachian Voice regrets the error.

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The Lilies Project Bridges Art, Activism and Community

By Molly Moore

On Jan. 13, approximately 70 people gathered at the library in Walnut Cove, N.C., to celebrate the kickoff of The Lilies Project, a public art initiative spearheaded by artist, activist and Stokes County native Caroline Armijo and funded by ArtPlace America's 2017 National Creative Placemaking Fund.

Armijo, along with scientists from N.C. Agricultural and Technical State University, will encapsulate coal ash in polymer to create large lily sculptures for a public art space in Walnut Cove.

The communities of Belews Creek and Walnut Cove sit near an unlined,

342-acre Duke Energy coal ash pond. Armijo is a member of the local Residents for Coal Ash Cleanup organization, which has been working with Appalachian Voices, the publisher of this newspaper, and others across the state to push Duke Energy to fully remove the toxic ash that is sitting in groundwater.

According to The Lilies Project's website, demonstrating how coal ash can be encapsulated and reused will "promote the building of a pilot plant at Belews Creek with the goal of eliminating the burial of new production coal ash."

The lilies theme pays tribute to

Jester Hairston, a composer and performer from Belews Creek, N.C., who wrote and sang the music for the 1963 film "Lilies of the Field."

The main installation is intended to provide a place for events, plays and other gatherings. Art will also be displayed throughout southeastern Stokes County.

Armijo aims to use the process of creating this space to bring community members together and share their stories — stories about Walnut Cove in general as well as residents' experiences with the health impacts of coal ash.

Learn more at theliliesproject.org

McConnell Aide to be Tapped for Appalachian Post

President Trump intends to nominate Tim Thomas as federal co-chair of the Appalachian Regional Commission, according to a statement issued by the White House on Jan. 4. The decision requires Senate approval.

Trump initially proposed eliminating the ARC as part of his 2018 budget plan. Senate Majority Leader Mitch McConnell of Kentucky publicly opposed the cut.

Thomas is currently a field representative on McConnell's staff. Thomas previously served as a special assistant within the Kentucky Environmental Cabinet and executive director of the Kentucky Infrastructure Authority, which helps finance the state's expansion of water and wastewater facilities.

The ARC is a regional economic development agency whose efforts span 13 states. Among its projects is the Partnerships for Opportunity and Workforce and Economic Revitalization Initiative, which has invested \$94 million in diversifying the economies of 250 coal-impacted counties since October 2015, according to the ARC website.

McConnell and Kentucky U.S. Rep. Hal Rogers are pushing to reallocate ARC funding to "the poorest communities" and potentially move the agency's headquarters out of Washington and into Appalachia as part of the ARC Reform Act, according to a press release issued by Rogers' office. — Ashley

Southwest Virginia High School Robotics Team Shines with Solar

Ridgeview High School's robotics team Squatch Watch from Clintwood, Va., won several awards at their regional FIRST Tech Challenge last December, advancing to the state finals.

The tournament brings together 7th to 12th grade students to construct and program robots to compete against robots built by students from other schools. FIRST participants across the nation can also apply for exclusive scholarships.

Last May, Squatch Watch won a \$500 mini-grant from environmental nonprofit organization Appalachian Voices, the publisher of this newspaper, for solar panels to power their robots.

Squatch Watch will be traveling to Richmond in February to compete in the state finals and possibly advance to the East Super-Regional and World Championship. — Kevin Ridder

Battery Company to Invest in Kentucky

In December 2017, power technology producer EnerBlu announced plans to open a \$372 million battery manufacturing plant in Pikeville, Ky., in 2020.

The Eastern Kentucky economy, which has faced a sharp decline in coal jobs, would benefit from the economic diversification the plant would bring, according to state Sen. Ray Jones.

EnerBlu projects the one million-square-foot plant would be located on a reclaimed surface mine and employ 875 people in its fourth year. The company also plans to move its headquarters and research and development work to Lexington early this year and employ 110 people, making their total investment in Kentucky over \$400 million.

According to the Lexington Herald Leader, state officials are hopeful that the project could put many of the laid-off miners back to work and increase demand for local housing.

The plant would be the first in the United States to make rechargeable lithium-titanate oxide batteries, which will power electric transit buses, commercial trucks, military vehicles and other equipment.

Gov. Bevin's office claims EnerBlu picked Kentucky due to the availability of a trained workforce. The company will also receive \$30 million in tax incentives from the state for the relocation.

While lithium-ion batteries have shown significant environmental impacts, not much is known about the effects of lithium-titanate oxide batteries. — Hannah Gillespie

BUILDING BETTER SPONSORED BY



Preventing Pipes from Freezing

Extreme weather is one of the expected effects of the climate destabilizing due to global warming. This year, many of the plumbers we work with have been busy fixing frozen pipes. Here's how to prevent frozen pipes if yours are susceptible to freezing.

Pipes can freeze when the environment that they are in is vulnerable to air leakage, is poorly insulated or there's no heat source. Any of these factors can cause frozen pipes, but all three together

plus freezing temperatures guarantees it. If your pipes are underneath the house, prevent air leakage into crawlspaces or basements. If you have crawlspace or basement vents, block them. Buy foam board and a can of Great Stuff spray foam. Measure the size of the vent opening and cut a piece of foam to fit. Keep it in place by spraying liberally around the edges with the spray foam.

Stop air leakage through your band joist cavities by pulling back the insulation in your floor joists (if you have it) and add-

ing caulk or spray foam around the edges. Replace the insulation.

If you have exposed cinder block in your crawlspace or basement, run six millimeter plastic from your sill plate down to the floor or ground. Air can pass through cinder block and many older houses have cracks in the mortar between the blocks where the air can flow freely through.

Second, insulate the pipes. You can buy pipe insulation at a hardware store.

ABOUT SUNNY DAY HOMES: Sunny Day Homes is a small, family-owned general contracting firm that has been incorporated since 1997. They built the first certified green home in North Carolina's High

Country in 2008 and have been advocating for non-toxic, environmentally responsible and energy-efficient building ever since. Call/text (828) 964-3419 or visit sunnydayhomesinc.com

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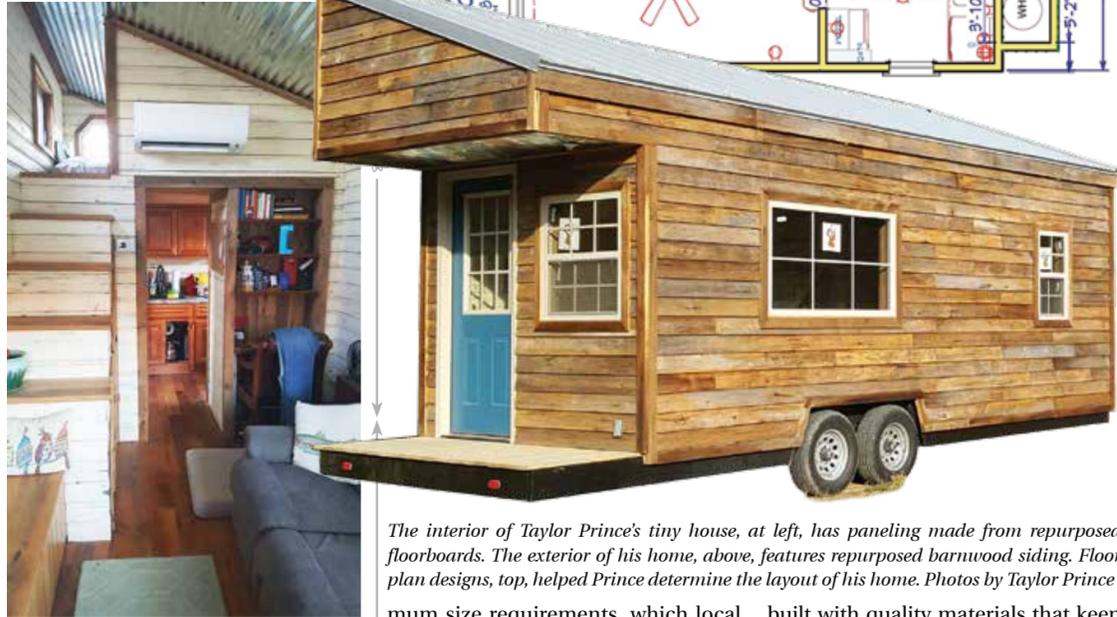
By Sarah Kellogg

In the soft mountains of Sugar Grove, N.C., Ingrid Forsyth and Ezra Knight live with their cat, Yin, in a 128-square-foot tiny home they built for \$11,000. The house has just enough room for a kitchenette, lofted bed, built-in loveseat and a fold-down table. The bathroom is one of the couple's favorite features, boasting a regular-sized shower they tiled with found terra cotta and an \$800 composting toilet, which surpasses the sophistication of a bucket only by its ability to separate No. 1 from No. 2.

Knight and Forsyth adore their space. They excitedly point out the beautiful kitchen cabinets made from repurposed chestnut they painstakingly refinished themselves. Knight recalls with a satisfied expression how time-consuming the tongue and groove walls were, and how fun installing the solar system was. Throughout their tiny abode, small artistic touches, like the loft ladder made from local rhododendron branches, add even more charm to a space clearly built with love.

The couple's home is a perfect example of a do-it-yourself "Tiny House on Wheels," a noticeable trend in American housing. Whether it's a fad or a movement remains to be seen, but there is no doubt that "tiny houses" have become an increasingly popular housing choice since the early 2000s.

Only an hour away in the valley of Triplett, N.C., I'm constructing my own tiny house on wheels. At 220 square feet it will have more room than the Sugar Grove Tiny, and also probably cost a few thousand dollars more in materials. Like Knight and Forsyth, I get excited and dreamy-eyed when I



The interior of Taylor Prince's tiny house, at left, has paneling made from repurposed floorboards. The exterior of his home, above, features repurposed barnwood siding. Floor plan designs, top, helped Prince determine the layout of his home. Photos by Taylor Prince

talk about my house, named Full Moon Tiny after the small-scale, organic Full Moon Farm on which it currently lives.

Not all tiny houses are on wheels, but they are all quite small, between 100 and 400 square feet, whereas the typical American home is about 2,600 square feet. These days, there are a myriad of small, local companies selling a wide variety of tiny homes, ranging from just a shell for DIY-ers to luxury abodes costing upwards of \$110,000.

Although the average American home has steadily increased in size over time, all across the country thousands of tiny houses are popping up as more and more people downsize their lives and their footprint.

In "The Small House Book," tiny house pioneer Jay Shafer argues that these trends are partly due to mini-

mum size requirements, which local governments began writing into housing codes in the '70s and '80s. These requirements, Schaffer claims, have led to larger, more expensive homes. Heavily influenced by developers, banks and the housing industry, housing codes often make it illegal for Americans to live in tiny, off-grid dwellings.

The tiny house movement is, in some ways, a response to this. Forsyth and Knight's home is smaller than the 260 square feet of habitable space that North Carolina requires for two people. But because their home is on a trailer, they can register it as an RV and bypass many of their state's housing codes — including the prohibition of composting toilets and repurposed lumber.

Tiny home owners are asked all the time, why not just get an RV? But, unlike RVs, tiny homes can have all the amenities of a normal house and are

built with quality materials that keep them warmer and more breathable than a camper.

"RV's are for everyone, and in a way made for no one," says Taylor Prince, who owns a 212-square-foot tiny house he built with local Mennonite barn builders in Oak Springs, Tenn. "We built our house around what we had and needed. They even measured my shoulders for the doorways!"

Plus, a new state-of-the-art camper costs about \$90,000 compared to Prince's custom tiny house, which cost him \$45,000.

Tiny is Green

Tiny houses literally have a smaller footprint, but they also use far fewer resources during construction than typical American homes. I was very

Continued on page 11

The Business of Building Tiny

In Brevard, N.C., Rachel Kinard of Just Ripe Farms operates an Airbnb out of a tiny house built by Nanostead, a small company in Marshall, N.C. She successfully uses her charming Airbnb to make extra income for the farm.

