

The background of the cover is a vibrant photograph of several lily flowers in shades of pink, orange, and red, with dark spots on their petals. A large, dark butterfly with orange and black markings is perched on one of the flowers in the center. The overall scene is set against a lush green background of foliage.

The Appalachian VOICE

August/September 2017

FREE

Wildflower Wonders

Discover some of the region's
brilliant late-summer blooms

Appalachia's Health Report

Residents contend with a rise in black lung disease and
opioid abuse along with other environmental threats

Cultivating Forest Medicinals | Pipelines Update | Hiking at Kentucky's Natural Bridge

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About the Cover



A butterfly alights on a Turk's cap lily in Vilas, N.C., along a tributary of Linville Creek. See our wildflower story on p. 8. This image was made by James M. Davidson, who also serves as Appalachian Voices' Graphic Communication Coordinator. In addition, Davidson is an artist, photographer and musician. View more of his work at orchardhillphoto.com and follow him on Instagram at [jdavidson888](https://www.instagram.com/jdavidson888).

A note from our team

For many Appalachians, summer means keeping our gardens watered, spending time in the woods and catching up on home projects. What we don't typically worry about is our energy costs. But as we lean towards fall, tens of thousands of families will once again face the worry of how they're going to pay their energy bills.

Since 2013, our Energy Savings for Appalachia team has advocated for a solution called "on-bill financing" that would allow families to pay for energy efficiency home improvements that lower their monthly bills while making their homes more comfortable. We're focusing on rural electric cooperatives, which serve more than 500,000 homes in the Appalachian region of Tennessee and North Carolina. One out of every five of those households struggle to pay their winter energy bills, with many spending more than a third of their income just to keep their homes warm.

Electric co-ops already have access to funding and resources that could help their customers save money and live more comfortably, while also creating jobs and lowering carbon emissions. So far, only a handful of co-ops in the region have taken steps to offer this program.

That could all change if co-op members make their voices heard. If you are a co-op member, you are a part-owner of your electric utility, meaning you have the power to influence the decisions your co-op makes regarding energy efficiency and clean energy.

A note from our executive director

As Appalachian Voices continues to fight new investments in fossil fuels, we're also striving to advance clean energy, including the most effective, low-cost solution — energy efficiency.

Home energy efficiency improvements can lift the burden of high utility bills — especially for low-income families — and make homes healthier, all while protecting our air and water from the impacts of dirty fuels. Below, Rory McIlmoil, our Energy Savings Program Manager, discusses how Appalachian Voices is working to make the benefits of energy efficiency more accessible and affordable to families in our region.

For the future,
Tom
Tom Cormons, Executive Director

Only by exercising the power we have as members of electric co-ops can we achieve a more efficient and sustainable Appalachia and alleviate the burden of energy costs faced by so many families. Electric co-ops can help address that problem for our families and communities. It's up to us to move them to action.

For our communities,



Rory McIlmoil
Energy Savings Program Manager

GET INVOLVED environmental & cultural events

Adopt-A-Trail Service Outing: Cooper's Rock State Forest

Aug. 19: Volunteer with the Sierra Club to help clean a cross-country ski trail in Cooper's Rock State Park, while enjoying nature and identifying trees. Free. Bruceton Mills, W.Va. Visit tinyurl.com/CoopersRockService or call 304-594-2636.

Solar Eclipse

Aug. 21: Do not miss this rare and mesmerizing natural phenomenon. Partial and full views of the eclipse can be seen across Kentucky, Tennessee, Virginia, North Carolina, South Carolina and Georgia. Wear proper eye protection. Visit eclipse2017.nasa.gov to learn more.

Season Extension/ Winter Gardening Workshop

Aug. 24: Learn about methods of gardening into the winter season at the Pine Mountain Settlement School. Free, registration required. Pine Mountain, Ky. Visit tinyurl.com/PineWinterGarden or call 606-558-3571.

Fungi Fest

Sept. 2, 10 a.m.-5 p.m.: Join the Asheville Mushroom Club for a day of mushroom education, including guided identification walks, classes, and vendors with edible mushrooms. \$10 non-members, \$5 club members. Swannanoa, N.C. Visit tinyurl.com/FungiFest or call 828-236-3817.

Culturefest

Sept. 7-10: Experience expressions of music and art from around the world, with performances,

workshops, activities for children and more at the Appalachian South Folklife Center. Ticket prices vary. Pipestem, W.Va. Visit culturefestwv.com/home or call 304-425-6425.

Roanoke Hike for Hospice

Sept. 10: Contribute to a great cause during the third annual Good Samaritan Hospice's hike, with trips ranging from easy to moderate, along with multiple activities and a VIP farm-to-table dinner. Registration required, cost varies. Roanoke, Va. Visit hikeforhospiceva.com or call 888-466-7809.

WV Highlands Conservancy 50th Anniversary Celebration

Sept. 15-17: Commemorate 50 years of protecting the natural land of West Virginia with outings, workshops, discussions and many other celebratory events. Ticket prices vary. Davis, W.Va. Visit wvhighlands.org/celebrating-50-years or email wvhc50@gmail.com.

9th Annual Flock to the Rock

Sept. 16, 11 a.m.-3 p.m.: Visit Chimney Rock State Park and learn about the birds that flock to the Hickory Nut Gorge and how to identify them, in a day full of hikes, presentations and demos. Included with park admission. Chimney Rock, N.C. Visit chimneyrockpark.com/event/9th-annual-flock-rock or call 800-277-9611.

Virginia Environmental Assembly

Sept. 22-23: Meet with other Virginia citizens to discuss current threats to the environment

See more at appvoices.org/calendar

and strategize ways to create movements of change. Registration required, ticket prices vary. Fredericksburg, Va. Visit vcnva.org/assembly or call 804-644-0283.

Great Outdoors Weekend

Sept. 23, 9 a.m.-3 p.m.: Join Friends of Big Bone to learn about the local history of paleontology and archaeology with scientists from the Cincinnati Museum Center and college professors. Free. Union, Ky. Visit tinyurl.com/BigboneOutdoorWeekend or call 859-689-5631.

Fall Folk Arts Festival

Sept. 23-24: Celebrate the folk traditions of the region with live music, crafts and food from the market and live demonstrations of practices from the 1800s. \$3. Kingsport, Tenn. Visit exchange-place.info/festival-details or call 423-288-6071.

High Knob Naturalist Rally

Sept. 30: Attend one of the largest events focused on ecology and conservation in the region with activities throughout the day at High Knob Lake. Free. Norton, Va. Visit clinchcoalition.net/high-knob-naturalist-rally.

National Storytelling Festival

Oct. 6-8: Let your mind wander as you listen to tales spoken by some of the best storytellers in the world. Ticket prices vary. Jonesborough, Tenn. Visit storytellingcenter.net/events/national-storytelling-festival or call 423-753-2171.

Across Appalachia

West Virginia Acquires Land for Newly Reintroduced Elk

By Rachel Pressley

As of late July, 23 elk roamed new public lands in southern West Virginia. The herd was introduced to the area in December 2016 as part of an effort to rebuild an elk population in the Mountain State.

Native to North America, elk began declining after Europeans arrived. According to the U.S. Fish and Wildlife Service, by 1880 the Eastern elk was extinct. The Rocky Mountain elk and the Manitoban elk are the two subspecies being reintroduced to lands once part of the Eastern elk's historic range.

During 2015 and 2016, the agency

acquired more than 44,000 acres that make up the Wildlife Management Area known as the elk zone. The land was obtained by purchasing and leasing separate tracts of land including 32,000 acres within Wapiti Woods, located in the Allegheny National Forest.

The Conservation Fund, an environmental nonprofit organization that focuses on preservation, along with 19 different organizations and many volunteers, joined in the effort to secure this land, which was once owned by mining, timber and land-holding companies. Some parcels are still awaiting post-mining reclamation.

The groups are all helping with the active elk restoration plan, which, according to the West Virginia Division of Game and Inland Fisheries, is addressing possibilities for elk management in Virginia while taking into consideration the biological, sociological, economic and environmental issues present.

Currently, more than three-fourths of the land is accessible to the public, while the rest is inaccessible until the reclamation bonds are released.

"We hope to establish a healthy, self-sustaining elk herd that we can one day have to offer for hunting opportunities, while at the same time, offering

a lot of opportunities for public enjoyment," says Randy Kelley, the state's elk project leader.

The West Virginia Division of Natural Resources is managing the elk zone and plans to release more Rocky Mountain elk to the area.

Kelley explained that to be able to eventually bring in more elk, the agency's Wildlife Resources Section is planning to lease and buy land as it becomes available for two other primary release areas. These sections will be part of the southern portion of the elk zone and will be protected and open to the public for recreational uses.

EPA Sampling for PCB Contamination

By Meredith Abercrombie

The U.S. Environmental Protection Agency was sampling water and soil in Minden, W.Va., as of press time in early August. It is suspected that PCBs — man-made chlorine-based chemicals — from equipment and oil dumped at an old mine in Minden are contaminating soil and water and causing cancer among many community members.

Shaffer Equipment Company used the abandoned mine site in the 1960s to store equipment, such as transformers, that contained PCBs. In 1979, the EPA officially banned their use of PCBs, acknowledging that the toxic chemical can lead to cancer.

Citizens expressed concerns about the EPA's current presence in Minden to the Register-Herald, alleging that previous visits have not resulted in any improvements. In the 80s and early '90s, the EPA attempted to clean up the mines multiple times, informing the town that the situation was resolved and there was no threat to residents' health. After continued problems, the

EPA sealed off the mine site in 1992.

But the high rates of cancer continue to be a problem. The Fayetteville Tribune reports that area residents believe one-third of their small community have been diagnosed with cancer.

Dr. Hassan Amjad, a physician in Minden, has been conducting research into the correlation between PCB contamination and the number of Minden residents diagnosed with cancer. In a press release by Headwaters Defense, an environmental justice organization, Amjad states, "The EPA is afraid to find their own mistakes."

The EPA was collecting samples from 20 sites, but only one of those was from the predominately black community that is closest to the mine site, and one of the most at risk. "The fact that they are not sampling there indicates mal-intent on behalf of the EPA," Amjad stated in the press release.

The EPA estimates that the results of the sampling will be ready by late summer. After that, there will be a public open house to discuss the results and answer questions.

2016 Deadliest Year for Environmental Activists

New research shows that 2016 was the deadliest year for environmental activists worldwide, with 200 deaths replacing the record set in 2015.

This is twice the number from five years ago, according to Global Witness, an independent watchdog group.

Global Witness, along with The Guardian news publication, aims to record every activist death this year to raise awareness of this rising trend. There were 98 killings identified within the first five months of 2017. — Meredith Abercrombie

Cicada Brood Hatches for First Time in 17 Years

The familiar hum of cicadas will be on full blast this summer, as Periodical Cicada Brood VI emerges for the first time since 2000. These cicadas are found in North Carolina, northeast Georgia and upper South Carolina.

Anglers are looking forward to the trout that surface to feed on the cicadas.

While there were sightings of cicadas in places like Maryland and Kentucky earlier this summer, Magicicada.org, a website that tracks cicada hatchings, suspects these are straggler populations that were not due to hatch until 2021. — Meredith Abercrombie

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U.S. Department of Justice Withdraws Funding Request for Kentucky Prison

By Rachel Pressley

In April 2017, the U.S. Department of Justice withdrew their funding request for a \$444 million prison on a former mountaintop removal coal mining site in Roxana, Ky.

The DOJ cited a declining prison population over the past few years and asked that the Federal Bureau of Prisons, a subdivision of the DOJ, expand capacity at existing facilities instead.

In President Trump's proposed budget, the Bureau of Prisons would direct \$80 million toward retrofitting and expanding the capacity of a federal prison in western Illinois to move prisoners there instead of constructing the new facility in Letcher County, Ky.

Among the concerns expressed by opponents of the Roxana proposal was the prison's potential impact on Lilly Cornett Woods, an old-growth forest located one mile from the proposed site.

"Not a lot of people get to say that they have an old-growth forest a few miles from where they live," said Tarence Ray, a resident involved with the Letcher Governance Project and a

former Appalachian Voices employee. "It's not something that we want to endanger. Road traffic noise, air pollution, light pollution and water pollution will have major impacts on that ecosystem."

The Prison Ecology Project, an organization that argues against the prison industry's history of water pollution and ecological degradation, and the Letcher Governance Project, a group of local residents that are rejecting the prison as a form of economic development, have been working with others across the country to fight against mass incarceration and the prison industry.

Rep. Hal Rogers, who represents the area in the U.S. House, claims that the prison would be helpful with employment since local residents are dealing with a lack of coal jobs.

"It's hard to be excited about the DOJ's decision because it's not a win, yet," said Ray. "We're still incarcerating more people in this country than any other country, and we can't get Hal Rogers, our own U.S. representative, to listen. There is still potential for him to fight this in Congress."

Community Members Fight Proposed Asphalt Plant

Residents of Glendale Springs, N.C., are speaking out against a proposed asphalt plant that Appalachian Materials, LLC, intends to build in their town. According to the permit application, the plant would produce 300,000 tons of asphalt per year.

A website started by Protect Our Fresh Air, the Ashe County chapter of The Blue Ridge Environmental Defense League, lists

concerns from community members, including the air quality for Camp New Hope, a haven for terminally ill children that is close to the plant site, and the traffic from the plant hurting the town's tourist economy.

Opponents are raising money to fight the proposal in court and are circulating an online petition. — *Meredith Abercrombie*

New Plan Being Crafted for Two North Carolina National Forests

By Meredith Abercrombie

The U.S. Forest Service is in the process of revising the Forest Plan for the Pisgah and Nantahala National Forests, which would guide the goals and objectives for these two North Carolina national forests for the next 15 years.

In the initial set of objectives released by the Forest Service, the three main themes were maintaining clean water, enhancing resiliency and connecting the people to the land.

A period of open houses, taking place across the different districts of the forests, was set to conclude Aug. 8. During that time, the public — including community members, environmental groups and business representatives — had a chance to talk to the revision team and district rangers about what they

wanted to see in the new plan.

Topics ranged from conservation concerns from environmental groups, logging areas for timber companies and recreational uses for the public.

The Forest Service will take the statements from the meetings and revise the released draft. They will then provide it to the public, where the process will begin again with more public hearings and another draft.

During the original part of the process, which started in 2014, citizens expressed concerns about preserving specially protected designations such as Wilderness Study Areas. These open houses mark a new approach the agency is taking to promote transparency and increase opportunity for public input.

The final draft of the forest plan is expected in the spring of 2018.

Studies Show Harmful Air Pollution From Wildfires

By Meredith Abercrombie

Two studies published by the Georgia Institute of Technology in June suggest that air particle pollution from forest fires is much worse than originally identified by the U.S. Environmental Protection Agency.

For the two studies, researchers collected smoke samples from forest fire plumes in the western United States to test particulates in the smoke. The results are relevant for other areas that have experienced forest fires, such as Appalachia.

One study found that the burning timber produced fine particles that

contained multiple harmful chemicals and could be a health hazard at a rate three times higher than the EPA reported in the emissions inventories from prescribed burnings.

The other study found that particulates from forest fires are lingering in the upper levels of the atmosphere and could be accelerating the rate of global warming.

University of Montana - Missoula atmospheric scientist Bob Yokelson recommends prescribed burnings to help reduce the amounts of harmful toxins being released into the environment by wildfires, according to a press release from the Georgia Institute of Technology.

Enviva Biomass Facility Meets Opposition

In December 2018, an Enviva wood-pellet processing plant is slated to open in Richmond County, N.C., next to the town of Dobbins Heights.

Enviva's website suggests that their wood pellets create an energy-dense fuel that emits much less sulphur oxide and carbon than other fossil fuels.

The Dogwood Alliance, an Asheville-based environmental organization, opposes the building of another plant for an industry that they say is speeding up climate change. Over 50 acres of forests

are destroyed daily in North Carolina and South Carolina because of logging for biomass pellets that are exported to Europe.

A video produced by the group shows residents protesting the building of the new plant with signs saying, "Stop Enviva" and, "Say NO to Enviva in Richmond County." The residents say the plant will cause pollution, increasing the risk of breathing problems and other health issues already in the community due to different plants nearby. — *Rachel Pressley*

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Two Interstate Pipelines Clear Regulatory Hurdles Despite Opposition

By Elizabeth E. Payne

This summer, the Federal Regulatory Energy Commission issued its final environmental review for both the Mountain Valley and the Atlantic Coast pipelines.

These assessments are intended to accurately evaluate the environmental risk the two projects would entail and respond to public concerns about the draft version issued in 2016. But community and environmental groups, including Appalachian Voices, the publisher of this paper, stated that the agency “utterly fails to independently assess whether the project is even needed,” and instead relies on the pipeline companies’ claim that the projects are necessary.

An April 2016 study by the Institute of Energy Economics and Financial Analysis found that natural gas pipelines out of the Marcellus and Utica shale are being overbuilt and that FERC is contributing to the overbuild by granting high rates of return to pipeline companies.

The groups also criticized FERC for overlooking the harm the pipelines would do to the water resources, forests, agricultural lands and wildlife along their routes.

“The Mountain Valley Pipeline will devalue our land, limit its uses and reduce taxes which support our schools and public services,” Maury Johnson, an affected landowner in Monroe County, W.Va., said in a statement. “It will impact the water that we so much depend upon for our families, our farms and our communities.”

“It should be criminal to attempt such a pipeline when the profound environmental damage has not been adequately assessed,” he added.

The U.S. Forest Service is reviewing its plans for the three national forests that the two proposed pipelines would cross. The agency issued its draft decision for the Jefferson National Forest on June 23, which would allow the Mountain Valley Pipeline to cross the forest if approved. Public comments for this plan closed on Aug. 7.

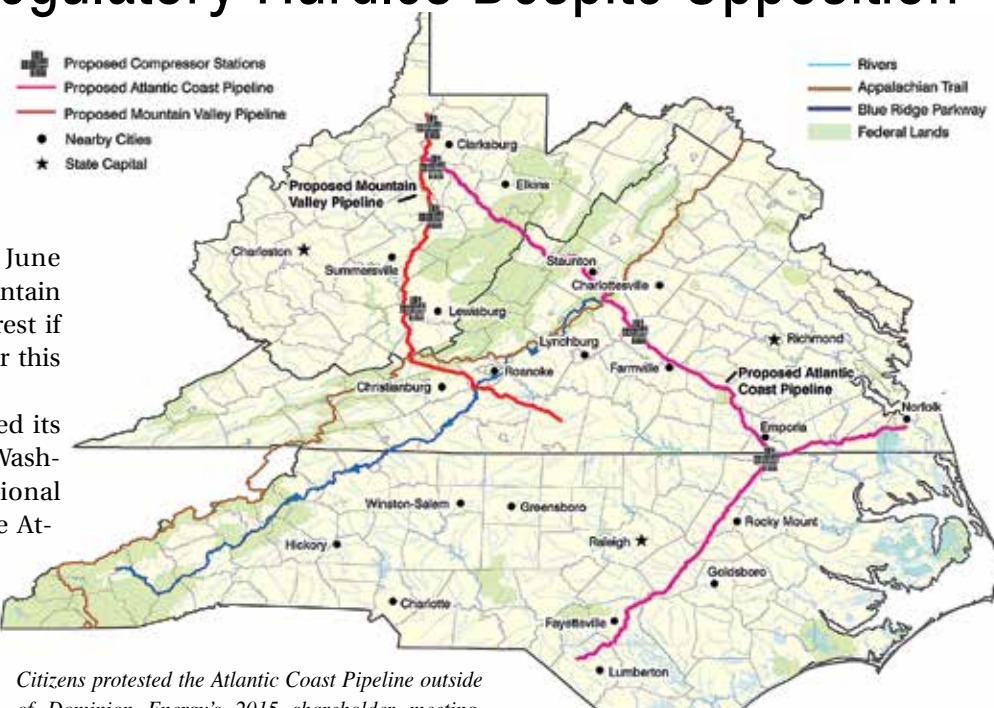
On July 21, the USFS issued its draft decision for the George Washington and Monongahela national forests, which would allow the Atlantic Coast Pipeline to cut through these territories. Comments can be submitted until Sept. 5.

Following a review of any filed objections, the USFS will decide whether to issue a special use permit, pending FERC approval of the pipelines.

Before the companies behind either pipeline can begin construction, each state along the routes must issue water permits required by Section 401 of the federal Clean Water Act.

In March, the West Virginia Dept. of Environmental Protection issued its 401 Water Quality Certification for the Mountain Valley Pipeline. Five environmental groups—including Appalachian Voices—have asked a federal appeals court to overturn this approval.

Public hearings for the certification were held in late July and early August for the Atlantic Coast Pipeline in West Virginia, Virginia and North Carolina and in Virginia for the Mountain Valley Pipeline. Written comments to the WVDEP were due by Aug. 4. In North Carolina, written comments must be submitted to the state’s environmental



Citizens protested the Atlantic Coast Pipeline outside of Dominion Energy’s 2015 shareholder meeting. Photo courtesy of Chesapeake Climate Action Network

agency by Aug. 19, and in Virginia, comments are due by Aug. 22.

“It’s definitely not a done deal, even though they’re presenting it like it is. It falls upon us as citizens to make people understand that it’s not something that’s set in stone,” Jordan Revels, a college student and AppalachianVoices intern told ThinkProgress. Revels is a Native American student at the University of North Carolina at Pembroke in Robeson County, N.C., where the Atlantic Coast Pipeline’s proposed route would cross Lumbee tribal lands.

Construction of the Constitution Pipeline, which would stretch from Pennsylvania to New York, was blocked in April 2016 when the New York Dept. of Environmental Conservation denied the pipeline company’s petition for a 401 water quality permit. Constitution Pipeline Company, LLC, is appealing this decision.

Lewis Freeman, the chair and executive director of the Alleghany-Blue Ridge Alliance, a coalition of 51 organizations working to stop the Atlantic Coast Pipeline, questions the speed with which the bureaucratic hurdles are being cleared.

“What we’re faced with here is misguided inertia,” he says. “Once they discovered all these deposits of gas, there is this inertia that has been created. ‘Oh, we must get it out, and we must use it,’



without thinking longer term: How long will we use it, and are there other energy sources that might replace it?”

A second legal challenge against the Mountain Valley Pipeline has been filed in U.S. District Court in Roanoke, Va. Citizens from Virginia and West Virginia contend that if FERC were to approve the pipeline, it would violate their Fifth Amendment rights under the U.S. Constitution, which requires that private lands only be taken “for public use” and with “just compensation.”

Before leaving for its August recess, the U.S. Senate confirmed two of President Trump’s nominees for FERC, restoring the quorum lost in February when one of the commissioners stepped down.

FERC is expected to make its final decision about the Mountain Valley Pipeline on Sept. 21 and about the Atlantic Coast Pipeline on Oct. 19.

For more information on the 401 hearings, including how to submit comments, visit apvoices.org/fracking/actions. Read about construction problems with two other Eastern pipelines on page 20. ♦

Hiking the Highlands Traversing the Rock Formations at Kentucky’s Natural Bridge

By Joe Tennis

On the outskirts of the Red River Gorge, hikers at Natural Bridge State Park walk among natural sandstone structures and climb stairs amid thickets of rhododendron and the shade of hemlocks. If you want the reward of long-range views from your workout, then you’re in luck at this jewel near Slade, Ky.

“We have approximately 20 miles of trails,” says Brian Gasdorf, a park naturalist. “The primary reason people come out here is for hiking on our system of trails.”

To gain an overview of the park, start hiking at the Hemlock Lodge for a loop that spans 2.3 miles but will likely leave you feeling you walked twice that length.

This route begins on the “Original Trail,” which crosses through a shady forest of Eastern hemlock, white pine and red oak, interspersed with odd sandstone formations.

Handrails line much of this trail. Yet you may soon be huffing and puffing just like the steam trains did in the 1890s, when this park was developed by the Lexington and Eastern Railroad.

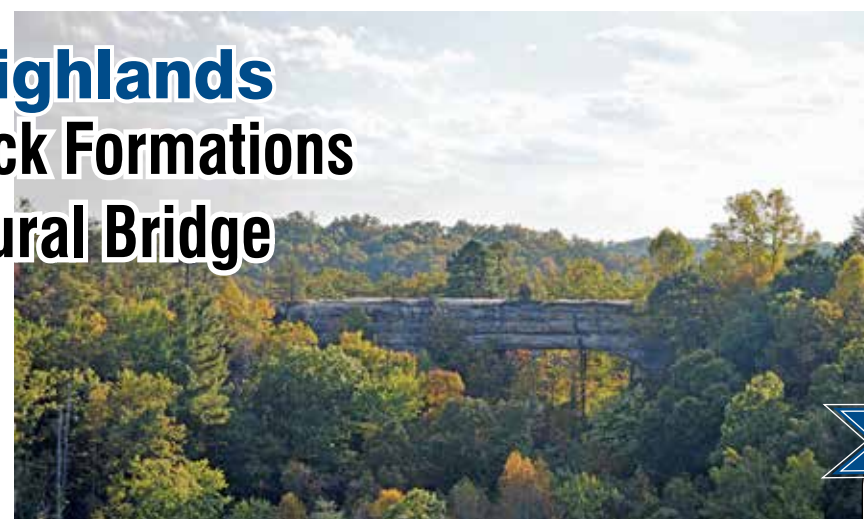
“We have a sign that says it’s the shortest and easiest route to Natural Bridge,” says Gasdorf, laughing a little. “Shortest is definitely the truth. Easiest, I think, was just put on there because it is the shortest.”

The trail makes a 350-foot elevation gain from the lodge to ultimately arrive at the sandstone arch, which stands 65 feet high and spans 78 feet in length.

“It’s one of the larger arches in the area,” Gasdorf says. “It has sort of a magnificent way that it stands there. And people like it because you can walk on top of it. We don’t have any railings on top, so there is the real natural element to it.”

Cross under the bridge and look left for a narrow passage known as “The Squeeze.” Geologically, Gasdorf says, “The Squeeze” is a vertical fracture that may have separated during an earthquake to form a passage with sheer walls.