Jeremy Stauffer, owner of Nanostead, is passionate about building small homes, especially on foundations. "For 10-plus years I was building

seriously big houses," Stauffer reflects, "but so many people were more interested in pictures of my tiny cabin than the big houses I was building, because they were poor kids like us. So I started building tiny houses because I really wanted to get into affordable and sustainable housing."

According to Stauffer, using a tiny house on wheels as a vacation rental

is one of the only ways to gain equity on it since they are technically RVs and won't appreciate in value like a standing house. He thinks that moving forward, there will be more small houses on foundations, between 600 to 1,000 square feet. "I think it will become a 'small home movement,'" says Stauffer, "but I do think the tiny home movement right now is as strong as it's ever been."



Photo courtesy of Nanostead

Hiking the Highlands

Bays Mountain: Lakeside and Fire Tower Trails

By Lorelei Goff

Tucked into the southwest corner of Kingsport, Tenn., is the state's largest city park: Bays Mountain Park and Planetarium.

Its sprawling 3,500 acres include a 44-acre lake, a planetarium, a nature center, animal habitats, an adventure ropes course, a farmstead museum and 40 miles of hiking and mountain biking trails.

The network of trails allows hikers of all abilities to design an outing to suit them. Two of the most popular hikes are the Lakeside Trail and the Fire Tower Trail.

In early January, I combined several trails to reach the fire tower. Beginning at the back doors of the nature center, I went to the left on Lakeside Trail and walked southwest across the dam.

The dam was completed in 1916 and raised another six feet in 1917, creating the 44-acre lake that serves as a wildlife habitat and an outdoor classroom. It served as the municipal

water supply for the City of Kingsport until 1944. Much of the stone used to construct the dam was quarried from Bays Mountain.

Just past the junction of Lakeside and Pine trails, a large tree gnawed halfway through marks the first evidence of the park's resident beavers.

Crows call from across the lake as I pass a lone mountain laurel. Ferns and holly dot the trailside interspersed with occasional patches of galax, partridge berry and spotted wintergreen. The faded brown remnants of wildflowers, long since gone to seed, whisper a promise of new delights to come with spring.

I pass the first of many benches along the trail before coming to a floating bridge that crosses a jutting finger of the lake. Stone steps here lead to the Orchid Trail above.

Soon after crossing the floating bridge, the trail begins to roll and curve. Bright green mosses brighten the forest floor.

Nearing the top of the hill, I enjoy a view of the lake while a woodpecker punctuates the rustling of dead leaves in the canopy.

The trail descends, snaking back toward the sound of running water rising from a beaver pond and dam. There's another above it to the left. A long wooden walkway takes me across the lower pond.



An observation deck along Lakeside Trail offers a tranquil view. Hikers willing to climb the 1937 fire tower are greeted with an expansive view that extends into four states on a clear day. Photos by Lorelei Goff



There are a variety of lichen and mushrooms along this trail. Even in winter, life abounds and amazing sights wait for those who will venture out to see them.

A little further on, I turn left onto Hemlock Trail, walking away from the lake toward the fire tower. The forest floor here is strewn with pine trees in various stages of decay, victims of a pine bark beetle infestation during the late 1990s and early 2000s.

The Lake Road Trail crosses Hemlock and the beginning of the Fire Tower Trail straight ahead marks a strenuous 0.6-mile climb to the tower.

The tower was built in 1937 by the Civilian Conservation Corps, a part of President Franklin D. Roosevelt's New Deal plan to use environmental projects to provide work relief during the Great Depression. The corps built 98 fire towers in Tennessee alone between 1933 and 1941.

According to Park Manager Rob Cole, the tower is nearly 100 feet high and sits at an elevation of about 2,600 feet, offering a 360-degree view. On a clear day, hikers brave enough to climb to the top of its wood and steel staircase

can see parts of Kentucky, Virginia, North Carolina and Tennessee.

Returning down Fire Tower Trail, I took Hemlock and made a left onto Lakeside, then followed the Holly Trail after passing another beaver dam and pond.

Eventually a wooden walkway widens into an observation deck over a wetlands area, offering a beautiful view of the lake and wildlife.

Passing Fern Trail on the left, which leads to Big Oak and Chinquapin, the Holly Trail rounds the lake and returns to the nature center.

Another option from the tower is to take Chinquapin Trail to the left at the lower part of Fire Tower Trail to complete a roughly five-mile loop connecting with Big Oak and Fern trails back to the nature center.

Chinquapin is designed for a mountain bike experience, with sharper curves and more frequent changes in elevation.

Once back at the nature center, there's plenty more to do. Check out baysmountain.com to see all this gem of a park has to offer. ♦

Bays Mountain: Lakeside and Fire Tower Trails

Difficulty: Lakeside is easy. Chinquapin is easy to moderate. Fire Tower is strenuous.

Details: The Lakeside Trail to Fire Tower Trail loop is nearly 5 miles. The Lakeside Trail to Fire Tower Trail to Chinquapin Trail loop is just over 5.5 miles.

Directions: Directions to the park from various locations can be found here: baysmountain.com/plan-your-visit/directions. From I-26, take Exit 3. Turn onto Reservoir Road for approximately 3 miles. Turn onto Bays Mountain Road and the park entrance is on the left.

Park Features: The park offers 40 miles of hiking and mountain biking trails, a nature center, animal habitats, a planetarium, an adventure ropes course with a zipline and a farmstead museum. Visit baysmountain.com for more info about the park and educational programs.

Cost: Entrance fee of \$5 per vehicle, except for members. Some fees for various programs.



Lichen and moss provide a splash of green in the winter forest, at top, and mountain bikers explore Chinquapin Trail. Photos by Lorelei Goff

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Can We Save the Mighty Hemlock?

As the threat posed by the hemlock woolly adelgid grows, so do efforts to save this magnificent species

By Tamara Marshall Whiting

“The world is changed. I feel it in the water. I feel it in the Earth. I smell it in the air. Much that once was is lost...” These are the words of Galadriel the elf in the opening scene of the first movie in the “Lord of the Rings” trilogy. These words, spoken in a work of fantasy, speak to a sad reality facing the Eastern and Carolina hemlock trees of the southern Appalachian Mountains today; many are passing away, dying before my eyes. I know this because I love these mountains and I have spent years hiking in her forests. But recent years hiking in these mountains have taken me on an unexpected journey into the noble efforts of many people to save our hemlock trees.

The survival of these trees is threatened by the hemlock woolly adelgid, an invasive insect that reached the West Coast on plants imported from Japan in the 1920s, and was found in the eastern United States near Richmond, Va., in the early 1950s.

The grandest of the two is the Eastern hemlock, often referred to as “the redwood of the East.” These trees can stand over 150 feet tall, their breadth can be over six feet in diameter, and their lifespan can reach upwards of 600 years. Eastern hemlocks have stood as giant citadels, proud citizens of these mountains. But today, many are skeletons of what they once were, with sagging branches drained of their sap — needless and dying.

Eastern hemlocks are a dominant tree in the eastern United States, extending up the Appalachian Mountains from northern Georgia and Alabama to Maine and as far west as Minnesota. Carolina hemlocks, their shorter cousin, are predominantly found in North Carolina and neighboring states.

I first became aware of the hemlock plight in 2013 while hiking to Helton Falls near Blood Mountain, Ga. As I descended the path to the falls, it became clear that something was terribly wrong. It looked like a chainsaw massacre had taken place — great big trees lay on the ground where they fell,



A trio of hemlocks in Pisgah National Forest, left, have succumbed to the woolly adelgid infestation. Photo by James M. Davidson. At right, the Grandfather Golf and Country Club in Linville, N.C., has installed a lightning rod to protect an old hemlock. Photo by Jim Magruder

with wide stumps left beside the path.

When I examined the wood it did not look diseased or hollow. The destruction looked so needless. I called the Georgia Forest Service after the hike and was told that the trees were weakened by the hemlock woolly adelgid and were dying, and that they had to be cut down for the safety of hikers.

So I researched the hemlock woolly adelgid, an aphid-like insect the size of the period at the end of this sentence.



Woolly adelgids locate themselves near the bark at the base of a hemlock tree's needles and suck out the sap. Over time, an infestation of these insects consumes the entire tree's nutrition, leaving nothing for the tree itself.

After infestation takes hold, a tree cannot produce new growth. It loses all its needles, and often dies within three to five years. If a tree survives the effects of the adelgids, it is still greatly weakened and usually dies from secondary causes.

It is easy to spot an infestation on a hemlock tree; it looks like waxy tufts of white wool stuck to the underside of the branches. Hemlocks that become stricken with the insect also change color — their needles fade to gray from the dark, rich green of healthy hemlocks and eventually fall off.

Saving Hemlock Trees

The efforts of many people working together are protecting hemlock trees across our national and state parks and forests. Efforts are being made on private lands as well, including country clubs, college campuses and individual backyards. University researchers, public employees, non-profit staff and citizen volunteers are all contributing their time and skill, including at some of the public lands

Continued on next page

Forester Jesse Webster checks for the presence or absence of *Laricobius* beetles, which feed on the hemlock woolly adelgid, at a hemlock conservation site. Photo by Mike Belleme

Saving Hemlocks?

Continued from previous page

I've explored in recent years.

In early June of 2016, I was hiking the Hemlock Nature Trail along the James Fork River in South Mountain State Park near Morganton, N.C. As I walked I noticed many young hemlock seedlings alongside it, but closer to the river I observed one diseased older hemlock after another towering into the air, infested and dying or already dead.

A sign alongside the trail explained that the hemlocks were being treated with a method called soil drench, which involves digging a trench near the base of a mature tree and filling the trench with a liquid pesticide mixture that can be taken up into the tree through its root system.

The pesticide eventually kills the adelgids while they feed on the tree, but does not harm the tree itself. This treatment has to be repeated every four to six years for the lifespan of the tree.

I caught up with the South Mountain rangers in May 2017 and asked them how their efforts were going. “The trees that have been treated are recovering,” Ranger Mark Sain said confidently, “but the older hemlocks that you noticed last year that were dead or dying were too close to the river to be treated with the method we have been using. The river would be contaminated from the pesticides if we treated them.”

In the Great Smoky Mountains National Park, forester Jesse Webster leads a team of trained technicians to fight infestations of the hemlock woolly adelgid close to water sources by hiking off trail, sometimes deep into the forest, to pump a pesticide mixture directly into infested trees.

This process has to be repeated every five to seven years. The tree injection system is being used to treat hemlocks in other large areas like Big South Fork National River and Recreation Area in Tennessee and Kentucky. But this technique requires skilled technicians and is more expensive than other treatments.

Biological Predators

In 2002, two foreign species of beetles — *Sasajiscymnus tsugae* from Japan and *Scymnus sinuanodulus* from China — were introduced into

Fighting the Hemlock Woolly Adelgid in North Carolina

By Molly Moore

The hemlock woolly adelgid is now in every Appalachian state. Its broad range has also mobilized a wide array of efforts to fight it.

Margot Wallston serves as coordinator of the Hemlock Restorative Initiative, which aims to protect North Carolina's hemlocks from the pest. The initiative is funded in part by the N.C. Department of Agriculture and U.S. Forest Service and is a program of the Asheville-based nonprofit organization WNC Communities.

The adelgid was first detected in North Carolina around 1995. At the time, the trees were stressed by drought and especially susceptible to the adelgid, which allowed the insect to gain a strong foothold in the state.

Initial efforts to treat trees with pesticides were expensive and, in hindsight, involved more chemical applications than necessary.

“A lot of the trees that are left that look like healthy, lovely hemlock trees are there because people decided to make the investment in chemically treating them,” Wallston explains. “Over time, we've learned more about how to use those pesticides, how often we need to use them and really how much is required to have an effective treatment without dousing the tree in excessive amounts.”

But, she says, chemical treatment “is still our No. 1 tool for ensuring that an individual tree does not succumb



AmeriCorps Project Conserve members and seasonal technicians treat hemlocks on state lands with pesticides. Photo courtesy of the Hemlock Restoration Initiative

to hemlock woolly adelgid.”