After squeezing through, turn left to cross atop the 24-foot-wide Natural



The striking Natural Bridge serves as the namesake of this Kentucky park and offers hikers a stone promenade with views of the Red River Gorge. Photos by Joe Tennis

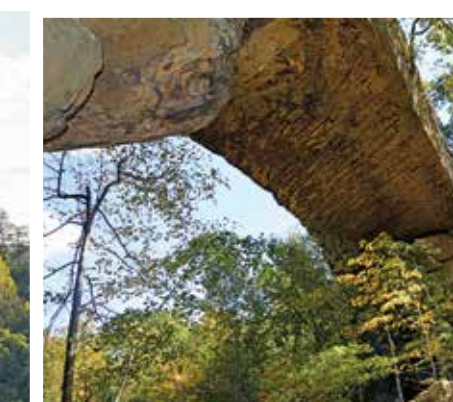
Bridge. The view from here overlooks the Red River Gorge landscape, with distant sandstone cliffs towering over lush valleys.

Continue following the Laurel Ridge Trail for about a half-mile, or maybe more, before arriving at a cliff called Lookout Point. This is what Gasdorf considers “probably the second-most visited lookout at Natural Bridge because you can actually get a picture of Natural Bridge itself from a distance, looking across the valley.”

Beyond Lookout Point, continue another half-mile to a dead-end at Lover’s Leap Overlook. “When you’re standing there, you actually look out to another outcropping rock,” Gasdorf says. “And what’s interesting about that location is we think there used to be an arch right there, spanning all the way across to that outcropping rock. That arch has since collapsed.”

That outcrop goes by several names, including Profile Rock, because the lower part of the rock can look like the profile of a face when seen from a certain angle. According to Gasdorf, this fallen arch is also known as the Devil’s Pulpit because it looks like the face has a podium in front of it.

Backtrack from the cliff about a quarter-mile, and you’ll come to a choice on how to travel back down. First, you can try the Needle’s Eye, a stairway built by the Civilian Conservation Corps in the 1930s. Or you can walk about 300 feet further to go down the Devil’s Gulch, a narrow chute with a rock wall on the left edge, which Gasdorf notes may be more treacherous. “They’re both very steep stairways,” he says. “And a lot of folks really enjoy them for the excitement of it.”



Natural Bridge State Resort Park

Length: Loop from lodge to Lover’s Leap is 2.3 miles roundtrip.

Difficulty: Moderate to strenuous

Directions: Follow Bert T. Combs Mountain Parkway to Slade, Ky., then take Kentucky Route 11 S/ Natural Bridge Road to the park entrance.

Contact: Call 606-663-2214 or visit parks.ky.gov/parks/resortparks/natural-bridge

where breakfast and dinner buffets await hungry hikers.

Hiking under these up-and-down conditions is not your typical walk in the woods, Gasdorf says. “Just a mile here can seem like a very different experience for somebody when they’re not quite used to that, so it’s something that they need to keep in mind.” ♦

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Naturalist's Notebook

Wildflower Wonders

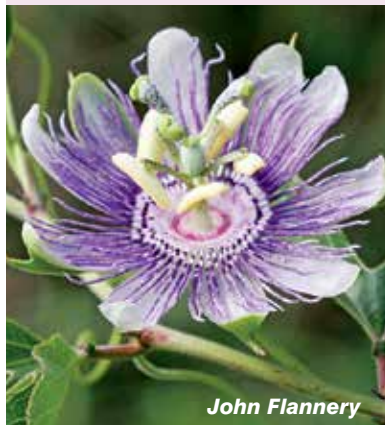
By Meredith Abercrombie and Rachel Pressley

Wildflowers are one of Appalachia's most vibrant symbols of summer. As the season's end nears, nature-lovers take time to appreciate nature's bouquet before the crisp fall air transforms the land into crunchy, colorful memories of what once was.

Here we explore a few beautiful, unique flowers that blossom in late summer along Appalachia's trails, forests and

riverbeds. While some have long been used as medicine, they can also be harmful, so consult a medical professional before use. Also, be aware of threatened and endangered flowers that should not be removed from their natural habitat. We hope you enjoy learning about these, and maybe find some blooming on your next adventure.

Passionflower



John Flannery

Also known as: Apricot vine, maypop, water lemon

Scientific name: *Passiflora incarnata*

Where and when to find it: Blooms from April to September in the East and Midwest in habitats such as roadsides, meadows, pastures, woodland edges and riverbanks.

Naturalist's Notes: According to the University of Maryland Medical Center, this exotic ornamental flower has many medicinal purposes. When properly prepared, it can be used for insomnia, gastrointestinal upset related to anxiety, generalized anxiety disorder and the relief of symptoms from narcotic withdrawal. The fruits that grow on the vine of the passionflower can be consumed by small animals and humans.

These flowers are the only food source for gulf fritillary caterpillars and are also vital for other butterfly larvae. The passionflower's unique structure requires a large bee for effective pollination. — R.P.



Soapwort Gentian
Wikimedia Commons



Appalachian Rose Gentian
Alan Cressler



Sampson's Snakeroot
Eric Hunt



Alan Cressler

Gentian Family

The Gentian family of flowering plants occurs on all continents except Antarctica. There are 87 biological groupings and over 1,600 species known.

The family evolved in the tropics and eventually spread to the North temperate regions. The species that grow in the eastern United States include the blue Appalachian gentian (*Gentiana austroriparian*), the pink Appalachian rose gentian (*Sabatia capitata*), the purple soapwort gentian (*Gentiana saponaria*), the purple Sampson's snakeroot (*Gentiana villosa*), the purple stiff gentian (*Gentianella quinquefolia*) and the blue bottle gentian (*Gentiana clausa*).

Bloom time for these specific gentians range from the end of July through October. They are also rare, at risk or endangered in specific states due to habitat fragmentation, destruction and degradation.

Gentians in the eastern United States typically grow in habitats like high elevation hickory-oak-pine forests, grassy balds, meadows, streambanks and roadsides. Globally, they inhabit deserts, savannas, prairies, rainforests, temperate forests and the tundra.

The plants have long been used as herbal remedies. Currently, gentians are used in weight loss products, skin care products, perfumes and homeopathic treatments.

Bumblebees hold a special value to bottle gentians. This flower never opens itself, therefore insects must pry open the petals in order to pollinate it. Bumblebees are the only insect strong enough to do so, making them vital to this species of wildflower. — R.P.

Ruth's Golden Aster

Also known as: Ruth's grass-leaved golden-aster, Ruth's silk-grass

Scientific name: *Pityopsis ruthii*

Where and when to find it: Blooms June to November in Polk County, Tenn., along the Hiwassee and Ocoee rivers.

Naturalist's Notes: Due to this herbaceous perennial's narrow distribution and the constant modification of its habitat, it is federally listed

Appalachian Grass-of-Parnassus



Scott Ranger

Also known as: Kidney-leaved Grass-of-Parnassus

Scientific name: *Parnassia asarifolia*

Where and when to find it: Blooms from late August to October and is found primarily in the Appalachian Mountains and Ozark Mountains. Habitats are at high elevations near mountain swamps, seeps and along-side streams.

Naturalist's Notes: The flower's white blooms and kidney-shaped basal leaves inspire its second name, the Kidney-leaved Grass-of-Parnassus. The white blooms have green veins along the petals that allow nectar to flow in specific paths. While the flower has a conservation status of G4, meaning that it is apparently secure, it is listed on the state endangered species list in Maryland and Kentucky. — R.P.

as an endangered species. Ruth's golden aster typically grows in crevices that are located between forest slopes and river channels. In June 2017, the U.S. Fish and Wildlife Service stated that they will release a five-year evaluation that includes a multi-step recovery plan for the species. The public is asked to provide information on the species before August 29. Visit tinyurl.com/fws-golden-aster for details. — R.P.

Mountain Angelica



Karen Roussel, Flickr
user karen3292

Also known as: Filmy angelica
Scientific name: *Angelica triquinata*

Where and when to find it: The mountain angelica is a wildflower whose home is the Appalachian Mountains, stretching from northeast Georgia to Pennsylvania. Find it blooming in more open areas of woods or meadows in late summer through September.

Naturalist's Notes: Mountain angelica's nectar is poisonous to some insects and causes an intoxicated state. It is one of the four angelica species found in the Southeast. The flowers range from white to greenish-yellow and are endangered in Maryland and Kentucky. — M.A.

Southern Harebell



Robert Love Taylor, flickr.com/photos/rlovetaylor

Also known as: Appalachian bellflower, small bonny bellflower, Southern bluebell

Scientific name: *Campanula divaricata*

Where and when to find it: The southern harebell is a member of the bellflower family and is native to the Southeast. It is found primarily in the Appalachian Mountains and blooms throughout late summer. The plant prefers rocky outcrops and shady slopes.

Naturalist's Notes: These flowers are named after their delicate bell shape. The plants only reach one to two feet in height but bloom in large masses. These wildflowers are currently classified as endangered in Maryland but are ranked globally in the G4 conservation category, meaning they are apparently secure. — M.A.

Goldenrod



Reina Pearson

Also known as: Genus of the Asteraceae family

Scientific name: *Solidago* spp.

Where and when to find it: Goldenrod refers to a genus of more than 100 species within the aster family. It is found across the country and blooms from July through September. While this wildflower is not exclusive to Appalachia, the bright splashes of yellow can be seen across the region. In fact, the goldenrod is the state flower of Kentucky.

Naturalist's Notes: Historically, the goldenrod has been used for many medicinal purposes — solidago derives from the latin word solidar, meaning "to make whole." Native Americans had multiple uses for the plant, like the Meskwaki, who made a lotion with the plant to help external wounds, or the Zuni, who chewed on the flower to help sore throats. Other common uses include the treatment of urinary tract infections, seasonal allergies, kidney stones and arthritis. It is often confused with ragweed, which blooms at the same time and in the same area as goldenrod and causes seasonal allergies. — M.A.

Turk's Cap Lily



Jim Fowler, jfowlerphotography.com

Also known as: American tiger lily, turban lily, swamp lily, lily royal

Scientific name: *Lilium superbum*

Where and when to find it: The Turk's cap lily blooms from July through September and can be found as far north as New Hampshire and as far south as Alabama. The wildflowers prefer wooded and swampy habitats, as well as wet meadows and thickets.

Naturalist's Notes: The beauty of the turk's cap lily is hard to miss. The common name comes from the traditional red hat worn in Turkey, which the flower resembles. The bright orange-red flower is speckled with deeper red spots and the long flowing petals droop down. You may spot hummingbirds hovering around the flower, as they are often attracted to the bright color. It is the tallest lily species native to America, often reaching seven feet in height. — M.A.

Spreading Avens



Jim Fowler, jfowlerphotography.com

Also known as: Appalachian avens, cliff avens

Scientific name: *Geum radiatum*

Where and when to find it: Spreading avens grows exclusively along the border of North Carolina and Tennessee at a minimum elevation of 4,367 feet. These wildflowers flourish in sunny, open conditions. Flowers bloom June through September, and their fruit forms August through October.

Naturalist's Notes: Spreading avens' flowers are a fluorescent yellow, while the leaves take a kidney shape. There are only 11 populations of spreading avens known to still exist. In 1990, it was listed as a federally endangered species. The biggest threats this species faces are erosion, deforestation and damage from human traffic. To help protect these at-risk wildflowers, stay on marked trails and be aware of where you tread during your excursions. — M.A.

BUILDING BETTER SPONSORED BY



Hempcrete Houses Walls That Really Breathe

You'll hear lots of people tell you that houses need to breathe. Usually when they say that they mean that it's normal for a house to be drafty. But that's a misconception — houses that leak air are simply wasting energy. The last 15 to 20 years have seen a dramatic improvement in the understanding of building science and the role of moisture management, air leakage and indoor air quality in creating an energy-efficient home that truly breathes.

Bio-aggregate concrete: These materials represent an exciting evolution in home construction. One example that is gaining interest is the use of a hemp by-product mixed with traditional lime concrete binder, which results in a product commonly called "hempcrete." Wall, floor or roof assemblies made with hempcrete have a few unique characteristics.

Hempcrete walls respond in a dynamic way to heat and moisture. They do not trap moisture the way wall cavities sometimes can — rather they absorb and release moisture in response to changing weather conditions. In addition, because of their monolithic construction and alkaline pH, mold cannot grow in a hempcrete wall. They also have a unique combination of insulation and mass that pro-



duces an extremely comfortable, healthy and energy-efficient living environment.

Low-carbon building material: The hemp material used is a by-product of typical industrial hemp production and thus has a very low environmental impact. The lime binder, which requires less energy to produce than portland cement, actually absorbs carbon through the life of the home, becoming stronger year by year and actually reducing the carbon footprint of the home over time.

Sunny Day Homes recently had the opportunity to participate in the construction of a hempcrete house being built in Asheville, N.C., under the guidance of a pioneer in hempcrete construction, and we're hopeful that we will be building one soon.

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

Cultivating Forest Medicinals, Creating Healthy Economy

By Eliza Laubach

Appalachia's forests feature an especially concentrated diversity of medicinal plants. From the famous ginseng to lesser-known false unicorn, many of these plants are valued in today's herbalism industry.

A traditional culture of harvesting plants like ginseng and ramps from the region's expansive forests has long helped to sustain area families. Now, a movement called forest farming is emerging to grow these plants in private forestland to decrease strains on plant populations and strengthen the market for Appalachian botanicals.

Cultivators Coalesce

Shafts of afternoon sunlight dapple the forest floor. A path bordered by partly rotten branches angles across the slope. Just beyond are patches of black cohosh, ginseng, goldenseal and bloodroot. A high fence only 10 feet away marks the border with neighborhood backyards, built some years after the first ginseng was planted here 50 years ago.

This demonstration forest garden at the Mountain Horticultural

Crops Research and Extension Center in Mills River, N.C., is a learning tool for extension agents, graduate students and members of the WNC Medicinal Herb Growers Club. All work together to plant the seeds and track the health of Appalachian forest medicinal plants.

Lorri Burra, a member of the club, first planted ginseng on her land seven years ago in an old box spring frame. For two years, she saw nothing, so she stopped looking. Then last year, she saw the ginseng.

"The plants move around," she says, "you can't even weed." Sure enough, a ginseng plant grows outside of the box.

Jeanine Davis, extension specialist and a teacher to Burra and many others, specializes in research and development for growing new crops, including medicinal forest plants. Many people in the forest farming field credit her as a mentor. Her most recent project involves serving as a partner on a regional, grant-funded coalition focused on providing resources, information and connection to forest farmers like Burra.

The Appalachian Beginning Forest Farmers Coalition is funded by



Michelle Pridgen, above, dug black cohosh last fall. This autumn, she plans to harvest it again. Photo by Priya Jaishanker. Other plants are commonly misidentified as black cohosh, left. There are 23 temperate species in black cohosh's genus, *Actaea*. Photo by Eliza Laubach

the U.S. Department of Agriculture and consists of 14 partners: universities, nonprofit organizations, governmental agencies and a regional extension program. Members include herbal medicine processors and growers.

The most commonly tended roots like ginseng and black cohosh need five to 10 years to reach medicinal potency. Disease, poaching and competition from native and invasive plants complicate this long harvest cycle.

"It takes a certain kind of person to grow herbs," says Davis. "It's not easy money." Forest farmers must be willing to take a long-term financial risk, unlike digging wild ginseng, which can sell for \$500 a pound to buyers who will mark it up even higher in Hong Kong.

Over-harvesting of the prized plant, which is reputed to benefit mental stimulation and long-term health, has caused extreme fragmentation and isolation of wild ginseng populations. This plight has encouraged forest farming, yet Davis also sees ginseng hunters' attitudes dramatically changing as more people talk about conservation. "Now people are concerned, not clearing it all out," she says. Still, there is a big slope to climb before people stop gathering wild ginseng.

Since ginseng's fame makes forest farming it a delicate matter of great risk and high fences, many forest farming experts are shifting focus to growing black cohosh instead, whose root is widely used for women's health. *Actaea racemosa* still crowns the understory of rich Appalachian

woodland coves and is heavily dug in the fall harvest season. It has several lookalikes and is not always correctly identified when wild harvested.

Black cohosh often fetches a lower price than stinging nettle, according to Pennsylvania State University ethnobotanist and coalition partner Eric Burkhart. Even though nettle grows like a weed and black cohosh grows slow and finicky, over-harvesting and a disconnect between wild harvesters and consumers lends it a low price. Burkhart does not want to see black cohosh populations become scarce like ginseng, and says this could happen within 100 years if people do not start cultivating it or better stewarding wild populations.

Greater connection between industry and academia and the current culture of wild harvesting is needed, says Burkhart, who desires to interface with root diggers in the woods. Many wild harvesters do not know their harvesting practices may be unsustainable long-term, nor that they could sell for a higher price if they were harvesting sustainably.

"If people are paid more, they will care more," he says.

Recognizing that building these relationships will take time to build trust, Burkhart hopes to make the coalition's workshops more accessible for rural Appalachian residents.

Marketing Quality Over Quantity

A paper Burkhart published in 2009 outlined the lack of profit in forest farming for anything but ginseng. Today he works with herbal medi-

continued on next page



Forest Medicinals

continued from previous page

cine producers to strengthen their selling prices. "Most of these plants are highly undervalued in the marketplace," he says.

Mountain Rose Herbs is changing that story. The large herbal supply company based in Oregon is buying ginseng and black cohosh from Forest Grown Certified farmers at a much higher price than the industry standard. The Forest Grown program, created by Pennsylvania Certified Organic three years ago, offers an organic certification with a new one that guarantees sustainable forest cultivation or wild harvesting standards.

Since beginning with ginseng, 10 more plants are now on the list for possible Forest Grown verification and 11 people have become certified, with five more expected by the end of this year.

United Plant Savers, an organization based in Southeast Ohio and focused on medicinal plant conservation, helped the program sprout by covering the certification costs for the first few farmers. The fees amount to just under \$1,000: \$750 for an organic certification and \$200 for the Forest Grown title.

The investment is a barrier to small-scale farmers like Lorri Burra, who is already certified organic with Oregon Tilth and has considered — but cannot afford — the Forest Grown Certification. Still, she plans to plant two acres of black cohosh next spring in hopes of selling to a large processor for a higher price.

Tess Weigand coordinates the Forest Grown Verification program and prioritizes the program's accessibility in the future. According to Weigand, they need to have enough people in the program to supply the processors, like Mountain Rose, who



are selling Forest Grown Verified products. To reduce costs, Forest Grown is looking for other sponsors to continue the cost-share program and also considering a model that would allow a group of farmers to apply as a cooperative. The inspector would visit certain sites each year.

Two female farmers in Grayson County, Va., piloted the Forest Grown Certified program for black cohosh last season, an effort organized by coalition partners. Katie Trozzo has worked in the community for the past three years to help build this forest farming model, which has also served as research for her doctorate in agroforestry at Virginia Tech. She says creating mutual trust among forest farmers is vital for this type of industry where product quality is of utmost importance.

Through that, she met Michelle Pridgen, who sells vegetables and preserves at a farmers market and also owns forest land. Mountain Rose Herbs bought black cohosh from Pridgen's and another forest farmer's wild stands last year, which were replanted with a bud from each root dug, following the Forest Grown practices. Pridgen saw an 80 percent survival rate in those black cohosh populations this spring.

Processing facilities, like Mountain Rose Herbs, must also be certified. Weigand says two more regional

Ginseng plants, far left, take two to four years to flower. The tiny white blossoms will transform into a bright red berry by fall. Photo by Eliza Laubach. At left, Cynthia Taylor, pictured front, collaborated with Michelle Pridgen and Katie Trozzo to sell black cohosh to Mountain Rose Herbs. Last fall, they harvested 50 pounds. Photo by Priya Jaishanker. Herb farmer Lorri Burra, below, considers her land an apothecary. One of her customers is a company that makes homeopathic remedies from forest plants. Photo by Eliza Laubach

herb processors will become certified by the end of 2017, part of a new project organized by Appalachian Sustainable Development at a local food storage warehouse in

Duffield, Va.

Herb Hub Happenings

The freshly constructed Appalachian Harvest Herb Hub in Duffield will be used for the first time this fall by five growers processing black cohosh roots. A professional-grade central processing site for harvested herbs serves a great need for regional forest farmers, whose drying methods range widely and are often cumbersome and tedious.

Appalachian Sustainable Development, a nonprofit organization based in Southwest Virginia and an Appalachian Beginning Forest Farmers Coalition partner, collaborated with David Christie on the herb dryer design and outreach for the Duffield facility. This past year, the partnership sought and educated farmers at presentations in East Tennessee, Southwest Virginia and Eastern Kentucky, and found funding from the Appalachian Regional Commission for the herb hub.

Christie farms herbs in Floyd, Va., and helped build a regional processing hub focused on Chinese medicinal plants in Floyd. He sees these facilities as a natural evolu-

tion as more people embrace herbs for healing.

"Why not in the coal country?" says Christie, referring to the Appalachian Harvest Herb Hub, which borders coal mining regions. "Why not where people are looking for a different form of an economy?"

A year ago Christie started a consulting business, Taproot Botanical Alliance, to link small-scale farmers to the growing national herb industry. Being a small-scale herb farmer himself unable to make living wages, his mission is "to make sure farmers can thrive in this world."

Michelle Pridgen is curious to see how it goes for the farmers using the herb hub in Duffield. She and the other farmer she worked with lost money last season with labor taken into account. So Eric Burkhart negotiated a higher selling price with Mountain Rose Herbs for growers this year, demonstrating the commitment across the board for creating economic benefit from cultivating forest medicinal plants. Now, with the new herb hub, Pridgen is renewing her certification and selling black cohosh again this fall.

Can forest farming also build community? As Pridgen notes, the potential economic opportunity may keep the younger generation in the county. According to Trozzo, more still needs to be figured out before it is economically viable, but with the coalition, she says, "I think we have the resources to see if we can get there." ♦

Learn to grow forest medicinals: Appalachian Beginning Forest Farmers Coalition trainings

- **Aug. 11-13 in Wise, Va.:** Forest site assessment and growing from seed to harvest
- **Sept. 29-Oct. 1 in Swannanoa, N.C.:** Forest farming intensive
- **Sept. 8-10 in Bloomingville, Ohio:** Forest farming business
- **Oct. 20-22 in Montreat, N.C.:** Post-harvest handling, processing and production

See website for more info: appalachianforestfarmers.org/386-2

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Appalachia's Health Report

The national struggle to provide affordable healthcare and to address the social and environmental factors that contribute to health problems is felt acutely in the region.

By Molly Moore

It's a recurring sight at fairgrounds, camps and schools across the country. Scores of volunteers and medical professionals with the nonprofit organization Remote Area Medical erect a temporary, first-come, first-served clinic to provide free screenings and treatments, along with dental and vision care, to hundreds — even thousands — of area residents over two or three days. Patients often spend the night in nearby parking areas to ensure a spot.

But these periodic clinics are not enough. Mary Vance, executive director of Mountain Hope Good Shepherd Clinic in Sevier County, Tenn., says one of the most pressing needs is access to primary care providers who can help maintain residents' health on a regular basis.

Mountain Hope is one of Tennessee's 55 safety net clinics — a term for clinics that serve uninsured and underinsured residents. Mountain Hope in particular only treats clients who live or work in Sevier County and do not have other forms of healthcare. The clinic received 9,600 visits in 2016 alone.

The most common ailments they see in-

clude diabetes, hypertension, musculoskeletal issues such as arthritis, and oral care, according to Vance. "Bad teeth can severely affect overall health and wellbeing," she says.

As a standalone nonprofit organization, Mountain Hope is primarily supported by the community through volunteers and donations from residents, churches, local government and businesses. But while the clinic does not directly receive federal funding, changes in federal policy that reduce eligibility for programs like Medicaid would have a trickle-down effect by driving even more people to safety net clinics.

"There's so many aspects to healthcare, not just primary care and clinics like ours," Vance says. "It's dental needs, behavioral health, coordinated school health, rural hospitals, it just goes on and on and on. If you don't have adequate funding to take care of those in need, those [services] go away but the people don't go away."

During three July days in Wise County, Va., 2,249 patients sought treatment from the temporary clinic hosted by Remote Area Medi-

cal. Another six such events will be held in Central Appalachia before the end of 2017.

At the Wise County clinic, Melody Reeves volunteered at an informational booth for We Care, a local, grassroots, non-partisan organization working to achieve affordable healthcare for all. Reeves and other We Care volunteers handed cards to attendees with their legislative representatives' contact information.

"What we told them is, we are encouraging people to stand up for their right to healthcare and to urge their representatives not to push anyone off of healthcare," Reeves says.

We Care aims to educate the public and legislators about how health policies manifest in the real world. The group has also handed out lists of the types of care that private insurers are required to provide under the Affordable Care Act, and asked that people compare that list to any new policy proposals.

"You can't have coverage for all and have it all be based on profit because then the sickest people will be pushed out of the market because it's not profitable," Reeves says.



Mountain Hope Good Shepherd Clinic is one of the many nonprofit clinics that provide health services to uninsured residents. Photo courtesy of Mountain Hope

Developing a plan that works for all requires lawmakers who are aware of the issues — something that Vance says is demonstrated by a Tennessee state senator who volunteers at the Mountain Hope reception desk once per year. "He doesn't say he's a senator but greets patients and gets to see who these patients are and what their needs are when they come through the door," she says.

Reeves suggests that legislators work with constituents in their areas to develop educational forums to help the public understand the issues and receive feedback from residents.

"Even though it's complicated, if we don't make the effort to have a public conversation about this, I don't think we can solve it," she says. "It's not one side against the other — we all need healthcare." ♦

Severe Black Lung Disease Makes A Deadly Resurgence

After years of decline, the crippling disease is rebounding, worse than before

By Dan Radmacher

"There is an epidemic here in Southwest Virginia, in Eastern Kentucky, in Southern West Virginia," says Ron Carson, director of the Black Lung Program at Virginia's Stone Mountain Health Services. "Miners are getting sicker and dying at a much younger age. A lot of people are going to be shocked when they see the numbers."

Carson has been working with researchers from the National Institute for Occupational Safety and Health to put hard numbers to this deadly resurgence, and he says they have been astounded by the number of cases Carson's clinic is seeing of progressive massive fibrosis cases, the most serious form of black lung disease.

In a report from similar research released last December, NIOSH researchers found a cluster of 60 such cases from one Eastern Kentucky radiology practice over a nine-month period — three times the number of cases the national Coal Workers' Health Surveillance Program found from 2011 to 2016.