The initiative works with state agencies and volunteers to try and provide every surviving tree on the state's public lands a quick, basic chemical treatment, based on the understanding that even one exposure to pesticides can make a big difference.

“Sometimes land managers haven't been able to get out to re-treat trees for 10 years and those trees still look so much better than all the ones that never got treated,” Wallston says. “They're green and they're thriving whereas their neighbors aren't.”

the Tennessee side of Great Smoky Mountains National Park to prey upon the hemlock woolly adelgid. According to Webster, however, this first effort brought scant results.

A new effort was made there with two different predator beetle species in 2006 and 2007 — *Laricobius osakensis* from Japan and *Laricobius nigrinus* from the Pacific Northwest — with much better results.

“We were able to go back two and three years later and find the next gen-

eration of beetles actively feeding on [the adelgids],” Webster explains. “And that was very encouraging.”

According to Webster, biological releases have been done every year since — the most recent was this past November. He explains that *L. nigrinus* and *L. osakensis* beetles seem to establish most easily and continue to be the most successful beetles in preying on the hemlock woolly adelgid. “Not enough yet,” Webster commented, “but they are there on the landscape

In 2017, in partnership with N.C. Forest Service programs, the Hemlock Restoration Initiative treated over 11,500 Eastern and Carolina hemlock trees on state forests, parks and game lands, according to Wallston. The National Parks Service and the Kentucky and Tennessee state divisions of forestry have similar programs underway.

Like many land managers across the region, Wallston and her partners are using a variety of tools in their efforts to arrest the adelgid's spread.

“As a state, we've been working on integrating more biological control in the form of predators that will consume hemlock woolly adelgid and create natural predator-prey balance,” she says.

The initiative also supports scientists with the North Carolina-based Forest Restoration Alliance who are trying to breed a hybrid between native hemlocks and Chinese adelgid-resistant hemlocks and understand why some native trees are able to withstand the pest while neighboring trees succumb. Researchers are also studying the most effective way to plant and raise young hemlocks in the forest.

“All the hemlocks are not dead,” Wallston says. “We are definitely going to protect pockets of hemlocks, and the hemlock will persist across the landscape.”

Read more from Margot Wallston in our online edition at appvoices.org/thevoice

and growing.”

A 2014 USDA Forest Service study in collaboration with the University of North Carolina, Asheville, and the University of Tennessee, Knoxville, in northern Georgia documented that *L. nigrinus* beetles are beginning to reduce the population of hemlock woolly adelgids when used in combination with soil injection treatments.

In the beginning, Webster expe-

Continued on next page



Hemlock woolly adelgid on a branch. Photo by Connecticut Agricultural Experiment Station Archive



Predatory beetles *L. nigrinus* and *L. osakensis* have been introduced to combat the adelgid. (Photo credits: Tom McAvoy, Virginia Polytechnic Institute and State University, Bugwood.org; Courtesy of National Park Service)

Saving Hemlocks?

Continued from previous page

rienced resistance about releasing these non-native beetle species into the park. Some scientists, ecologists and concerned citizens were afraid that they could cause more problems than they would solve. The kudzu vine, for example, was introduced to stop erosion but quickly proved to be an aggressive invasive species. But, according to Webster, once the general public learned about the detailed scientific scrutiny that must be done before any new species is introduced into a landscape, most people realized that the low risk of negative ecological impacts was worth taking, considering there was a strong possibility of saving trees.

Predator beetles have since been released in many locations. In the fall of 2017 alone, the U.S. Forest Service and state partners released 13,000 beetles in the Northeast and mid-Atlantic and 10,000 in Southern Appalachia.

Cumberland Plateau of Tennessee

On the Cumberland Plateau, the presence of the hemlock woolly adelgid has been relatively recent. In South Cumberland State Park the pest was first discovered in 2012 in Marion

County, Tenn., and has since expanded into the three adjacent counties included in the park.

The soil injection treatment has been used extensively in the park since 2013. I spoke with South Cumberland State Park Manager George Shinn this last July and he told me that “every tree 10 inches in diameter and bigger within 300 feet on both sides of major drains (ravines and waterways) that could be treated was treated.” He explained that the trees have been recovering well and the spread of the adelgid has slowed due to the park’s quick response upon first detection of the pest.

According to The Nature Conservancy, the presence of the hemlock woolly adelgid has been confirmed in most counties on the Cumberland Plateau, though its range is spotty. The Nature Conservancy, along with state and federal agencies and other partners, have treated thousands of trees in their efforts to stop the adelgid’s spread across the plateau.

In the lower elevation areas of the park’s Savage Gulf, there still exists one of the most impressive old-growth hemlock forests in the southern range of the species: the Werner Timber Tract. In November 2016, I looked down on this amazing forest from a vantage point on the ridge above, happy that

Be a Hemlock Helper

Treat your trees: The Hemlock Restoration Initiative’s Margot Wallston says that applying chemical treatments is the most effective way to defend individual hemlocks from the woolly adelgid, and advises residents not to overlook young, skinny trees.

She explains that the cost of chemical treatment has dropped dramatically over time — large trees can be treated for a few dollars, and little ones might cost pennies. “[Landowners] don’t need to hire anybody if they are comfortable doing it on their own and they only have to do the treatments every several years instead of every year or every other year as initially thought,” she says.

Wallston discourages most individuals from using predator beetles, noting that it’s an expensive option and there’s no guarantee beetles will stay on a specific property.

Volunteer: Many state forestry divisions and nonprofit organizations gladly accept volunteers to help treat and monitor trees. Call your agricultural extension office for local suggestions.

Take a picture: Come across a healthy hemlock in the woods, surrounded by trees that have succumbed to the woolly adelgid? Upload a photo via the Tree Snap app to share the tree’s location with researchers investigating hemlocks that are naturally resistant.

Prevent problems: Help avoid the spread of another invasive species by using only native plants in your landscaping.

For more information or to volunteer, visit the Hemlock Restoration Initiative at save-hemlocksnc.org.

this area appeared to be healthy and untouched by the spread of the hemlock woolly adelgid.

But after speaking with George Shinn, sadly I learned that the insect had been detected in the Werner Timber Tract that same fall, unknown to me as I was looking down with such awe upon it.

According to Shinn, two releases of predator beetles were done in the tract as soon as the infestation was noticed. I spoke with him again recently, and learned that another release was done in fall 2017. While Shinn stated that it is too early to make any conclusion about how the treatment is going, he is hopeful about its success.

Climate Change and Its Effects

Long term climate and precipitation research has been done by the U.S. Forest Service at the Coweeta Hydrologic Laboratory Southern Research Station near Otto, N.C. These studies conclude that, as a result of climate change, the southern Appalachian Mountains are becoming warmer and drier, with more frequent and severe droughts.

These conditions are encouraging the expansion of the adelgid and are making the battle against this insect tougher. Cold winter temperatures

The author, Tamara Marshall Whiting, hiking at South Cumberland State Park, which is also fighting the woolly adelgid.



THE APPALACHIAN VOICE

Saving Hemlocks?

Continued from previous page

die-off will continue. A 2012 U.S. Forest Service and Western Carolina University study projects that in the future the absence of the eastern hemlock will cause significant changes in the structure and health of southern Appalachian forests.

Stands of eastern hemlocks provide important habitats and shelter for many creatures. Hemlocks grow along streams and rivers, forming thick canopies that keep water temperatures cool for aquatic animals and trout. With the loss of hemlocks and the dense shade they provide combined with rising temperatures from climate change, scientists project that stream temperatures will increase, reducing the native trout habitat and leaving them with the ability to survive in only a few refuges in higher altitudes.

Once hemlocks die, the space they leave behind will be filled by other species. One 2012 study from the U.S. Forest Service and Texas A&M Uni-



versity examined a portion of Pisgah National Forest in North Carolina and forecasted an increase in pine and oak as hemlocks decline. Another 2012 study from the U.S. Forest Service and Virginia Tech anticipates a large increase in rhododendron. This study projects that more extensive rhododendron thickets may be the greatest negative ecological impact of the loss

of hemlock trees since they slow the growth of other species.

The littering of streams with needles and branches from dead hemlock trees will also affect nitrogen levels and stream structure. And without the shade and root systems that hemlocks have historically provided near rivers and streams, more light will reach the forest floor, moisture will be lost and a contin-

The adelgid arrived at Grandfather Golf and Country Club in North Carolina in 2001. The club’s Pete Gerdon, near left, first used chemical treatments. Later, he collaborated with Watauga County entomologist Richard McDonald to introduce a beetle from the Pacific Northwest that feeds on the pest; he considers the beetle a great success. Photo by Jim Magruder. At far left, hemlock trees stand near a Blue Ridge Parkway trail. Photo by James M. Davidson

ued drying will happen in the forests.

This is how nature works. Everything is connected. The demise of the hemlock trees is likely to cause a great loss of diversity. Every life affects another, and every death can cause the dying of others.

The world has changed. This death and dying impacts me profoundly. But the saving is as profound. As I hike and gaze up at healthy majestic hemlocks that still live and grace our land, I have renewed hope for the resilience and continued presence of this amazing tree in these, my beloved mountains. I am grateful for each tree that has been saved, those that will be saved and the people who are working tirelessly to save them. ♦

Tiny Houses

Continued from page 6

pleased to only create a single bag of waste constructing the entire shell of my tiny house. Building an average American house, on the other hand, produces seven tons of construction waste, according to Shafer, and uses almost an acre of forest!

With such a small space, builders can afford the extra cost of sustainably sourced materials, high-quality insulation, LED lights and energy-saving appliances. They also often use recycled lumber such as barnwood and other second-hand building materials like windows. Many folks design their tiny homes to be completely self-sufficient, utilizing composting toilets and solar energy systems.

Due to their small size and efficiency, tiny houses use relatively little in the way of electricity and fuel. A report commissioned by the Oregon Department of Environmental Quality found that “reducing home size by 50 percent results in a projected 36 percent reduction in lifecycle greenhouse gas emissions.” The average tiny home

is 90 percent smaller than the average American house, meaning a 65 percent reduction in greenhouse gas emissions.

Finances and Freedom

Like me, Forsyth and Knight wanted to build a tiny house because it seemed like the most achievable way to own a home. Sick of paying rent and wary of debt, Forsyth recalls, “I was really passionate about sustainable, regenerative, off-grid living, and I saw that the only way to delve into that, especially given the amount of money we had, would be to build a tiny structure.”

“It’s incredibly liberating to not have a mortgage,” Prince notes. “I didn’t have to go to a bank to build a structure and I’m able to adapt if I’m thrown a curveball.”

Not only are tiny houses a response to building codes and an effort to live more sustainably, they’re also a response to the affordable housing crisis in America. For this reason, the tiny house trend may indeed be a movement and not just a fad.

“I legitimately thought it was going to be a fad,” reflects Prince, “as in, over as soon as it started. But wages aren’t exactly going up and housing



The author stands with her tiny house while working on the plywood sheathing. Photo courtesy of Sarah Kellogg

availability isn’t exactly getting better either, so it seems kind of like a natural alternative for folks struggling to find a comfortable space to live.”

Tiny Homes, Big Community

Throughout the process of building my tiny house, I’ve met so many great people. I’ve learned to ask for help when I need it. I’ve borrowed tools and I’ve lent them. In a sense, I’ve started

to build a community through my tiny house project that I wouldn’t have otherwise had.

Prince was drawn to a tiny home because he wanted to change his life, to get rid of the stuff he didn’t need and the large empty rooms he never used.

“There’s an emotional and social aspect to it,” Prince says. “Now I want to start creating more common spaces where people can share their belongings and have access to other people’s stuff if they’re willing. So, you have your living space but the community has additional places to meet your material needs. Not everything has to be on your own private property.”

For Forsyth and Knight, living tiny means opening up the lines of communication. “There’s no room to go hide and smolder in,” Knight reflects, “we have to communicate.” Forsyth agrees, noting, “we have to be careful what energies we bring into such a small space. But my favorite part of living in the house is the sense of togetherness that both challenges and strengthens our relationship!”

View more photos at appvoices.org/tiny-houses.

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THIRSTING for CHANGE

Over thousands of years, the creeks and streams of Appalachia shaped mountain hollers and wove together to create the rivers that provide drinking water to many of the region's residents and wild creatures. Just as every part of the landscape is touched by water, so too every human is affected by the quality and availability of fresh drinking water — or the lack of it. On the following pages, we hear from some of the residents who don't have access to reliable, healthy water in their homes, and examine several of the challenges facing rural water systems.

The Invisible Infrastructure

As rural water systems age, challenges mount

By Dan Radmacher

Most Americans don't think twice about the ability to turn on a tap and have clean, safe water pour out.

"Water is something we take for granted," says Glenn Barnes, associate director of the Environmental Finance Center at the University of North Carolina School of Government. "We just assume we're going to turn on the tap and water's going to come out and it's not going to kill us."

But in many places across Appalachia, people live without such an assumption and it can be a devastating situation for these residents.

"When you are talking about communities and service to those communities, there is no greater, higher calling than to provide safe drinking water and proper sewage treatment," says Amy Swann, executive director of the West Virginia Rural Water Association, which serves as a resource for small water and wastewater systems in the state. "There's none. If you don't have those two building blocks, you don't have anything. You don't have economic development. You don't have a place where people want to come to work and live. You've got trouble attracting teachers, doctors, dentists and other professionals."

Donna Stanley, administrative agent for the Coalfield Water Development Fund in Big Stone Gap, Va., agrees. Stanley worked in U.S. Rep. Rick Boucher's office when the federal fund was established to help

complete financing for water projects in Southwest Virginia.

"Of all the things I encountered working in the congressional office, this is what touched my heart the most," Stanley says. "If you don't have water, you don't have much else. Poor water quality really increases costs for people. You need to buy bottled water or install expensive filtration systems. Low-income people just can't afford that expense."

Aging water systems, declining populations, economic distress and a host of other factors are making it very difficult for thousands of small community water systems across Appalachia to keep up with day-to-day operating costs, much less plan ahead to ensure that the system is properly maintained and upgraded.

"These places are doing what they can with limited resources, but there's a limit to how far you can go with underfunding infrastructure," says Barnes. "The biggest problem is that the pipes are buried. Most people have no idea what shape the pipes are in. You've got

pipes that are 100 years or older in that region. Some systems still have cast-iron pipes. Some still have clay pipes. There are some still with wooden pipes, believe it or not."

In some places, like Martin County, Ky., residents are afraid to drink the water — which often flows brown — when it flows at all. Residents went more than a week in January without any water due to the district's inability to pay to install a replacement for a broken pump. "Nobody trusts drinking the water here," says Gary Ball, editor of *The Mountain Citizen* in Martin County. "People who can afford it buy bottled water — even to cook with."

The expense of bottled water isn't an easy one to bear for a lot of people in the county, which has a median income of



The jars above show municipal tap water from a Martin County, Ky., family's home in 2016. They gather water from a seasonal spring when it's flowing, and when the taps run dry, the family has used boiled pool water for bathing and washing dishes.



Below, in January 2018 the reservoir that supplies the Martin County Water District's treatment plant dropped so low that the system lost pressure, leading to an outage that lasted 9 days for some residents. A pump, left, was used to feed the water treatment plant. Citizen photos by Lisa Stayton, courtesy of *The Mountain Citizen*

just over \$29,000. "Those who can't afford bottled water are forced to drink what comes out of the tap," Ball says. "We have lots of retirees on fixed incomes, people who have to choose between buying bottled water and buying medication or food."

In addition, Martin County residents pay a lot for the water they don't trust. Ball says residents pay \$6.70 per 1,000 gallons, resulting in \$50 to \$60 monthly bills — almost three times what Louisville, Ky., residents pay per 1,000 gallons. According to the Environmental Working Group's Tap Water Database, Martin County's water system has long been in violation of federal drinking water standards and contains at least four contaminants at levels that exceed various public health guidelines.

Martin County residents have been working with the Kentucky Public Service Commission to force the water district to improve its operations and act more transparently. After Martin County Concerned Citizens — a watchdog group that

Ball is involved with — was granted intervenor status in the PSC hearings, four of the five members of the water district board resigned.

Ball doesn't expect much of their replacements. "They're not appointed based on knowledge or expertise, but on whether they'll make any waves," he says.

The situation in Martin County has gotten a lot of press, but it's far from the only struggling system. While small systems across the nation face many of the same challenges, in Appalachia, those challenges are often amplified and exacerbated by issues like terrain, geography and isolated pockets of population.

"The systems are smaller in Appalachia, and the topography makes creating regional systems more challenging," says Jeffrey Hughes, director of UNC's Environmental Finance Center and co-author of a 2005 study examining funding of drinking water and wastewater infrastructure in Appalachia. "The region is very diverse economically, but at the time of our study, communities on the whole had fewer resources than the U.S. as a

Continued on page 14

(UN)WELL WATER

By Kevin Ridder

Melissa and Chauncy Easterling first discovered that something was wrong with the well water that fed their Jolo, W.Va., home in late 2016. Neither they nor their local health department could pinpoint the cause.

"It had a real strong odor to it, and then it started looking kind of red, like it was rusty," Melissa says. "Like sewage and rotten eggs put together. It would literally knock you off your feet."

The U.S. Centers for Disease Control and Prevention states that "over 15 million U.S. households obtain their drinking water from private wells." These are not protected by the federal Safe Drinking Water Act, which regulates public drinking water.

A 2009 U.S. Geological Survey study of 2,167 private domestic wells across the country found that roughly one in five had at least one contaminant at a potentially unsafe level. Most states, including West Virginia, do not regulate well water quality after the well's construction, according to nonprofit organization The National Groundwater Association. This leaves the responsibility of well maintenance and treatment up to the well owner.

While it is generally recommended for well owners to have their water tested annually, state-certified lab tests cost hundreds of dollars. The Easterlings hadn't had their well tested since it was built around 15 years ago.

When their well went bad, the Easterlings reached out to Appalachian Water Watch, a program that tracks water pollution run by nonprofit organization Appalachian Voices, the publisher of this newspaper. Appalachian Water Watch tested the well and found several contaminants, including lead, at levels above the U.S. Environmental Protection Agency's non-enforceable public health goals. Lead was also found in one of their neighbor's wells.

The family still doesn't know what exactly caused



The tale of two families faced with undrinkable water

What comes out of the Easterlings' kitchen faucet is so toxic, they were told they shouldn't even touch it — let alone drink it. Photo by Willie Dodson

the sole water source for their home to turn sour — but they have a strong feeling the culprit is one of the many old coal mines or gas wells dotting the ridge where they live.

Chauncy is particularly suspicious of one coal mine just 70 feet below their well's deepest point. It's been sealed off for years, but he recently spotted discharge coming out of one of the mine's wellheads that he plans to get tested soon.

"It's got this reddish-white gunk it's puking up onto the ground," Chauncy says. "I'm really not sure what it is, but it's also spilling into the main creek down there."

A few weeks before their tap water began to change color, Melissa's father suddenly passed away from kidney failure at 69.

While the Easterlings cannot say for sure if the well contamination directly led to his death, Chauncy suspects that it contributed. Two of the pollutants detected in the Easterlings' well, lead and copper, have been shown by the EPA to cause kidney damage.

"It was a shock to me, because he was just as healthy as an ox, I thought," Chauncy says. "He'd get up and chop firewood, he'd get out in the yard and play with that little boy of ours. It was unreal."

The Easterlings' public service district has nearly completed a plan to extend municipal water to their part of the county, but it lacks fund-



A plastic bottle filled with Melissa and Chauncy Easterling's tap water. Photo courtesy of the Easterlings

ing to complete the project. The family is trying to raise awareness about the lead in their water to both make it a higher priority and help assist the district's case for obtaining federal grants.

Until then, a 5,800-gallon rainwater tank is their primary source of water.

"And tanks ain't cheap," Chauncy says. "What I paid for that tank, I could've bought 10 years of water off of the water company."

He characterizes his family's situation as "a constant battle." Since their water supply is dependent on rainwater, rationing is a must. On top of that, the water in their tank can start to grow algae and bacteria if it sits too long. They often have to buy extra water too, spending \$50 to \$100 a month depending on the amount of rain.

"By the time we've washed clothes, taken baths, flushed the commode — I'd say we go through about 1,500 gallons to 6,000 gallons, maybe, a month," he says. "It just depends on what you got to do. We try to wash clothes when it rains now."

Filtration Fixes?

Jane, whose name has been changed out of concern for her husband's coal mining job, had to install a filter on her Pike County, Ky., well in 1989 after the taps started to run red. Like the Easterlings, Jane and her husband live in an area surrounded by old coal mines and gas wells — meaning if the pollution originated from one of these sites, it would be very difficult to determine which one.

According to Jane's daughter Kandace, the area's water quality has gotten progressively worse since 1989.

Continued on page 17



CONTAMINATED

Drinking Water Problems in Appalachia

By Hannah Gillespie

NC Among 41 States Grappling with Trihalomethanes

In June 2017, Duke Energy withdrew its request to add bromides to several of the scrubbers at its North Carolina coal-fired power plants due to a related 2015 spike in Charlotte drinking water contamination. This follows a June 2017 lawsuit filed by environmental groups that challenged Duke's request due to the cancer-causing nature of bromides.

North Carolina coal ash basins have also violated their Clean Water Act permits by allowing bromides to flow into surface and groundwater, according to lawyers for the Southern Environmental Law Center. This contamination in North Carolina is an indirect result of a 2002 state law that limited air pollution from coal-fired power plants. To reduce air emissions, Duke Energy installed scrubbers, which resulted in wastewaters containing bromide.

Trihalomethanes are an unhealthy byproduct that can form during the water treatment process, including when bromides interact with chlorine. If consumed in sufficient quantities over time, these chemicals may adversely affect the central nervous system and cause cancer as well as kid-

ney or liver problems, according to the U.S. Environmental Protection Agency.

After scrubbers were installed at the Belews Creek power plant in 2008, trihalomethanes started showing up in the drinking water of nearby Madison and Eden, N.C., according to the Winston-Salem Journal. By March 2017, Madison and Eden had spent roughly \$1 million and \$2 million, respectively, on systems to better deal with trihalomethanes, although the concern remains.

A lawsuit filed in December 2017 charges that operations at the Belews Creek power plant have contaminated groundwater and local waterways with elevated levels of many pollutants, including bromides.

The Environmental Working Group identifies 41 states, including the entire Central and Southern Appalachian region, with the exception of Tennessee, as having trihalomethanes over the federal legal limit of 80 parts per billion in some of their water. In Kentucky alone, 74,048 people have water with trihalomethanes over the legal limit.

WV Residents File Claims Related to 2014 Water Crisis

Residents and businesses affected by the January 2014 Freedom Industries chemical spill have until Feb. 21, 2018, to file settlement claims as part of a class action lawsuit, pending final court approval of the arrangement.

The industrial chemical, 4-methylcyclohexane methanol, also known as MCHM, spilled into the Elk River just upstream of the Kanawha Valley Water Treatment Plant in Charleston, W.Va., after leaking from a storage tank.

According to the American Conference of Governmental Industrial Hygienists, prolonged exposure to high concentrations of MCHM can cause headaches, difficulty breathing and eye and skin irritation. As a result, residents had to rely on bottled water.

If the settlement receives final approval, it will be paid by West Virginia American Water and MCHM manufacturer Eastman Chemical, although the compa-

nies deny liability and blame the now-bankrupt Freedom Industries for the spill.

The class action lawsuit covers anyone who received tap water from the Elk River intake plant and any hourly worker whose employer closed due to the water contamination. The incident affected 231,000 residents and businesses.

The resulting \$151 million settlement allows households to file a simple claim form and obtain \$550 in compensation for the first resident and \$180 for each additional resident. Separate claims can also be submitted with more detailed information regarding losses for residents, pregnant women, businesses and organizations.