Around the same time the NIOSH report was released, an NPR investigation by Howard Berkes aired that identified more than 1,000 cases of progressive massive fibrosis during the past decade — 10 times the number officially recognized by the federal government.

Complicated black lung is debilitating in the extreme, Carson says. "Some young miners come in to this clinic in wheelchairs because they don't have enough breath to walk," he says. "We have miners at age 28 with eight years of exposure to coal dust waiting for a lung transplant."

Progressive massive fibrosis, like other forms of black lung disease, cannot be cured and is eventually fatal. Carson says the clinic focuses on easing the miners' suffering. "We make every effort to give them a better quality of life," he says. "Therapists do pulmo-



Above, miners walk to a mobile health screening unit operated by the National Institute for Occupational Safety and Health. Photo courtesy of CDC-NIOSH. Ron Carson, at left, directs the Black Lung Program at Stone Mountain Health Services in Virginia. Photo courtesy of Stone Mountain Health Services.

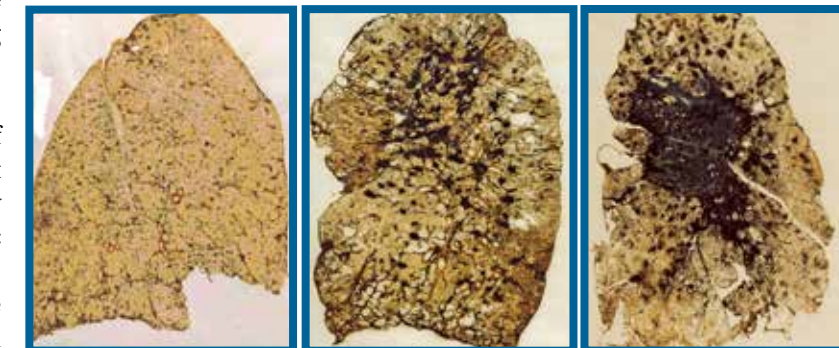
consensus that it's partially related to the thinner coal seams being mined these days in Appalachia.

"There's less coal and more rock," Hutchison says.

Carson agrees. "Some say all the easy coal is gone," he says. "There's a lot of rock and silicate now that you have to remove to get to the coal," he says. "Another thought is that the longer working hours and the type of machinery that's mining the coal produces much finer particles that respirators just don't capture."

Some wonder whether the decline of union mining is playing a role. Chuck Nelson, a retired miner with 30 years of experience, says the emphasis in non-union mines is on running coal, not worrying about coal dust or ventilation. "I know you heard how [non-union] Massey runs coal," says Nelson, who worked for Massey for seven years. "It was so dusty, I couldn't see. I had to turn the cap light off because all that dust just reflected light back in my eyes. That's the way they mined coal after Massey dissolved the union."

Carson acknowledged that the clinic sees a lot more non-union miners now, and said he has heard from miners that union mines did more to address dust retention. "I can only rely on what miners tell us," he says. "There must be some validity to it because you hear it so often: We have regulations in place, but those regulations are not being enforced."



From left to right: a basically normal human lung; a lung with coal workers' pneumoconiosis, also known as black lung disease; a lung with coal workers' pneumoconiosis and progressive massive fibrosis, also known as severe black lung disease. Photos courtesy of CDC-NIOSH

Solving the Opioid Epidemic

What's working and what isn't

By Kevin Ridder

Huntington, W.Va., a city located in Cabell County, has experienced a disturbing trend in the past few years. In 2015, Cabell County 911 received 944 total calls related to drug overdoses, compared to 272 calls in 2014. And in 2016, they received 1,476 calls — a 443 percent increase from 2014. The increase, according to the City of Huntington's Mayor's Office of Drug Control Policy, is due to the opioid epidemic.

People are overdosing on opioids — prescription drugs like oxycodone and illicit drugs like heroin — in cars, gas stations, libraries, homes, department stores and fast food restaurants in higher numbers than ever before. As Cabell County and other communities like Greensboro, N.C., attempt to adapt to an ever-worsening situation, they're learning that traditional ways of dealing with drug addiction are not effective.

"If you arrest somebody and put them in

jail, you are not really dealing with the dependency," Capt. Rich Culler, head of the vice/narcotics division in the Greensboro, N.C., police department, says. "You just can't arrest your way out of the problem."

The opioid crisis in America has gotten progressively worse in recent years. According to the Centers for Disease Control and Prevention, sales of prescription opioids in the United States "nearly quadrupled from 1999 to 2014," while the amount of pain Americans reported showed no significant change. The CDC also reports that "heroin-related deaths more than tripled between 2010 and 2015," with deaths related to synthetic opioids like fentanyl seeing a 173 percent increase from 2014 to 2015.

And Appalachia has seen the worst of it. According to Heroin.net, a resource that provides information to people suffering



Heroin Hearse, a nonprofit community action group in Huntington, W.Va., drives this hearse (right) to spread awareness of the opioid epidemic. One of their recent initiatives was to clean out a walking tunnel littered with used needles (above). Photos courtesy of Dwayne Woods/Heroin Hearse.

from drug addiction and connects them to treatment centers nationwide, Kentucky and West Virginia have been hit particularly hard. In Clay County, Ky., the average annual rate of opioid-related deaths per 100,000 residents from 1999-2013 was 115.1, compared to the national average of 5.6 deaths. In McDowell County, W.Va., the average death rate was 100.5 per 100,000 residents each year.

According to Kim Miller, the director of



corporate development with Presteria Center, the largest behavioral services provider in West Virginia, much of Appalachia's drug problem stems from pharmaceutical companies flooding the market with opioids in a region where injury-prone heavy industries like coal and timber were king.

She says that pharmaceutical companies saturated the state with drug salesmen

continued on page 14

continued on page 17

Opioid Epidemic

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who would tell doctors that oxycodone was effective for mild to moderate pain and wasn't habit forming. When a coal miner was injured at work, Miller says, they would be prescribed opioids — that should be reserved for end-of-life events — to deal with pain that likely could have been managed with ibuprofen. Now, with heavy industries in decline, many former workers are left addicted to opioids and without a job. The loss of income and health insurance has turned some to the cheaper, more potent heroin.

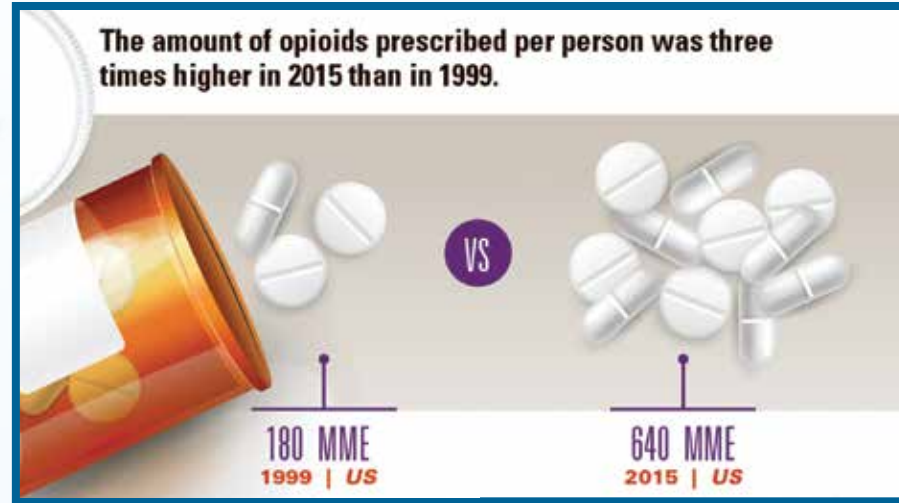
Communities are beginning to fight back against the companies that heavily marketed opioids. In northeast Tennessee, state prosecutors are filing a lawsuit targeting several large pharmaceutical companies that manufacture these drugs. According to a June article in the Knoxville News Sentinel, "the lawsuit seeks to hold Big Pharma responsible for the opioid epidemic in Tennessee by labeling the drugmakers as drug dealers and accusing them of lying about the addictive properties of opiates and aggressively pushing the drugs as miracle cures for all manner of pain."

Culler and his department think that prescriptions should be seen as a key part of the problem.

"Instead of just arresting people, we're going to try and get to the root of the problem, and that's where the prescriptions come in," Culler says. "Prescriptions, for us, were one of the ways we saw people getting addicted. Once people's prescriptions ran out, they couldn't get the pill anymore, so they went to buying pills on the street. But the pills on the street are more expensive, and heroin is cheaper."

Once prescription pills open the gateway to heroin, Culler says, that's where the overdoses happen. When someone takes a prescription opioid, it's engineered to be a consistent dose — whereas heroin is often cut with substances like fentanyl, a cheaper and extremely potent synthetic opioid originally created by pharmaceutical companies that can kill in minuscule amounts.

In Culler's eyes, the opioid epidemic is a simple case of supply and



Opioid prescription rates vary greatly from county to county, according to the CDC. Graphic by CDC Vital Signs. Sources: ARCOS of Drug Enforcement Administration; 1999. Quintiles IMS Transactional Data Warehouse; 2015.

Roughly 30 Huntington citizens volunteered with Heroin Hearse in July to clean up their community, at right. Photo courtesy of Dwayne Woods/Heroin Hearse.



demand. He says that for decades, police agencies have always just tried to deal with the suppliers, no matter how low-level. But that did nothing for the demand. Since money is involved, Culler says, there is always going to be someone stepping in to fill the shoes of every supplier arrested. It's necessary to address the demand in order to get rid of the supply.

"We want to protect people," Culler says. "And when you see this many people dying, and you're not having any effect, you've got to stop and look at what you're doing."

Difficulty with Treatment

Both hurting and helping the addiction epidemic are drugs like buprenorphine — commonly sold under the brand name Suboxone — used to help wean people off of opioids.

Kim Miller with Pretera Center says that medication-assisted treatment is the gold standard for treating opioid dependence, as long as it's strictly monitored and accompanied by counseling.

"It curbs the cravings, it helps people stabilize their life," Miller says. "Ultimately, our goal is to help people get off of buprenorphine as well. And sometimes you have to do that very slowly because people have developed psychological dependence as well as a physiological dependence on buprenorphine."

But according to an August 2016 ar-

ticle in the Richmond Times-Dispatch, "[Suboxone is] the most-abused, most-sought-after street drug across [Southwest Virginia], which has been flooded with the drug like nowhere else in the state. Federal funding for drug courts requires localities to offer Suboxone in their treatment programs. Some judges have said they'd rather do without the funding — or even close their courts — rather than agree to using Suboxone."

In a 2015 article in Alcoholism & Drug Abuse Weekly, National Association of Drug Court Professionals CEO West Huddleston said, "The real issues are, who gets [medication-assisted treatment]? What medication is appropriate for which person? How long is the appropriate course of [medication-assisted treatment]? And what is the medical rationale for making those and other decisions?"

To help curb buprenorphine abuse, Pretera Center helped West Virginia develop stricter standards for treatment, such as only giving a week's supply of the drug at a time instead of a month's. Additionally, patients at Pretera Center clinics must pass drug tests and attend regular therapy sessions to continue receiving buprenorphine.

In March of this year, the Virginia Board of Medication also began re-

quiring that prescribers refer patients to counseling while undergoing medication-assisted treatment and that prescribers give only a week's supply of the drug at a time.

From the Brink of Death

It's become increasingly more common for first responders in all communities to carry naloxone — a lifesaving opioid overdose reversal drug that revives a victim within 60 seconds — to every call they answer.

And for good reason, says Kenny Burner, West Virginia state coordinator for Appalachia High Intensity Drug Trafficking Area, a federally-funded initiative to address drug addiction and trafficking in the region. In his city of Huntington, W.Va., located in Cabell County, the fire department responds to more overdose calls than they do fires.

"You don't have 12 fires a day, but it wouldn't be uncommon for there to be 10 or 12 overdoses a day," says Burner.

But even though it saves lives, Burner says that naloxone is still an extremely controversial drug in Huntington. He often hears first responders ask how many times they are going to save these people — to which he responds, as many times as needed.

"I'm not going to be the one who decides who lives and dies," says Burner. "And that's a personal, faith-based decision on my part. I don't feel that anybody has the right to say no. That's like saying we're not going to save somebody with lung cancer because they should have known better than to smoke."

Part of this frustration stems from what Burner calls "compassion fatigue" in first responders, who often respond to the same address over and over. Burner likens compassion fatigue to post-traumatic stress disorder.

"I think we really need to be aware of our first responders who are going out on these [overdose calls] reviving people and saving lives," says Burner. "They're getting tired. It's getting worse, and I don't think it's peaked yet. It's not a simple problem, and there's not going to be a simple solution."

According to Alex Smith, an economics student at the University of North Carolina at Greensboro and co-founder of the campus' drug addiction recovery program, revival from

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Opioid Epidemic

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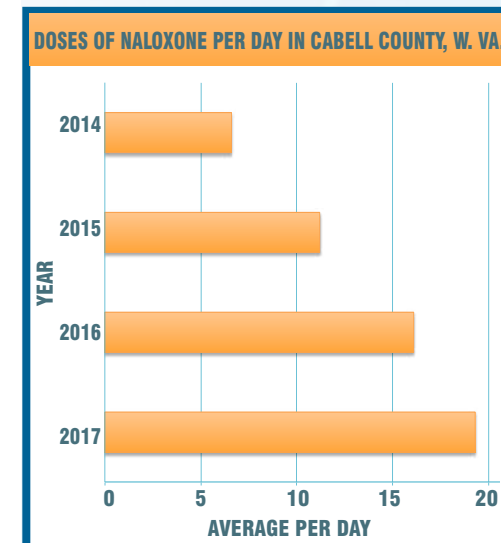
naloxone causes side effects that do not make this frustration any easier. Naloxone can put a person addicted to narcotics in immediate withdrawal, causing extreme distress and sometimes aggression. This causes the victim to be resistant to treatment advice given at the scene.

Mat Sandifer, director of clinical services at Triad Behavioral Resources, an outpatient addiction treatment clinic in Greensboro, says Guilford County is in the process of adopting a rapid response strategy to address this in lieu of prosecuting the patient.

Essentially, the strategy entails sending a police officer, an emergency medical technician and a social worker to the victim's home within 36 to 48 hours after the incident to talk about treatment options. Sandifer says this can include things like harm prevention, clean needle exchange, HIV and Hepatitis C prevention, inpatient treatment and outpatient medication-assisted treatment options.

The rapid response strategy, Smith says, shows promise in other communities such as Colerain Township, a suburb of Cincinnati, Ohio, with a population of 58,499.

"In the past two years since they've been operating [a rapid response team], they've had 80 to 85 percent of people they've engaged with say yes, they want to go to treatment or engage in some type of support services offered in that com-



Synthetic opioids have led to more overdoses and more need for naloxone, a drug that can reverse narcotic overdoses. Source: WV Bureau for Public Health, Office of EMS.

munity," says Smith. "Which is huge — you're looking at a much smaller success rate of the people who go to the traditional 30-day treatment program."

But as the recovery community continues to work for solutions to addiction, Smith says, Attorney General Jeff Sessions pushed the country backward when he announced an initiative in May to pursue harsher sentences for drug users.

"This is a bigger conversation," says Smith. "Right now, we're talking about opiates — heroin and pain pills. In the '80s, we were talking about crack-cocaine. This problem is going to morph into some other drug and some other epidemic if we don't start treating it as addiction, as a health problem."

Changing the Stigma

"I'm 66 years old," says Kenny Burner. "When I grew up, a heroin addict was somebody in an alley in New York with a spike sticking out of their arm. Now, it's kids my kids went to school with. It doesn't discriminate."

"There's a stigma to being a 'drug addict,'" he continues. "But they feel the worst about it. You're looking at somebody who's living in hell on Earth. I don't think anybody ever wakes up in the morning and says, 'You know, I think I want to become a heroin addict.' That's not the way it happens."

According to Mat Sandifer with Triad Behavioral Resources, drug addiction is a brain disorder where the user gets completely sublimated by the drug, making the need to use more powerful than even the need to eat and sleep. He says that talking about drug addiction like a brain disorder is a crucial step in addressing the opioid crisis.

UNC Greensboro's Alex Smith has a closer relationship with the negative stigma surrounding drug addiction than most. When he entered college straight out of high school 12 years ago, he was physically and mentally addicted to prescription opioids. When prescription pills became too ex-



A syringe exchange kit provided by the Cabell-Huntington Health Dept. Photo by Alligator Jackson/Alligator Jackson's Inside Huntington WV

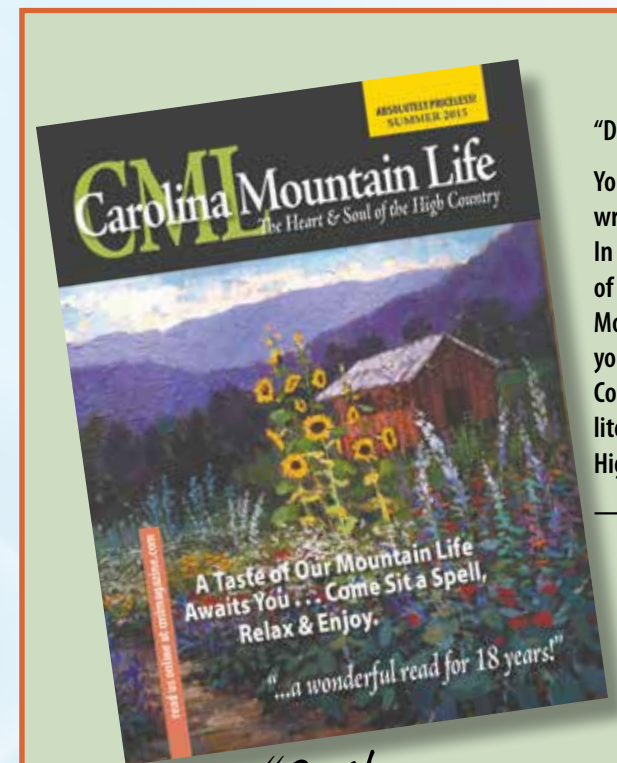
pensive, Smith dropped out of college and started using heroin.

"[The stigma associated with drug abuse] was a big part of me not reaching out for help when I was 18," says Smith. "There was a lot of shame and guilt that I carried along with that."

When Smith's family found out about his addiction, he underwent

afterwards.

"We have people who are in recovery who are doing great things," says Smith. "That's the wonderful thing, we're a very resilient community. And when given the proper resources to manage our substance abuse disorder, we give back to the community tenfold." ♦



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The Human Impact

Mining and Fracking in Appalachia

By Elizabeth E. Payne

Central Appalachia has a wealth of natural resources, but extracting fossil fuels has come at a high price to the communities living near mountaintop removal coal mining and natural gas fracking sites.

Mortality rates in coal-mining counties of Appalachia lagged 24 years behind the national average, according to a 2008 study by Dr. Michael Hendryx, then of West Virginia University. That's after adjusting for the social and economic inequalities — such as levels of education and rates of poverty — that affect life expectancies across the region as a whole.

Additional studies have documented increased rates of illnesses including cancers and respiratory and heart diseases. And a similar pattern is emerging in communities near fracking sites.

Initiatives such as the Mountain Air Project — a five-year study on the reduced lung health in Eastern Kentucky — are tackling the health disparities in Appalachia. Other research is focused on identifying possible causes, such as the extractive industries themselves.

A Truckload of Problems

Winding through the hills and hollers of Central Appalachia, small mountain roads are bearing far more



Lois Bower-Bjornson's children have experienced nosebleeds and skin irritations since fracking wells began operating near their home in Southwest Pennsylvania. Photo by Lois Bower-Bjornson

traffic than they were ever intended to. A steady stream of trucks going back and forth from mountaintop removal coal mining and natural gas fracking sites is doing more than inconveniencing local communities. It's making them sick.

"This unique geographic characteristic of the region means that roadways typically travel along valley bottoms, and homes are concentrated along these roadways. So the potential for particulate matter pollution to be exacerbated in this region is quite large," says Dr. Viney Aneja, a professor in the Department of Marine, Earth and Atmospheric Sciences at North Carolina State University.

Particulate matter pollution refers to particles in the air of different sizes and from different sources. The smaller the particles are, the more risk they pose to human health. Larger particles, such as pollen or dust, are roughly one-fifth the diameter of a human hair and can cause irritation to airways. Smaller particles, roughly one-twentieth the diameter of a human hair, can form from chemical reactions between naturally occurring and industrially derived gases and liquids. The resulting compounds, such as sulfuric and nitric acids, lead to further health risks.

Even smaller particles, known as ultrafines, are one-millionth the size of a human hair and can penetrate deep into lungs on a cellular level. Such particles come from gas and diesel engines and energy production, among other sources, and research is beginning to demonstrate significant health risks from exposure.

In August 2008, Dr. Aneja spent two weeks collecting information about the amount of small particles polluting the air along roadways near Roda, Va. His research was initiated after residents complained about the problem and was supported in part by the Sierra Club.

Aneja's research tested for comparatively large particles in the air resulting from coal trucks passing along the roadways, and it found that during times of heavy traffic the area had up to three times more particulate matter than recommended by the U.S. Environmental Protection Agency's air



Heavy traffic to and from a fracking well pad causes a dust cloud along a small roadway in West Virginia. Aug. 15, 2014. Photo courtesy of The FracTracker Alliance, www.fractracker.org/photos

quality standards.

According to The Allegheny Front, Dr. Michael McCawley, interim chair of the Department of Occupational and Environmental Health Sciences at West Virginia University, has made a similar connection with trucks traveling to and from fracking well pads.

What the Frack?!

As natural gas increasingly displaces coal as the nation's leading source of electricity, equally dismal health impacts are emerging in the communities living near fracking sites.

Dr. Jill Kriesky is the associate director of the Southwest Pennsylvania Environmental Health Project, a nonprofit public health organization focused on the well-being of communities near the state's natural gas extraction sites. The group was founded five and a half years ago in order "to provide timely, trusted and accurate information for residents who think their health has been impacted by shale gas drilling," according to Kriesky.

The organization offers environmental and health assessments to help track changes in individuals' health and monitor the air and water in their homes. They are also collecting information for a national health registry for people who believe their health is or could be impacted by unconventional oil and gas development.

According to Kriesky, the health problems the organization is witnessing correspond to those found through academic research and include coughs and irritation in the nose and throat, sleeplessness, headaches, stress and anxiety. Irritation to eyes and skin, as well as gastrointestinal problems and effects on newborn birth weights

and birth outcomes, have also been observed.

This observation is supported by a study published in April 2017 that found while the infant mortality rate in Pennsylvania fell overall during the periods studied, in the five most heavily fracked counties the total number of infant mortalities increased from 36 between 2003 and 2006 — before the expansion of fracking — to 60 between 2007 and 2010, after the expansion of fracking. The study found some association with contaminated well water.

Kriesky said that the Environmental Health Project has also noticed an increase in social stress suffered by communities near fracking sites.

"The community's completely divided, and industry does that on purpose, so they can pit neighbor against neighbor," says Lois Bower-Bjornson, whose family lives within 1,000 feet of a natural gas well pad in Southwest Pennsylvania.

More than two dozen well pads surround her home, as do retaining ponds that hold fracking waste. A transmission line crosses her property, and a compressor station is only two miles away.

Bower-Bjornson's children have suffered nosebleeds and skin irritation, though she is quick to note that others have it worse.

A Mountain of Evidence

Dr. Michael Hendryx has been studying the health impacts of mountaintop removal for more than a decade. Now a professor in the School of Public Health at Indiana University, Hendryx began his research on the subject while teaching at West Virginia University.

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Human Impact

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He has authored or co-authored more than 30 scientific studies about the health impacts of surface mining, and his results are clear: mountaintop removal coal mining has a "significant and meaningful" impact of the overall health of the communities near the mines.

"When I think about the health effects that we've seen that are uniquely related to mining that come through most strongly and most consistently, I would say that people who live in those mining communities are more likely to have respiratory illness, chronic forms of lung disease like COPD," Hendryx says. "They're at greater risk for lung cancer. They're at greater risk for heart disease. They're at greater risk for chronic forms of kidney disease. They'll report poorer health-related quality of life, they'll report an increase in the number of illness symptoms they experience over time.

"There's also some evidence, though it's only one study, that the risk of birth defects will be higher for



This mountaintop removal coal mining site is on Looney Ridge above Inman, Va. Photo by Erin Savage/Appalachian Voices

mothers who have babies that live in this region," he continues. "Those are the kinds of effects that come through most strongly in our research."

Hendryx has also published a study demonstrating a link between surface mining and an increased risk for depression and depressive symptoms, a result, at least in part, of the radically altered natural environment caused when familiar mountains are destroyed.

For those living near a surface mining site, Hendryx recommends improving the air quality of their homes to help avoid some health risks.

"The risks are most clearly related to air-related problems," he says.

Black Lung

continued from centerspread

Carson says miners have told him that more is done when federal or state mining inspectors are on the scene. "Miners will tell you that when they go in, they have three cuts to finish on their shift. They don't have time to hang up the curtains to rechannel the air. But let a mining inspector come on board, and everything is all white from the lime used to keep the dust down. The water is on the sprinklers on the head of the cutting machine. But when the inspector leaves, it's all back to normal. It's all about production. That's what miners tell us."

In 2014, the U.S. Mine Safety and Health Administration enacted tougher dust rules, lowering the concentrations of coal dust allowed in mines over the next several years. It will take time to see if those regulations are effective and enforceable — and if they will lower the incidence of black lung.

In the meantime, the Affordable Care Act, also known as Obamacare, included amendments offered by Sen. Robert C. Byrd, D-W.V., that make it easier for coal miners to get black lung benefits — and to ensure their survivors continue to receive benefits after they die without having to prove their death was caused by black lung.

"The Byrd Amendments shifted the burden of proof from the miner," Hutchison says. "Coal companies have to prove that mining didn't cause the black lung. In the past, coal company lawyers could shop around and find doctors who would say miners were disabled, but not because of black lung."

Jackson & Kelly, a prominent West Virginia law firm, came under scrutiny for withholding evidence of black lung in miners to help coal companies avoid paying for benefits. In a Pulitzer Prize-winning investigation in 2013, the Center for Public Integrity found that Jackson & Kelly routinely employed such cutthroat tactics for decades.