As of December 2017, nearly 38,000 compensation claims had been filed, primarily by residents. Claims can be submitted at wwaterclaims.com/claim-forms or by calling 1-855-829-8121.

Invisible Infrastructure

Continued from previous page

whole — in other words, income was lower, economic growth was lower, etc.”

That study summed up the drinking water and wastewater situation in the region like this: “By any definition Appalachia is a rugged land of extremes. Its generally ample rainfall and, in some subregions, its groundwater resources bless it with water for drinking and waste assimilation. But its topography, its legacy of water pollution from economies built around resource extraction, and the extremely low fiscal capacity of many of its communities make funding water and wastewater improvements difficult.”

Those working to help improve access to drinking water in Appalachia today seem to agree about the difficulty of maintaining and improving drinking water systems in the region. “The challenges, generally speaking, are about the terrain — the hills and the ability to get water up the hills, then deliver it to people,” says Rahul Gupta, commissioner of the West Virginia Department of Health and Human Resources Bureau for Public Health. “The communities tend to be more rural, with fewer customers. Three-hundred-and-fifty-six of the 454 public water systems in West Virginia have a population average under 3,300.”

Water Costs

Economies of scale make a huge difference in public water systems, according to UNC's Barnes. “The system that you need to serve 100 people costs about the same as a system that serves 500,” he says. “That's a challenge.”

It's a challenge that many small communities in Appalachia don't have the resources to meet. “Small towns have lost their industrial base,” says Barnes. “They have aging populations, shrinking populations. The total number served is going down while the number on fixed incomes or unemployed is going up. Commercial and industrial customers that could help share the pain aren't there anymore. A lot of federal grants aren't there.”

A small, economically distressed rate base makes it difficult to charge enough to pay for day-to-day operations or take on the kind of debt necessary to finance expensive upgrades



A crew repairs a water line. Photo courtesy of the West Virginia Rural Water Association.

or replacements — especially with systems that are well past their operational lifespan.

“I used to joke about some of these places using duct tape and chewing gum to keep things running until I literally found a system that patched a hole in a pipe with duct tape,” Barnes says.

“Water systems require constant upkeep,” says Michael McCawley, interim chair of the Department of Occupational and Environmental Health Sciences at West Virginia University. “Pipes go bad. Pipes leak. It's the nature of the system. Constant upkeep means you need constant revenue, but the revenue sources have changed. The production of coal is down, taxes are down.”

Exacerbating these trends, state and national agencies have shifted from providing funding through grants to using low-interest loans. “Grants are becoming very hard to come by,” says Andy Crocker, Virginia state manager for the Southeast Rural Community Assistance Project, Inc., a nonprofit group that helps communities develop and maintain water and wastewater systems. “Water systems can't justify borrowing money when it will result in the customers, the end users, having bills much higher than they can afford. Grant money has filled that gap for a long time, but the climate is getting more difficult just because grants, period, are disappearing.”

These smaller systems often lack the staff-

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Invisible Infrastructure

Continued from previous page

ing capacity to effectively go after the grants that are available. “Even when extra money has been available, like through the American Recovery and Reinvestment Act, these systems are always slower getting out of the blocks,” says Russ Rice, director of planning and development for SERCAP. “They don't have the staff and research capability to apply. It's difficult for them to compete with more urban and more well-resourced cities.”

As a result, bigger cities got the lion's share of the grant money directed at drinking and wastewater infrastructure in the 2009 stimulus bill passed to help get the country out of the Great Recession, according to Rice.

Crocker claims the previous prevalence of grant funding ingrained some bad habits in water system managers. “In the '80s, utilities didn't look at managing their assets because they thought they could just get a grant for it,” Crocker says. “That philosophy ended up really hurting them worse. That's why they got so far behind; they kept kicking the can down the road. As the grant money began to disappear, it was hard for them to believe, so they kept kicking needs down the road.”

Politically, it can be hard in some communities to pitch a big investment in water and sewer upgrades, especially if it will result in rate increases. “One of the things I've seen in talking to communities and people working in utilities, they have trouble selling upgrades to water,” says Amanda Howe, SERCAP's director of regional programs. “It's not something [residents] see every day like roads and bridges. They're not thinking about it until it's a problem.”

Public health is an obvious concern that arises from worries about the declining state of infrastructure. Leaks can allow potential carcinogens, heavy metals and other contaminants into the system.

Though lead exposure from old pipes became a huge story in Flint, Mich., Gupta said that doesn't appear to be a problem in West Virginia. “What we've discovered when we do see elevated levels of lead in children, it's usually not in the water, but the housing,” he says. “We have a lot of older housing with lead-

1,000 DAYS ON BOTTLED WATER

By Kevin Ridder

Jan. 11 marked the 1,000th day that hundreds of North Carolinians living near Duke Energy's coal ash basins have lived on bottled water. Affected residents spoke at press conferences in Raleigh and Charlotte that day along with lawmakers and representatives from environmental groups, including Appalachian Voices, the publisher of this newspaper.

According to Caroline Armijo with Stokes County Residents for Coal Ash Cleanup, families have learned some uncomfortable realities after being on bottled water for nearly three years.

“Your children can't play in the bathtub or swim in your pool,” Armijo



says. “You have to brush your teeth with bottled water. You have to make your coffee with bottled water. You know how many bottles it takes to boil a box of pasta.”

State Rep. John Autry took the podium to call out his colleagues in the General Assembly.

“I urge the leadership in the leg-

based paint and other things. That seems to be more the issue than is the water.”

Some systems don't have the resources to do the testing needed to determine how safe the water is, according to Walt Ivey, director of the West Virginia Office of Environmental Health Services. “If systems aren't doing the testing that needs to be done, we really don't know the quality of the water,” Ivey says. “If we see that, we'll issue a boil water order as a precautionary measure.”

Sometimes, lack of testing isn't because water systems can't afford the testing, it's because they can't find licensed professionals to run them. “Retaining qualified system operators can be very difficult,” Barnes says. “You've got just the kind of issue that any small town has for any job. There's been a giant flow of people from rural areas to urban areas.”

According to Barnes, younger people aren't entering the profession, causing older operators to stay on long after they would have ordinarily retired. “It's unfortunate,” he says. “These are good-paying, stable jobs. But it's not a very sexy field to be in. Very few people set out to be in the water field.”

Sustaining Small Systems

The coal town legacy across much of Appalachia also causes problems. In many company towns, water was provided to residents free of charge. Meters

N.C. Residents Call for Action

islature and the [N.C. Department of Environmental Quality] to demand that Duke Energy remove all of its coal ash from unlined pits and safely recycle it or dispose of it aboveground on Duke's property,” he said.

Duke Energy spokesman Jeff Brooks, however, states that the coal ash ponds did not contaminate the well water.

“We've not seen to this point a connection between Duke Energy's operations and the findings in their wells,” Brooks says. “But we've worked from the beginning to try to address [residents'] concerns and provide peace of mind.”

Under North Carolina law, Duke

Continued on page 22

weren't even installed. When the coal companies left or went out of business, communities often struggled to keep the water flowing. After a private system went bankrupt, the McDowell County Public Service District in West Virginia took it over and initially served 522 customers, according to McDowell PSD Executive Director Mavis Brewster.

Convincing some of the communities to sell their systems — even the struggling ones — sometimes requires educating residents. This is especially true when taking over municipal systems as the McDowell PSD did, which requires a vote by the community.

“The first time the election was held in Northfork, it failed,” she says. “People were afraid of the rates. Even though the service was terrible, they didn't want to come in.” The PSD printed up

flyers and sent employees to talk to residents, and the second vote passed.

Many experts agree that this kind of water system consolidation is one of the best ways to reach the economies of scale that can make operations sustainable. But there are many barriers in the way, including a reluctance to cede political control and long-held animosities. “Sometimes mayors don't get along,” says Barnes. “One town I was working with, swear to God, balked because of a fight after a basketball game in 1971. The people said they haven't been able to trust that town since.”

In West Virginia, many small systems have been selling out to West Virginia American Water Company, according to Swann with the West Virginia Rural Water Association. “The rates are

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CONTAMINATED: Drinking Water Problems in Appalachia

By Hannah Gillespie

Springs Harbor Potentially Harmful Bacteria

Leigh-Anne Krometis, associate professor in Virginia Tech's Department of Biological Systems Engineering, began studying the use of Appalachian roadside springs for drinking water in 2016 to determine whether they could be a public health risk.

Krometis studied how often and why people collect drinking water from 19 springs across five states: West Virginia, Kentucky, Virginia, Tennessee and North Carolina. Her research suggests that an average of five people collect water from each spring daily. Krometis left short surveys with pre-addressed envelopes for visitors at six locations. Of survey respondents, 88 percent collect spring water specifically for



drinking, with 65 percent stating that taste is a primary motivator. Although 64 percent of respondents use well water in their home, they stated that they do not trust its quality.

Krometis' samples of these springs were all positive for coliform bacteria, which indicate that disease-causing organisms could be present, and *E. coli* was found at over half. Some *E. coli* bacteria can cause severe diarrhea, vomiting and abdominal cramps.

GenX Chemical Found in Some NC Drinking Water

In response to concerns about contaminated drinking water, on Jan. 11, the North Carolina General Assembly reviewed House Bill 189, which would reappropriate \$1.2 million for state and federal agencies to study the chemical GenX.

The health effects of GenX are unknown, but it became a public issue when the results of a study that began in 2013 were published in June 2017 on the front page of the Wilmington Star. North Carolina State University researchers found over 600 parts per trillion of GenX in the Wilmington area's drinking water. The non-enforceable state health goal of 140 parts per trillion was established in July 2017.

Chemical company DuPont, and later their spin-off company Chemours, have legally discharged chemicals into North Carolina's Cape Fear River for years under a state wastewater permit. About a quarter million residents from Fayetteville to Wilmington rely on this river for drinking water. According to PBS, the Cape Fear Public Utility Authority does not filter out GenX because there are no state or federal regulations for the chemical.

Since Sept. 13, 115 wells tested near Chemours' Fayetteville Works facility have had GenX levels above 140 parts per trillion. Subsequently, affected residents have been receiving bottled water from the company.

Additionally, a 2017 study found chemicals related to GenX in Jordan Lake, which provides the drinking water for the Triangle.

DuPont began using GenX in 2009 to replace another fluorinated compound, perfluorooctanoic acid, due to health concerns. GenX is chemically similar to PFOA. It is classified as an emerging contaminant, which means the U.S. Environmental Protection Agency has identified the need to evaluate and possibly regulate the pollutant, but there is no firm timeline for a study and no guarantee that any rules will be established.

After an unreported October spill of dimer acid flouride, which breaks down into GenX in the water, the Wilmington utility filed a lawsuit against Chemours and DuPont. Similarly, North Carolina has sued the companies for lack of transparency and moved to suspend the company's discharge permit.

Invisible Infrastructure

Continued from previous page

typically higher because they are a for-profit company," she says. "But they have more staff, and more experienced staff. It's hard to say there's a downside by the time systems make the decision. Usually, they put it off until their backs are against the wall."

But consolidation under West Virginia American Water exacerbated the impact of the 2014 chemical spill on the Elk River near Charleston, which affected all of the company's 300,000 customers across the state. Critics of the company, such as the organization Advocates for a Safe Water System, charge that West Virginia American Water puts profit over safety, citing the company's decision to remove water monitoring equipment from the Elk River treatment plant in 2004. "There are still folks who are leery of the water company because of that chemical spill," Swann says.

Some places are making consolidation work well. "Kentucky has been far and away the most successful state at encouraging regionalization," Barnes says. "The number of systems in Kentucky is significantly lower than states around them."

Four counties in Southwest Virginia have also made great strides — mostly by working together, according to Jim Baldwin, executive director of the Cumberland Plateau Planning District Commission. "Back in the 1970s, only about 20 or 25 percent of the population had public water access," says Baldwin. "Today, that's in the mid-90s. It's been a pretty amazing story."

The four counties — Buchanan, Dickenson, Russell and Tazewell — face many of the same challenges as the rest of Appalachia. "The challenge has been the high cost of construction, the high cost of operation and maintenance after a system is built, and then the geographic challenge sort of underpins all that," says Baldwin. "In the coalfields, there are huge counties, area-wise, but not much concentration of population. There have been a lot of water extensions up remote hollers. It's been a hugely expensive proposition."

The Coalfield Water Development Fund, which started with a \$10 million federal endowment grant, helped significantly with that expense by bridging the gap between what resources were needed and what communities could pull together on their own. "When communities looked at all the other funding sources that might help the project and got to the place where they just couldn't

make it happen, our program would help fill the hole," says Donna Stanley, the fund's administrative agent. She says the fund has contributed more than \$8 million to projects, leveraging more than \$88 million in other funding.

Regionalization has also been key. "Buchanan County had no significant surface water," Baldwin says. "To get adequate drinking water, they had to join forces with Dickenson County and the town of Clintwood to build the John Flanagan Lake water treatment plant. That meant 25 miles of water lines just to get to Buchanan County."

There are some problems associated with regionalization. The long network of pipes connecting remote customers can lead to health concerns. Corker from the Southeast Rural Community Assistance Project explained that when water is in the distribution system for a long period of time, disinfection byproducts — such as trihalomethanes and haloacetic acids — can form. Both Dickenson and Buchanan counties have violated federal levels of these substances, which have been linked to cancer.

"Regionalization means a great big spread-out distribution system," Corker says, which leads to the conditions that cause these byproducts to form. "Utilities that have had issues have been aggressive in dealing with them. They are very aware and being very proactive."

The planning district works with the counties and municipalities to help write applications and find funding. Public funding has been an absolute necessity, according to Baldwin. "The customer base alone wouldn't support the construction, financing, operation and maintenance," he says. "One system spends \$750,000 annually just on the power bill to keep pumping stations, pressure-reducing stations and other things running just to make the system work."

Luckily, both the federal government and Virginia state government have pitched in. "There's been a big effort on the federal and state level to focus funding resources on Southwest Virginia, especially in the coalfields, that have been supported over the years and continue to be supported," Baldwin says.

But cooperation among communities has remained a vital component. "I see it every day," Baldwin says. "I see communities facing challenges and neighbors and partners coming together. There's a unanimity in purpose in terms of public water in this area. Everybody works together. If we didn't work together, good things couldn't happen."

Continued on next page

(Un)Well Water

Continued from page 13

"It used to be one of my favorite things was to stand by the creek with my kids and watch crawdads, and we've not had crawdads in I'd say probably three or four years," Kandace says.

Kentucky is another state that does not monitor or regulate the water quality of private wells. And according to Kandace, hooking up to municipal water is not an option, as not enough people live in their area to extend the line.

When Jane upgraded her filter recently, she had to pay \$200 for its installation. She also pays \$45 monthly for a technician to come change it.

Even with the filter installed, the family boils the tap water before cooking with it and uses bottled water for drinking and making ice. Orange stains in bathtubs, sinks, dishes and laundry are commonplace in their home.

"It's hard to get that stuff out," says



Pipeline Precautions

Although it's up in the air whether the proposed Mountain Valley and Atlantic Coast pipelines will be approved, some residents aren't taking any chances when it comes to their well water.

The developers of both pipelines are offering pre- and post-construction well and spring testing to residents within 150 feet of the project's proposed path and within 500 feet of the proposed path in areas with karst terrain, which

is more vulnerable to pollution.

Montgomery County, Va., resident Lynda Majors lives in a karst area greater than 500 feet from the Mountain Valley Pipeline and is still concerned — so she teamed up with two of her neighbors to test their wells through environmental consultant group Downstream Strategies. She says it's critical to go through a group familiar with the courtroom to have a "legally defensible baseline" of data, and that she wouldn't

test her water through MVP regardless because "they have no incentive to do things well."

The preliminary test Downstream Strategies conducted was just under \$2,000 for each resident, and the possible post-construction one would likely be over \$500. If the water were to be contaminated, according to Majors, bringing a lawsuit would cost tens of thousands of dollars.

"There's a lot of people who would like their water tested, but they don't have the money," she says.

Virginia nonprofit group Friends of Nelson County is offering residents the opportunity to test their wells now for 87 pipeline construction-related contaminants, as well as ethane and methane, in the event that the Atlantic Coast Pipeline is constructed.

So far, around 15 participants have signed up. Ben Holmes with Friends of Nelson said the group is pursuing grants for the estimated cost of \$1,000 per household.

Kandace. "You feel like you're always cleaning. ... My sister has blonde hair, she has to get it fixed all the time because it was coloring her hair orange. There's a lot of things that we deal with, that other people don't have to deal with."

Regardless of the problems with their water, Kandace doesn't see how

her parents could move out of the house her grandparents built with their own hands even if they wanted to.

"I just can't imagine any way financially they could move," she says. "And mama said she don't have any intentions, all her family is here. All the whole holler is here. And her cemetery, my papaw's grave. It's a nest egg, your

land is your investment. Your house is an investment. And it will go on to the other generation." ♦

If you suspect your well has been impacted by coal or gas infrastructure, you can reach Appalachian Water Watch toll-free at 1-855-7WATERS.

Invisible Infrastructure

Continued from previous page

There was no alternative."

The cooperation has paid off, and Baldwin hates to think where his region would be now without it. "We're in the best situation we've ever been in," Baldwin says. "If these communities didn't have good public water, I don't think many of them would still be here. They wouldn't still be viable. We've faced a lot of challenges in terms of the economy. Had they not had safe, adequate drinking water, the story could be a much worse story. Business, industry and even tourism all depend on adequate public infrastructure, especially water."

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The Ongoing Cleanup of Abandoned Coal Mines

A key federal mine reclamation program is up for reauthorization in 2021 — and the work is far from finished

By Kevin Ridder

Across the nation, there are thousands of mine reclamation projects that have needed to be fixed since before 1977 and would cost over \$10.5 billion to remediate. If the federal Abandoned Mine Land Reclamation Program is not reauthorized in 2021, the future of most of these decades-old abandoned mine sites could be left up in the air.

The AML program, which was established by the Surface Mining Control and Reclamation Act of 1977, was the first regulatory step toward fixing the slew of the coal industry's leftover messes. Even under current law, however, pollution problems from newer and older mines persist.

The act requires coal companies to pay a fee to the U.S. Office of Surface Mining Reclamation and Enforcement for each ton of coal produced, adding up to approximately \$9.2 billion to date. Those funds have gained \$1.5 billion in interest, the majority of which has been put towards the United Mine Workers of America health care plans.

The federal agency then distributes annual payments to states and tribes based on a complex formula involving the amount of coal each state and tribe currently produces and the amount produced before 1977. Roughly \$4.3 billion has been disbursed for reclamation projects and around \$2.5 billion has been distributed for other uses, according to the U.S. Department of the Interior.

"The size of the remaining problem is very shocking," says Eric Dixon with the Appalachian Citizens' Law Center, a



Acid mine drainage leaks from an abandoned mine, left, into West Virginia's Sovern England watershed in 2016. Photo courtesy of Friends of the Cheat. Construction on a system similar to one that treats drainage as it flows to Greens Run in West Virginia, below, will begin at the Sovern England site this spring. Photo by Adam Webster



nonprofit law firm. "It will take us many years, many decades at our current rate, to clean up all of the abandoned coal mines that fall under this program. And those are only the coal mines that were abandoned prior to 1977."

Additionally, not all of the money from the program has been delivered to states and tribes, and fees paid by coal companies have not risen alongside inflation. Before 2006, payments were subject to the annual congressional budget process, leading to a \$2.5 billion unappropriated balance. Annual payments to states and tribes are now mandatory.

Calls to accelerate Appalachian mine remediation resulted in the creation of the AML Pilot Program in 2016, which

authorized annual payments from the U.S. Treasury, not the AML Fund, to three Appalachian states and then six in 2017. The RECLAIM Act, a bill that would disburse \$1 billion from the AML Fund's unappropriated balance over five years instead of waiting until 2023, passed the House Natural Resources Committee in June. The bill's supporters — including Appalachian Voices, the publisher of this newspaper — are urging both chambers of Congress to vote on the House's version of the RECLAIM Act, H.R. 1731, in early 2018.

The Cheat River: An Unfinished AML Success Story

West Virginia's Cheat River is currently a favorite for whitewater enthusiasts and anglers alike.

But after decades of nearby coal mining, visitors to the river in the '70s and '80s had "complained of stinging eyes, nosebleeds and other ailments," according to the environmental nonprofit organization Friends of the Cheat's website.

In the summer of 1988, so much acid mine drainage from abandoned and active coal mining operations had built up in the river that the water ran orange.

Today, the Cheat watershed is in a much better state, thanks largely to Friends of the Cheat and funding from a variety of sources including the Abandoned Mine Lands program. AML funds have also helped the West Virginia Department of Environmental Protection undertake nearby land reclamation projects that have improved downstream water quality.

"It's unbelievable the comparison between what the river looked like then and what it looks like now, just 30 years later," FOC Executive Director Amanda Pitzer says.



Rocks in the Cheat River Canyon in 2015, above, are still stained from acid mine drainage. Photo by Kent Mason. But the water quality is much better than it was in the summer of 1988, left. Photo courtesy of Friends of the Cheat



If the AML program ends in 2021 as scheduled, however, Pitzer says they "could see progress lost," since there are still hundreds of abandoned mine sites polluting the watershed.

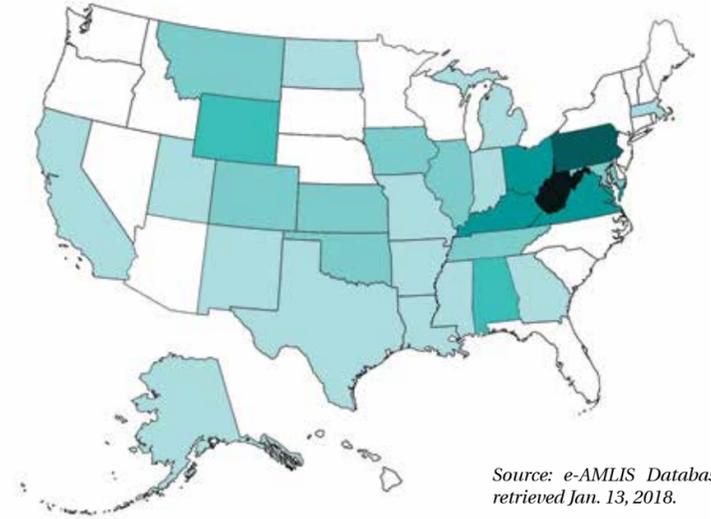
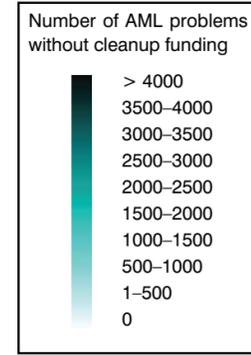
"For the future, I can't say I have an answer if we don't get [AML program] reauthorization or something that looks like it," she says.

Information available to the public through the OSMRE's online Abandoned Mine Land Inventory System — from which much of the data on the following pages is sourced — is limited. It only includes abandoned mines that have been catalogued by the federal government, and problems that affect the environment but not human health are not required by law to be listed.