Thanks to the Byrd Amendments,

"There are some measures people can take to try and filter indoor air more effectively. That could be beneficial ... [Also], don't smoke; smoking rates are high in these communities and they're only going to make things worse. If you can take other measures to improve your health and engage in healthy behaviors, try and do that."

Federal Agencies Finally Take Notice

With all of this observed and documented impact, the federal Office of Surface Mining Reclamation and Enforcement announced in 2016 that it would fund a study by the National Academies of Sciences, Engineering, and Medicine to review existing scientific research on links between adverse health impacts and mountaintop removal coal mining. The committee formed to tackle this project will summarize state and federal regulations that govern the practice and survey relevant scientific literature to identify short- and long-term health effects for populations living near these sites and the causes for them.

The committee held its first meeting in Washington, D.C., in March 2017, and the project is expected to take two years. A hearing that allowed for public

miners disabled by black lung only have to prove they have worked in the mines for 15 years to win benefits. Black lung advocates are concerned that the Byrd Amendments might become collateral damage in the Republican Obamacare repeal efforts, though many Republican lawmakers said they wanted to preserve those benefits regardless of Obamacare's fate.

Advocates say it's also important for Congress to increase funding for black lung clinics in light of the increasing numbers of severe black lung cases. "These clinics around the country are all funded by grants," Carson says. "The funding has been level for the past five or six years. We're finding bipartisan support for a funding increase."

The Black Lung Benefits Reform Act of 1977 authorized up to \$10 mil-

input was held in West Virginia in May, with another session planned for Kentucky in late August.

As the health impacts of mountaintop coal removal are finally being recognized, many worry that the switch to natural gas may carry just as many risks.

"There is a lot that is still unknown in terms of health impacts [from natural gas drilling], but there are certainly enough indicators in the direction of health impacts to be concerned about, that it doesn't seem like we should be going full force ahead with this industry," says Kriesky of the Environmental Health Project. "We should be taking a pause and figuring out what really is happening here in terms of people's health."

Visit appvoices.org/nas-hearings for details on the National Academy of Sciences hearings. ♦

The Environmental Health Project offers suggestions for ways people can protect themselves and their families, such as limiting exposure by using air filters, drinking bottled water and documenting changes by keeping a health journal. For more information, visit environmentalhealthproject.org/staying-healthy



A student learns how to identify irregularities in various lung radiographs. Photo courtesy of CDC-NIOSH

lion for the Federal Black Lung Program, but actual funding has been less than that for years. In June, a group of Democratic Senators sent a letter to the heads of the Senate Appropriations Subcommittee on Labor, Health and Human Services, and Education to request full funding. ♦

A Burning Issue

The Health Costs of Coal Ash

By Elizabeth E. Payne

After laboring to clean up the nation's largest coal ash spill, many workers became sick and 17 died, alleges a lawsuit filed in July on behalf of more than 50 workers and workers' survivors.

The lawsuit was filed against Jacobs Engineering, the company hired by the Tennessee Valley Authority to clean up the 2008 disaster, which occurred when a dam failed at the TVA's Kingston coal-fired power plant in Harriman, Tenn. More than 1.1 billion gallons of coal ash sludge spilled across rivers, homes and fields. According to the Knoxville News Sentinel, the workers sent to clean up the toxic substance were not provided any protection or warning about the dangers of coal ash exposure.

During the cleanup, 4 million cubic yards of the toxic ash was transported from Harriman, Tenn., — a town that is 90 percent white and middle class — to a landfill in Uniontown, Ala., which is 90 percent African American with 45.2 percent of its population living below the poverty line. Soon after, local residents and landfill employees in Uniontown began experiencing health problems.

Every year, the nation's coal-fired power plants produce 130 million tons of coal ash; much of the ash that has accumulated over the past decades is stored in unlined impoundment ponds scattered across the country — some of which are more than a thousand acres large.

This toxic byproduct of burning coal for electricity contains concentrated amounts of the same heavy metals present in coal, including mercury, arsenic and lead. These toxic heavy metals can increase risks to human health by leaching out of the impoundment ponds into the surrounding soils and groundwater. Even greater risks accompany the failure of these impoundments.

According to a 2014 study by Physicians for Social Responsibility and Earthjustice, the fine particles in coal ash can cause significant health problems when inhaled, such as respiratory illnesses, heart disease and an increased risk for stroke.

For North Carolinians living near Duke Energy's coal ash locations, such studies seem to confirm their fears.

Living in the "Danger Zone"

According to David Hairston, many folks describe Walnut Cove, N.C., as the 'danger zone.'

The town sits just a stone's throw west of Duke Energy's Belews Creek Power Station and its large coal ash impoundment pond.

While Hairston now lives about eight miles away from the power plant, he was born and raised in Walnut Cove, and his mother lived there until she



David Hairston, left, was born and raised in Walnut Cove. Photo by Dot Griffith. He worries about the health effects to his community caused by Duke Energy's Belews Creek Power Plant, above. Photos courtesy of Appalachian Voices

passed away three years ago.

"You can travel from my mom's house to the steam station, and there's homes on both sides of the road through that five-mile drive," Hairston says. "And there's not a house you can pass by that's not somebody either battling [cancer], beat cancer or died from cancer on either side of the road. Or if it's not, somebody that's living on an oxygen tank because of respiratory problems.

"The closer you live to the coal ash pond and the coal ash fill, the more sickness you can see," he continues.

On Feb. 2, 2014, a pipe beneath a coal ash pond at another Duke power plant in Eden, N.C., ruptured, spilling more than 39,000 tons of coal ash into the Dan River. The Dan River flows

through Walnut Cove on its way to Eden.

Following the spill, North Carolina regulators passed the Coal Ash Management Act which required, among other things, that drinking wells within 1,500 feet of the state's 34 coal ash impoundments be tested for contamination.

As a result of that testing, more than 300 homes across the state received "do not drink" letters from the state's Department of Health and Human Services, including several homes near the Belews Creek power station. Most of those wells contained high levels of two carcinogens, vanadium and hexavalent chromium.

The "do not drink" orders were

continued on next page

A Burning Issue

continued from previous page

later rescinded by the administration of then-Gov. Pat McCrory, which asserted that higher levels of these toxins were in fact safe (see sidebar). The uncertainty weighs on the families living near these coal ash sites.

"How would you feel, as a mother of a newborn child [and you] can't afford to move, that's scared to bath your child in water, that you may be killing it, or you may be making it sick or make it have a disability by the time it matures because it's immune system is so weak," says Hairston. "Or having to raise a child down there breathing that air. Because unfortunately what you inherited from your parents, what they worked years for, a home, that is valued at nothing, and you can't afford to go anywhere. That is what they're dealing [with]."

Facts in a Sea of Uncertainty

After residents came to them asking for help understanding the results of their state-required water samples, researchers from the University of North Carolina launched their "Well Empowered" project to assist communities across the state, who, for any number of reasons, are concerned that they may be exposed to heavy metals through their private wells.

Researchers at UNC have been studying well water in the state for more than a decade. This project is a collaboration between university researchers in the Department of Environmental Sciences and Engineering and the Institute for the Environment, and has been supported by community members and environmental nonprofit organizations, including Appalachian Voices, the publisher of this paper.

"About three million North Carolinians get their water from a well. So [water quality] isn't an abstract question, this is really important to North Carolinians who don't have any other options for water, for drinking water," says Dr. Andrew George, the commu-



Members of ACT Against Coal Ash living near Belews Creek, including David Hairston (near right), meet to strategize how to clean up the coal ash near their homes. Photo courtesy of Appalachian Voices. Andrew George of the University of North Carolina takes a soil sample at a home in Goldsboro, N.C. Photo courtesy of Kick Coal Ash Out of Wayne County

nity engagement research associate at the Institute for the Environment. During the initial phase of the project, the group distributed surveys and collected water samples from homes in Walnut Cove and Goldsboro, N.C., both located near coal ash ponds. But they hope to broaden their research and help more people.

"We are starting in specific areas because the communities approached us. Those were the communities that had greatest concern," says Dr. Rebecca Fry, a biologist and toxicologist in UNC's Department of Environmental Sciences and Engineering, whose research focuses on the health effects from exposure to heavy metals.

"This study is really about helping people to have access to testing their water samples, helping them interpret the results from the inorganic assessment that we're doing," she says. "We're looking at a whole panel of metals, a whole panel of inorganics, and helping them interpret what the results mean."

For communities that received official "do not drink" letters but were later told their water was safe to drink, getting facts they understand and trust can be a relief.

"We're an independent, third-party research team, and now that we've gotten these results out there, that help

were concerned about the safety of their gardens.

The team is beginning to receive results for the 40 homes sampled in Walnut Cove and nearly 20 houses sampled in Goldsboro. When results are returned to the residents, the UNC team provides them with information about any heavy metals that were found in their water, suggests what — if anything — needs to be done to make the water safe, and answers any questions the residents might have.

"For many of these metals, the most important thing for the homeowner is to know whether or not they're present and at what levels," says Fry. "That's what we're aiming to help with."

For communities living near the state's coal ash ponds, having a non-partisan group of scientists provide facts about the quality of their drinking water can provide peace of mind, but it's only one piece of the complex health puzzle they're dealing with.

But for Hairston, even the impact of small amounts of contaminants need to be taken seriously.

"People consuming it with their water, out of their garden food and breathing it through the air, over a 40-year period of time, it takes a toll on your health," he says. ♦

TVA Ordered to Clean Up Gallatin Coal Ash

On Aug. 4, a federal judge ordered the Tennessee Valley Authority to excavate the coal ash stored at its coal-fired Gallatin Fossil Plant in Gallatin, Tenn., and move it to a lined landfill. The ash currently sits in unlined impoundments above porous karst limestone.

The ruling came as a result of a Clean Water Act lawsuit filed by the Tennessee Scenic Rivers Association, represented by the Southern Environmental Law Center, and co-plaintiff Tennessee Clean Water Network. At press time, the TVA had not announced whether it would appeal the decision.

N.C. Water Filtration Standards Set

After the February 2014 disaster at Duke Energy's power plant in Eden, N.C., that resulted in 39,000 tons of coal ash spilled into the Dan River, state regulators passed the Coal Ash Management Act. The rule, together with a 2016 revision, mandates that Duke Energy provide access to clean drinking water to every household that is reliant on well water within one-half mile of a coal ash impoundment pond. Many affected communities, however, such as Walnut Cove, lie outside this half-mile radius.

To meet this requirement, Duke

can either connect households to municipal water or provide wells with a filtration system capable of removing any unsafe contaminants.

In July 2017, the N.C. Department of Environmental Quality issued performance standards for these filtrations systems. But the standards do not require testing specifically for hexavalent chromium, one of the carcinogenic heavy metals found in the well water of nearly 200 homes that received "Do Not Drink" letters from the state's Department of Health and Human Services in 2015. Instead,

they allow for all types of chromium at levels significantly higher than that recommended by scientists at DHHS.

The allowable level of vanadium, another carcinogen identified in well-water samples, is under review.

While running for governor, Roy Cooper criticized then-Gov. Pat McCrory for overturning the health department's 2015 standard of no more than 0.07 parts per billion of hexavalent chromium and replacing it with the far less protective standard of 10 parts per billion of total chromium when the administration rescinded

the "Do Not Drink" letters.

After the Cooper administration adopted the same standard, which is 140 times higher than state scientists recommended in 2015, McCrory was quick to note the hypocrisy.

According to a review of DHHS emails by the Winston-Salem Journal, the more lenient standard allows for "a lifetime cancer risk that runs between 1 in 7,000 at best and 1 in 700 at worst." The stricter standards represent a 1 in a million chance of developing cancer for an individual with a lifetime of exposure.

Virginia and North Carolina Vow Climate Action As U.S. Withdraws from Paris Agreement

By Zach Kopkin

On June 1, 2017, President Trump announced his intent to withdraw the United States from the Paris climate accord signed by 194 other countries.

In 2015, after six years of negotiation, President Obama signed onto the agreement, a non-binding treaty in which every country submitted its own plan to reduce its greenhouse gas emissions in order to avoid catastrophic increases in global temperatures. The accord's formal withdrawal process takes four years to complete.

According to The Independent, a majority of people in all 50 states support the Paris climate accord.

As of mid-July, 13 states, including Virginia, had officially joined the

U.S. Climate Alliance, and 359 mayors, representing over 66 million Americans and every Appalachian state except West Virginia, had joined the Mayors National Climate Action Agenda. Both groups pledge to meet the nation's previous Paris climate accord goals of reducing greenhouse gas emissions by 26 percent from 2005 levels.

The governors of North Carolina and Virginia have each signed the "We Are Still In" letter, agreeing "to provide the leadership necessary to meet our Paris commitment."

In May, Virginia Gov. Terry McAuliffe issued Executive Directive 11 instructing the state environmental agency to regulate carbon emissions from existing power plants through a carbon cap-and-

trade program. Like the Obama administration's now-defunct Clean Power Plan, this program would set a limit on carbon emissions and create a financial incentive for power companies to find cleaner ways to produce energy.

But McAuliffe supports two proposed natural gas pipelines that would cut through the state. Methane leakage from the Atlantic Coast and Mountain Valley pipelines would lead to as much greenhouse gas pollution as 45 coal-fired power plants, according to an analysis by Oil Change International, an organization that exposes the costs of fossil fuels.