Decades in the Making: A Mine Reclamation Backlog

Unfunded Abandoned Mine Land Problems Nationwide

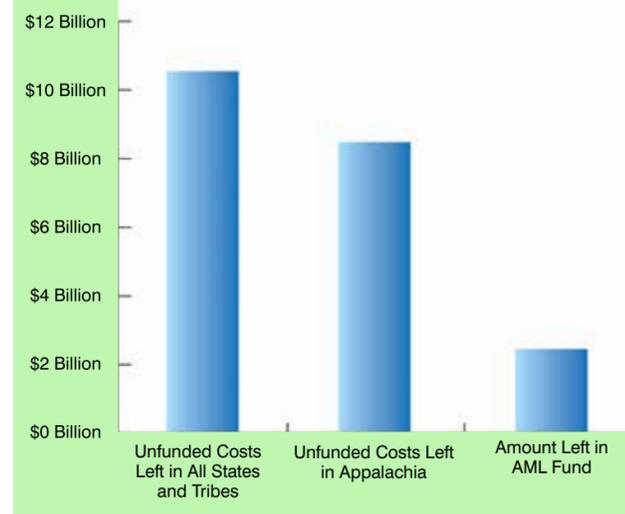
There are 20,803 total Abandoned Mine Land problems that have yet to receive funding for cleanup — 14,608 in Central Appalachia alone. This map is based on publicly-available data on abandoned mine problems remaining that have not received funding, such as polluted water and underground mine fires. This does not represent all the abandoned mine lands in the United States, as the database is limited.



Source: e-AMLIS Database, retrieved Jan. 13, 2018.

Budget Breakdown

Anticipated Cleanup Costs Versus the Current Balance



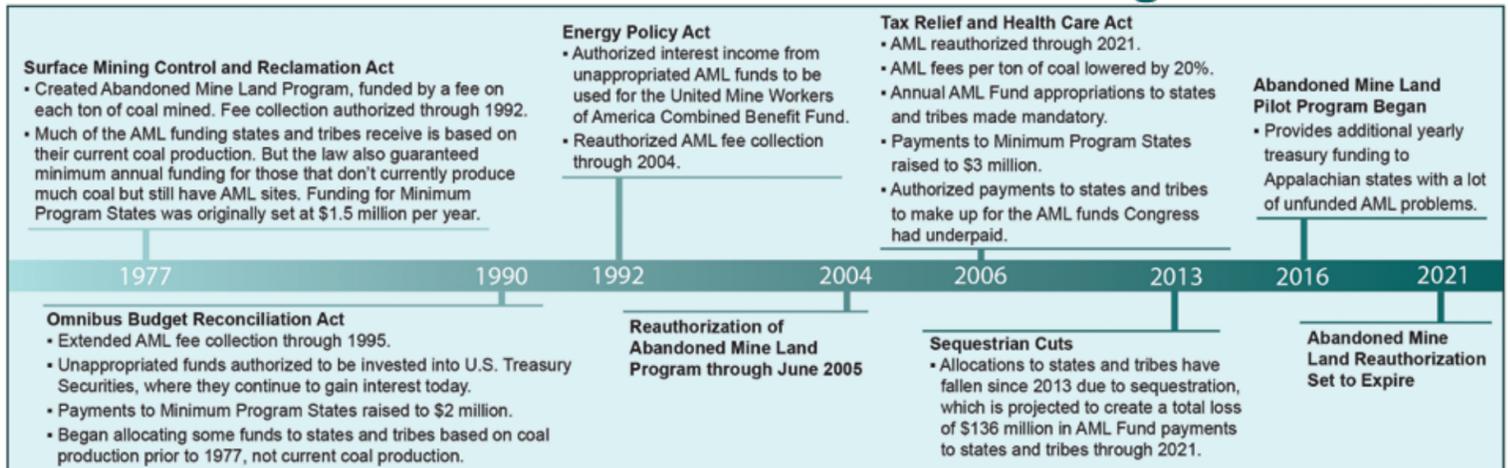
Follow the Abandoned Mine Money

This estimated economic impact for fiscal year 2017 encompasses the Abandoned Mine Land Reclamation Program and the Abandoned Mine Land Pilot Program. Source: OSMRE

State	Total Jobs Supported	Total Labor Income	Total Economic Impact*
Alabama	257	11,533,974	25,870,000
Kentucky	730	32,752,297	73,461,405
Maryland	54	2,429,692	5,449,651
Ohio	326	14,635,299	32,826,083
Pennsylvania	1,136	50,938,499	114,251,948
Tennessee	54	2,429,692	5,449,651
Virginia	268	12,013,208	26,944,893
West Virginia	936	41,974,160	94,145,482
Total	3,762	168,706,822	378,399,113

*These estimates assume that local workers were hired for the reclamation work.

Four Decades of the Abandoned Mine Land Program



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Electric Rate Reform Pits Utilities Against Consumer, Clean Energy Advocates

By Brian Sewell

Reacting to dynamic changes in the nation's energy landscape, electric utilities across the Southeast are proposing an array of reforms that could raise costs on ratepayers. Groups advocating for more distributed clean energy resources and stronger consumer protections are sounding the alarm.

In Virginia, lawmakers are in agreement that it's time to move beyond an unpopular "rate freeze." The 2015 law locked in base rates and allowed the commonwealth's largest utilities to keep hundreds of millions of dollars in overearnings — revenues above a guaranteed rate of return that would typically be refunded to customers.

But lawmakers rejected legislation to simply undo the rate freeze, and a proposal to overhaul rate design favored by Dominion Energy and Appalachian Power Company is controversial.

The Grid Transformation and Security Act would force utilities to return a modest portion of the overearnings they captured during the freeze. It would also grant the companies more latitude to skirt regulatory oversight and spend ratepayer money on projects deemed by the bill to be in the public interest. Those investments could then be counted against utilities' earnings, increasing revenues while decreasing the likelihood of a refund to ratepayers being triggered.

A lobbyist representing the Virginia Poverty Law Center, Stephen Haner, told the Richmond Times-Dispatch that the proposed customer payback "represents pennies on the dollar compared to the potential refunds the [State Corporation Commission] might order."

Raising fixed charges could create a buffer for power companies against revenue losses, whether from flat electricity demand or the rise of distributed resources like rooftop solar. Opponents describe the tactic as unfair to low-income customers, who typically consume less electricity, and to those who have installed solar or invested in energy efficiency upgrades.

The Tennessee Valley Authority recently postponed a plan to restructure rates, but municipal utilities like the Knoxville Utilities Board plan to hike fixed charges for local customers to recover the cost of buying power from TVA. Speaking at a meeting of the utility's board of commissioners in January, Southern Alliance for Clean Energy Executive Director Stephen Smith asked commissioners to hit pause on planned fixed charge increases and to oppose efforts by TVA to charge local utilities grid-access fees — fees that would be passed onto customers.

Meanwhile, still mired by its mis-

handling of coal ash, Duke Energy hopes North Carolina regulators will approve a rate increase to help it recoup costs associated with cleaning up the mess. North Carolina Attorney General Josh Stein joined environmental groups demanding that Duke Energy and its shareholders foot the bill.

"Duke Energy has known that coal ash was going to be an issue since at least the 1990s, but the company didn't deal with it," Stein said in a statement. "Now that it's more expensive for Duke to clean up its coal ash mess, it wants North Carolinians to pay the price."

Stein and the attorneys general from states including Virginia and Kentucky recently called on the Federal Energy Regulatory Commission to investigate whether current electric rates are fair given the windfall electric utilities received as a result of federal corporate tax reform.

Last fall, Kentucky Attorney General Andy Beshear opposed a request by American Electric Power subsidiary Kentucky Power that would have increased annual revenues from base rates by \$60 million. "The people of Eastern Kentucky do not deserve any more punches in the gut," Beshear said in an October press conference.

Ultimately, the Kentucky Public Service Commission approved an increase in base rate revenue of just \$12 million, citing the lighter tax burden on utilities. Beshear applauded the decision but acknowledged in a statement that, for many Kentuckians, it's not enough.

"I will continue to fight so that no family must decide between feeding their children or keeping them warm," he said.

Slight Uptick in 2017 Coal Production and Jobs

By Erin Savage

Coal industry data from the end of 2017 is still trickling in, but the industry does not appear to have made major gains. For several years, the Energy Information Administration has predicted coal production would stabilize, following its steep decline between 2014 and 2016.

Coal production increased in 2017, due largely to a robust export market linked to storm-damaged Australian ports and decreased Chinese production. These factors contributed to a 70 percent increase in United States coal exports in the first 10 months of 2017 from 2016, bringing exports back to a level seen in 2014.

Based on Mining Safety and Health Administration publicly available data, coal production across the nation increased approximately 9.6 percent during the first three quarters of 2017 compared to 2016. But for the mines reporting fourth quarter data so far, production is down about 3.6 percent compared to fourth quarter 2016.

Based on MSHA data from the first three quarters of 2017 and preliminary numbers for the fourth quarter, coal employment increased by 771 jobs, or 1.4 percent, compared to 2016, but is still well below employment seen in the decade prior to 2016.

The 4 West Mine in Pennsylvania recently announced plans to close by the middle of 2018, which will result in a loss of 370 jobs.

Deal Reached Over Seeping Coal Ash Ponds in NC

On Jan. 9, Duke Energy and North Carolina state regulators announced an agreement regarding leaks from coal ash impoundments at the Allen, Marshall and Cliffside power plants.

At issue were 21 leaks at the three plants identified prior to Jan. 1, 2015. Duke agreed to pay \$4,000 for each violation and drain the impoundments at the facilities by specific dates in 2020 and 2021. — Elizabeth E. Payne

Kingston Coal Plant Awaits New Wastewater Permit

In December, the Tennessee Department of Environment and Conservation held two public hearings concerning a draft wastewater permit for the Tennessee Valley Authority's Kingston Fossil Plant in Kingston, Tenn. The draft permit contains updated federal guidelines on pollutants from coal-fired plants such as mercury, but does not require the plant to meet those restrictions until Dec. 1, 2023.

In a public comment to TDEC, members

of environmental organization Sierra Club stated that "just a year ago, TVA said it could and would comply with the [regulations] well-ahead of the schedule TDEC is now proposing. As a result, TDEC is proposing to let Kingston continue dumping toxic mercury and arsenic into the Clinch River for years longer than even TVA initially suggested."

A final permit is expected to be issued by Feb. 1. — Kevin Ridder

Atlantic Coast and Mountain Valley Pipelines Struggle to Get Underway

By Elizabeth E. Payne

In January, the Federal Energy Regulatory Commission issued approval to begin preliminary tree felling for the proposed Atlantic Coast Pipeline in parts of Virginia and West Virginia, and in parts of West Virginia for the proposed Mountain Valley Pipeline. At press time, both projects were awaiting some regulatory approvals along their paths.

On Dec. 7, the State Water Control Board in Virginia approved permits for the Mountain Valley Pipeline over robust objections from citizens and environmental groups. The following week, the same board approved permits for the Atlantic Coast Pipeline, but stipulated that they would take effect only after additional environmental impact reports were completed and approved.

Hearings for both pipelines were packed, and board members heard from residents and water quality experts.

Immediately following the first decision, several environmental groups — including Appalachian Voices, the publisher of this paper — filed a petition with a federal appeals court to overturn the state's decision on the MVP.

On Jan. 9, Appalachian Mountain Advocates filed a lawsuit with a separate federal appeals court to challenge FERC's decision to grant a "certificate of public convenience and necessity" for the Mountain Valley Pipeline. The suit was filed on behalf of a coalition of environmental groups, including Appalachian Voices.

In West Virginia, landowners who have been sued by Mountain Valley Pipeline to gain access to their property filed a brief in late December in

the U.S. District Court in the Southern District of West Virginia arguing that pipeline developers should not gain access until they have met all certification requirements by FERC, according to MetroNews.

In North Carolina, the state's Department of Environmental Quality has delayed a decision regarding an air quality permit needed for a compressor station along the Atlantic Coast Pipeline, is pursuing a deal to buy SCANA Corp., a South Carolina energy company, which would likely pave the way for an expansion of the ACP into South Carolina.

And in Virginia, Sen. Tim Kaine sent a letter to FERC on Jan. 5 asking that the commission reconsider its approval of the two pipelines.

"The commission approved the MVP and ACP on 2-1 votes when two

of the five commissioner slots were vacant," he wrote. "The split decisions were most unusual — 98 percent of FERC orders in 2016 were unanimous. Given that the commission now has a full complement of five members, there is real concern about whether the divided rulings by a partial commission fairly reflect the FERC position."

Meanwhile, Dominion Energy, a lead partner in the Atlantic Coast Pipeline, is pursuing a deal to buy SCANA Corp., a South Carolina energy company, which would likely pave the way for an expansion of the ACP into South Carolina.

"This combination can open new expansion opportunities, including the Atlantic Coast Pipeline that is now under development, bringing lower-cost natural gas to the region," Dominion CEO Tom Farrell said of the deal.

Coal Mine Deaths Rise in 2017, Agency to Reconsider Black Lung Rule

In 2017, coal mine fatalities surged, reversing a years-long downward trend culminating in record low deaths in 2016. The federal Mine Safety and Health Administration reported in January that 15 coal miners lost their lives in 2017, nearly double the nine lives lost the previous year.

In December 2017, MSHA also announced that it would revisit Obama-era regulations intended to protect miners

from black lung disease, a fatal condition caused by the inhalation of coal dust. The agency said it would investigate whether the dust standards "could be improved or made more effective or less burdensome by accommodating advances in technology, innovative techniques, or less costly methods." — Elizabeth E. Payne

Underground Gas Liquids Storage Facility Clears Hurdle

The Appalachia Storage and Trading Hub, a proposed project lead by the Appalachia Development Group LLC, cleared the first of two application phases for a \$1.9 billion loan from the U.S. Department of Energy, according to the Associated Press.

If constructed, the facility would store natural gas liquids that are used in plastics and other chemical industries.

West Virginia Sen. Joe Manchin said the storage hub would bring economic benefits to the state. But environmental and citizen groups oppose the project because of the environmental and health risks associated with the storage and transport of the liquids, plus the related increase in fracking and pipelines that would be needed to supply the industry. — Elizabeth E. Payne

TVA Blows Off Wind Project

Citing a lack of need for more energy resources, Tennessee Valley Authority President Bill Johnson walked away from what would have been one of the nation's largest wind deals, according to the Times Free Press.

"We're looking at a power demand in the future that is flat, or declining slightly, so we don't anticipate needing major additions to power generation for a decade or more," he told the publication.

The project would have transmitted wind-generated energy from Oklahoma and Texas into the Southeast.

"This was one of the best renewable energy deals in the Southeast and could have brought 3,500 megawatts of clean, renewable power to our region at an extremely low cost — cheaper than what TVA is now paying for its power," Stephen Smith, executive director of the Southern Alliance for Clean Energy, told the paper. — Elizabeth E. Payne

Trump Announces Tariffs on Solar Panels

In January, President Trump imposed a four-year, 30 percent tariff on imported solar modules and cells, a hit to one of the fastest-growing industries in the nation. The tariff will decrease by 5 percent each year it's in effect.

The decision resulted from a trade case involving two foreign-owned companies that manufactured panels in the United States and had complained that they couldn't

compete with cheaper imported panels.

But the Solar Energy Industries Association states that solar panel manufacturing accounted for roughly 5 percent of the 38,000 solar-related manufacturing jobs in 2016, and that over 137,000 Americans worked in solar installation that year. The association estimates the decision will result in 23,000 lost jobs in 2018 alone. — Kevin Ridder

FERC Rejects Coal, Nuclear Subsidies

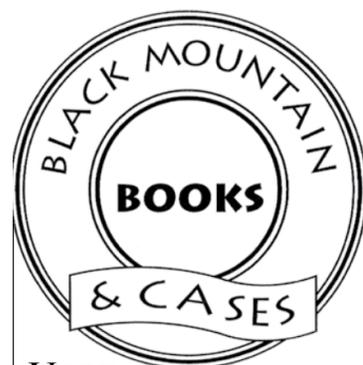
On Jan. 8, the Federal Energy Regulatory Commission unanimously denied U.S. Secretary of Energy Rick Perry's plan to subsidize struggling coal and nuclear plants on the grounds that it did not satisfy "clear and fundamental legal requirements" of the Federal Power Act.

The Department of Energy proposed the plan in September and stated the reforms were "necessary to maintain the reliability and resiliency of our nation's grid."

PJM Interconnection LLC, an Eastern regional grid operator, had opposed Perry's plan.

"I don't know how this proposal could be implemented without a detrimental impact on the market," PJM President and CEO Andrew Ott told Bloomberg Markets in October.

In their denial of the plan, FERC gave grid operators 60 days to suggest any necessary grid resiliency measures. — Kevin Ridder



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Engaging Members of Electric Cooperatives

The Appalachian Voices Energy Savings team has been working to educate, organize and provide technical support to member-owners who want to engage in the decision-making processes of their rural electric cooperatives in East Tennessee.

At press time, we were preparing for a Jan. 30 community forum in Cumberland Gap, Tenn., with members of Powell Valley Electric Cooperative to cover topics such as electric cooperative history, structure and decision making, member rights and responsibilities and special programs available to electric co-ops. At the event, participants will learn about and discuss their role as electric cooperative members and owners.

Members of Powell Valley Electric Cooperative have been working with management and staff to address

community concerns about vegetation management practices along the co-op's electric line right-of-way. Many of the co-op's members hope to see an herbicide spray opt-out policy available to them this spring.

If you are interested in helping to educate your fellow co-op members in other parts of Powell Valley Electric Cooperative's service area (including Virginia) or in another electric co-op in East Tennessee with a presentation like this one, please reach out to us at (865) 291-0083 or email Tennessee Outreach Coordinator Bri Knisley at brinna@appvoices.org.

If you are interested in hosting a presentation on co-op member rights and engagement in North Carolina, contact N.C. Outreach Coordinator Lauren Essick at (828) 262-1500 or email lauren@appvoices.org.

Appalachian State University students joined our North Carolina Energy Savings team at the Watauga County Farmers' Market. The students educated Boone, N.C. residents about programs to help weatherize local homes and reduce power bills.



Continuing the Fight Against Pipelines

Despite some recent permit approvals for the Mountain Valley and Atlantic Coast pipelines, the pipeline resistance is going strong. Now that the pipelines have received conditional notices to proceed with some tree cutting from the Federal Energy Regulatory Commission, developers are doing everything in their power — and outside of it — to pressure landowners and cut trees, even in instances where they don't have easements.

The pipeline developers are also attempting to condemn landowners who haven't signed over easements even though

numerous approvals and permits are still pending on each pipeline. Pipeline resisters are currently working hard to support directly impacted landowners, prevent illegal tree cutting operations, and monitor the pipeline route so we can report any violations as quickly as possible.

We are also working with numerous groups to support and pass bills that protect Virginia landowners from unwanted surveying, and ensure a thorough and transparent water quality review process for interstate pipelines. The fight continues on many fronts!

1,000 Days Bottled Water

Continued from page 15

has until October 2018 to install permanent water supplies for residents within a half-mile radius of coal ash basins near 10 of the utility's power plants in the state. According to a Duke press release, affected residents near public water supplies have the option of being connected to municipal water or having a well filtration system installed, while those in more remote areas will only have the filtration option.

But Duke won't be providing a permanent water supply for people like Roger Hollis, who lives just outside the half-mile radius of a Cleveland County, N.C., coal ash basin and has a contaminated well.

"I'm assuming that the money is the problem," Hollis said at the press conference outside Duke's Charlotte headquarters. "But with [\$22.74 billion] in revenue and Duke Energy CEO Lynn Good making over \$13 million a year salary, with a \$2.6 million bonus just a couple years ago, why can't our small community get drinking water?"

The N.C. Utilities Commission is currently deciding whether to approve a 16.7 percent rate increase for residential

customers of Duke Energy Progress and Duke Energy Carolinas. If approved, a portion would fund the cleanup of Duke's unlined coal ash basins.

"We are definitely in favor of seeing Duke Energy pay for its negligence in regards to its coal ash waste disposal," Luis Rodriguez with the Sierra Club said in Charlotte. "And we definitely want to make sure that Duke does not pass the cost of this off to ratepayers in the form of rate hikes."

According to Rep. Autry, legislative action is needed.

"I think the ultimate solution is to make sure that [the General Assembly] properly funds the Department of Environmental Quality and the Department of Health and Human Services to deal with those issues," he said.

"It's time for two things to happen," Appalachian Voices' N.C. Program Manager Amy Adams said at the Charlotte event. "One, to make sure the corporations who make money and reside in our state are doing the right thing by the citizens who live here. Secondly, it's time for the state of North Carolina to set groundwater standards that are protective of human health for all 3.5 million North Carolinians who rely on groundwater." ♦



Bruce Gould and Kate McClory: Advocates for a Better Appalachia

By Hannah Gillespie

Bruce Gould and Kate McClory are self-proclaimed "tree-huggers." Although both are from the Boston area originally, the couple has lived in Richmond, Va., since 1980. Kate got her first taste of nature at Girl Scout camp. Now, she says, their connection to nature comes from walking the trails near the James River, which they can see from their house. "Even though we live in the city, we get to really experience nature every day," says Kate.

An avid reader, Kate works as a librarian. Bruce retired from his position as the executive director of the Virginia Motor Vehicle Dealer Board and now spends his time volunteering, playing music and gardening. When Kate retires, the couple plans to become more involved with the Sierra Club, which they have been members of for nearly 40 years.

A passion for the outdoors was natural for the couple. "We just care about the environment that we live around, the water and air quality," says Bruce. "We just make sure we



want to leave a good Earth to our daughters and generations going forward. I have a degree in Earth Science; I've always been interested in the environment around us."

Instilling this appreciation for nature in their two daughters as well was important to the parents. Bruce describes a six-week-long cross-country road trip the family took years ago, where they visited parks across the country. "They're just so beautiful," Bruce says. "They just need to be maintained and preserved. I think that helped give [our daughters] an appreciation for the environment. That's just something that's always been with us."

Bruce and Kate are also

Member Spotlight

advocates for alternative energy. The Virginia residents speak of their distaste for the Mountain Valley and Atlantic Coast pipelines.

They are also passionate about housing, education and healthcare for all. The couple hopes to see more sustainable jobs and tourism, and wants to see people from diverse backgrounds getting more involved in the outdoors as well.

Around 2009, Bruce and Kate's youngest daughter, Maeve, started working at Appalachian Voices as the distribution manager for The Appalachian Voice, leading

Bruce and Kate to become members of Appalachian Voices six years ago. Since 2011, the couple has distributed 800 papers per issue. After Maeve left the organization, they continued to distribute the paper because, as Kate says, they "know it's a good organization."

Bruce enjoys conversing with people who pick up the Voice from their distribution location — a local health-food store in Richmond — where the stack of papers often needs to be replenished every ten days.

"I feel like I'm doing my little part to educate people about environmental issues related to Appalachia, and the way [The Appalachian Voice] flies off that newsstand, people must be interested," says Bruce.



Appalachian Voices is committed to protecting the land, air and water of the central and southern Appalachian region. Our mission is to empower people to defend our region's rich natural and cultural heritage by providing them with tools and strategies for successful grassroots campaigns.

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N.C. Program Manager Amy Adams speaks in front of Duke Energy HQ.

Quick Fixes to Weatherize Your Home

How to tell if you need...

Weatherstripping: If you can see light coming in around the edges of your door or feel drafts from your windows, weatherstripping could be the quick, cheap fix you need!

More insulation: Check your attic and crawlspace. It might be time for improvements if the insulation is lower than the joists, or if you're missing insulation altogether.

Water heater improvements: Feel the air around your water heater; if it is warm you are losing heat. Wrap your water heater in an insulating jacket to keep that heat inside! Also, see if you can turn down the heater — 120 degrees Fahrenheit is ideal.



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"The forest, the mountains in their would-be natural state has been the principal theme of my work since the '70s," says Valle Crucis, N.C., artist Lowell Hayes. An excerpt from his 2010 136-inch by 96-inch "Family Group," a bas relief painting composed of acrylic and natural materials, is pictured above. "I concentrated on hemlocks for years, sharing my feelings for them, making an emotional appeal to people to be aware and concerned," he says. Read about efforts to save the hemlocks beginning on page 8.

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