In North Carolina, Jill Lucas from the Division of Air Quality states that the agency's work has been uninterrupted by the federal government's announce-

ment. She noted that between 2005 and 2014, total carbon dioxide emissions statewide have decreased by 18 percent. Lucas stated that DAQ will further reduce North Carolina's carbon footprint by remediating excess nitrous oxide emissions. The remediation will be funded by a projected \$92 million settlement with Volkswagen for the company's Clean Air Act emissions violations.

In July, N.C. Gov. Roy Cooper announced his opposition to offshore drilling and seismic testing for oil in state waters. Cooper also signed Executive Order 11 and House Bill 589, which aim to expand the state's wind and solar power industries, respectively. He has not yet taken a stance regarding natural gas pipelines.

Problems Persist for Rover and Mariner East 2 Pipelines During Construction

By Meredith Abercrombie

The Rover and the Mariner East 2 natural gas pipelines are facing multiple setbacks, as state governments halt construction because of permit violations and harm to surrounding ecosystems.

The Rover Pipeline is set to run through West Virginia, Ohio and Michigan, while the Mariner East 2 would run through Pennsylvania, West Virginia and Ohio.

On July 17, the West Virginia Department of Environmental Protection gave Energy Transfer Partners LP, the group constructing the Rover Pipeline, a cease-and-desist order in response to reports of sediment runoff into nearby streams along the pipeline route that violate state water quality standards.

This is not the first issue that the

Rover Pipeline has faced. On July 7, the Ohio Environmental Protection Agency released orders concerning waste that contained diesel fuel released from construction sites. Additionally, thousands of gallons of drill sludge have been released in wetlands and near waterways in Ohio.

Work on the Mariner East 2 pipeline in Pennsylvania has also been postponed, as a state judge ordered a two-week hold on construction due to multiple instances of water contamination. This pipeline is overseen by Sunoco Pipeline, which recently merged with ETP.

Most recently, two legislators wrote the Federal Energy Regulatory Commission asking that they take a deeper look into ETP and their pipelines, including the Rover and Mariner East 2.

RECLAIM Act Passes House Committee

By Molly Moore

A bipartisan bill to accelerate the reclamation of abandoned coal mines while boosting economic development is moving through Congress despite objections from the National Mining Association.

On June 27, the House Natural Resources Committee passed the RECLAIM Act, which was introduced by Rep. Hal Rogers (R-Ky.) to revitalize coal mining communities. The legislation would direct \$1 billion over five years to restoring abandoned mine lands.

Committee members also approved an amendment put forward by Rep. Don Beyer (D-Va.) to require projects that receive funding under the bill to spur local economic development. Proponents of the bill, including Appalachian Voices, the publisher of this newspaper, hailed the amendment as an improvement to an earlier version.

Before the committee vote, the National Mining Association announced its opposition to the RECLAIM Act in a letter to lawmakers.

"At the very last minute, lobbyists for the coal industry decided to try to kill the bill," says Appalachian Voices Senior Legislative Representative Thom Kay. "Fortunately, representatives worked across party lines to not only pass the legislation through committee, but to improve it along the way."

As of early August, the RECLAIM Act had 25 co-sponsors in the House and five in the Senate. Advocates have said they hope the bill will reach the floor for a vote in fall 2017.

"A vote in favor of the RECLAIM Act is a vote to rescue coal country – and it's the right thing to do," Rep. Rogers said in a statement.

Learn more at appvoices.org/reclaim-committee

Opposition to Potential Nuclear Reactors in Tennessee

By Rachel Pressley

The Tennessee Valley Authority is seeking an early site permit from the Nuclear Regulatory Commission to allow two or more small modular nuclear reactors to eventually be installed at its 1,200-acre Clinch River site in Roane County, Tenn.

This type of nuclear power plant is an experimental structure that produces 50 to 300 megawatts in total power, roughly one-third the power of traditional nuclear power plants.

At a required public meeting on May 15 in Oak Ridge, seven commenters were in favor of the plan and five were opposed. The draft environmental impact statement is expected to be released in June 2018 prior to another comment period.

The Tennessee Valley Authority suggests that small modular reactors allow

for improved safety, lower costs and reduced construction time.

Several green groups petitioned the U.S. Nuclear Regulatory Commission with concerns about the potential reactors. On June 12, the Blue Ridge Environmental Defense League argued that the proposal would violate the National Environmental Policy Act and that the reactors would increase the risk for hydrogen explosions. The groups argued that renewables are a better investment.

The Southern Alliance for Clean Energy and the Tennessee Environmental Council also filed a petition. Dianne Curran, the attorney for both groups, argued that the plant would be dangerous and costly. With a smaller emergency planning zone than is normally required, state and local governments would not be able to prepare for an emergency properly.

NC Passes Controversial Solar and Wind Law

By KaLeigh Underwood

A new North Carolina law and executive order, which is being marketed by the governor's office as a commitment to the state's thriving solar and wind industries, is also being criticized by many advocates of renewable energy.

State Representative Tim Moore told news source Agri-Pulse that the law aims to protect ratepayers and modernize the state's energy grid with a pro-growth approach. Citing the state's large solar presence, Duke En-

ergy pushed to allow for competitive bidding among solar developers.

The law also "opens the door for Duke Energy to attack net metering for rooftop solar customers," Rita Leadem, assistant director of NC WARN, told Public News Service NC. Net metering allows solar customers to get credit for the surplus electricity they produce and add to the power grid for others to use.

The law contains an 18-month moratorium on issuing permits for wind energy. In signing the bill, Cooper also issued an executive order directing the state to expedite pre-application review and recruit future wind projects.

Repeal of EPA Methane Rule Denied in Court

Environmental groups celebrated a win in early July as the District of Columbia's U.S. Court of Appeals denied the U.S. Environmental Protection Agency's efforts to suspend an Obama-era methane leak rule.

The 2016 rule required companies to report and repair methane leaks. This would reduce the amount of heat-trapping gas being released into the atmosphere and accelerating global warming.

The court stated that the EPA still has a right to reconsider the regulations but did not agree with the agency's proposed two-year suspension of the rule prior to a review.

Earlier this year, Congress voted on whether to repeal the methane leak rules. The House approved the measure, but it failed in the Senate. — Meredith Abercrombie

Newsbites

Jobs in Solar Outnumber Coal in VA

A report from Virginia Public Radio says that in 2016 the number of solar jobs in the commonwealth was higher than the number of coal jobs, with 3,236 and 2,866 jobs respectively. The Virginia Department of Mines, Minerals and Energy reports that there was a 40 percent drop in coal employment over the past five years, while the Solar Foundation reports that the jobs in solar have risen by about 65 percent in the past year.

Duke Withdraws Chemical Plan

Duke Energy withdrew its request to add more chemical compounds in multiple coal-fired plants that would cause an increase in contamination and threaten drinking water in Charlotte, N.C. The chemical compounds were intended to reduce the amount of air pollution from the plants. In 2014, bromides in the drinking water from a separate chemical used by Duke Energy caused community concerns, the Charlotte Observer reports.

Third Coal Ash Recycling Site Announced in NC

On June 30, Duke Energy met a state deadline by announcing plans to construct a coal ash recycling plant at its Cape Fear coal-fired power plant in Moncure, N.C. The utility also plans to construct similar plants at its Buck Steam Station in Salisbury and H.F. Lee Plant in Goldsboro.

Coal ash is a toxic byproduct of burning coal for electricity. When processed and reused to make concrete, its toxic properties are minimized, according to the U.S. Environmental Protection Agency.

An amendment to the N.C. Coal Ash Management Act passed last year requires Duke Energy to recycle coal ash at at least three of its storage sites. Legislation considered by the N.C. General Assembly in June tried to overturn the recycling requirement, but the bill failed. — Elizabeth E. Payne

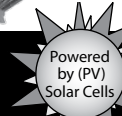


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Appalachia's Environmental Votetracker

115 TH CONGRESS: Below are recent congressional bills and amendments on environmental issues and how central and southern Appalachian representatives voted. To see other recent votes, or for congressional representatives outside of the five-state area, visit congress.gov . ● = pro-environment vote ✗ = anti-environment vote ○ = no vote	Kentucky		Tennessee				North Carolina			Virginia		West Virginia				
HOUSE	T. Massie (R) KY-04	H. Rogers (R) KY-05	A. Barr (R) KY-06	P. Roe (R) TN-01	J. Duncan (R) TN-02	F. Fleischman (R) TN-03	S. Desjarlais (R) TN-04	V. Foxx (R) NC-05	P. McHenry (R) NC-10	M. Meadows (R) NC-11	T. Garrett (R) VA-05	B. Goodlatte (R) VA-06	M. Griffith (R) VA-09	D. McKinley (R) WV-01	A. Mooney (R) WV-02	E. Jenkins (R) WV-03
H.R. 2910, the Promoting Interagency Coordination for Review of Natural Gas Pipelines Act, would give more deference to the Federal Energy Regulatory Commission in the pipeline permitting process and limit other agencies. 248 AYES 179 NOES 6 NV PASSED	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
H.R. 806, the Ozone Standards Implementation Act, would delay the implementation of ozone standards enacted in 2015 and prohibit the EPA from reviewing ozone until 2025, among other measures. 229 AYES 199 NOES 5 NV PASSED	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗

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The Fight Against the Mountain Valley and Atlantic Coast Pipelines Continues

As federal regulators continue to rubber-stamp the dangerous, inadequate plans for the Mountain Valley and Atlantic Coast pipelines, we're continuing to fight back alongside residents and grassroots groups across Virginia, West Virginia, and North Carolina. Throughout the summer, our team has been driving turnout to state water quality permit hearings, challenging Virginia's inadequate review process, and sharing information about these un-

necessary projects far and wide.

We've collected public comments for three federal agencies and are continuing to urge residents across North Carolina and Virginia to participate in the ongoing environmental reviews in their states.

For regularly updated information on upcoming hearings, action opportunities and public comment periods, visit appvoices.org/fracking/actions and check our Events listings on Facebook.

Max Rooke served as our Virginia Grassroots Organizing Assistant this summer. Below is an excerpt of her reflections on this internship from our blog. Read more from our team at appvoices.org/frontporchblog

"The past two months have allowed me to learn skills I didn't realize were skills and hear stories from impacted landowners who I would never have met if not for this internship. ...

The most important thing I learned was how to draw people together around

a shared goal, which is the core of grassroots organizing. As I take on other challenges, I'm grateful to the wonderful Appalachian Voices team for helping me learn about how people can work together to protect their environment.

As summer ends, my time with Appalachian Voices is ending as well, but the fight against the Mountain Valley and Atlantic Coast pipelines is as hot as ever. August brings five official public hearings regarding the pipelines as well as two informal meetings, and by the

end of the month, all three relevant public comment periods will have ended. Although I'll be in Hampton Roads far from the proposed construction, we're all downstream.

Come August 14, I will be driving two hours to Dinwiddie, Va., with a jar of water from the Chowan Watershed, which the Atlantic Coast Pipeline would snake through near the Virginia-North Carolina border. That night in Dinwiddie, the Virginia Depart-

ment of Environmental Quality will hold its last public hearing regarding either pipeline's impact on water quality in the state. I will join others in speaking out against the proposed pipelines and protecting our access to clean water from the mountains to my coastal marshes."



This summer, Max Rooke, left, and Lara Mack of our Virginia team shared news and resources about the fight against proposed pipelines at events across the state.

Hello and Goodbyes

Help us in welcoming two new members to our Energy Savings team in Knoxville, Tenn!

Brianna Knisley joins as our Tennessee Outreach Coordinator, bringing her passion for rural solutions and economic and environmental equality to our work to bring energy efficiency to co-op members in the Volunteer State. Originally from Ohio, Bri has a B.A. in sustainable development from Wilmington College of Ohio.

Nina Levison joins us as our 2017-18 AmeriCorps OSMRE/VISTA associate with the Tennessee team. Nina hails from New England and holds a B.A. in environmental science and



Inset: Joe Payne. Above, from left to right: Lou Murrey, Brianna Knisley and Nina Levison.

policy from Hampshire College.

Through a partnership with the organization We Own It, we are also welcoming Joe Payne, a member-owner of Powell-Valley Electric Cooperative, as our

Cooperative Energy Democracy Fellow. Joe has an MBA from Lincoln Memorial University, has worked as an energy auditor with the Tennessee Valley Authority, and is dedicated to addressing local environmental concerns.

We would also like to bid a fond farewell to Lou Murrey, who served as our 2016-17 OSMRE/VISTA in Knoxville (and is a phenomenal photographer!). We'll very much miss her enthusiasm and unwavering passion for social justice.

Lastly, join us in saying a big THANK YOU to our amazing crop of summer interns (see our staff box on the opposite page for a list of names). Our interns add so much to our organization and we are forever grateful for their dedication and service.

The Voice team would like to issue a very special farewell to Maggie Sherwood, who first joined as our Graphic Design intern in summer 2015 and soon after became the primary designer for the publication while finishing her degree at Appalachian State University. We have greatly appreciated her design talents, positive attitude and passion for our mission. This issue is sadly her last, but we wish her much success in her new position at the University of North Carolina Charlotte!



AppalachianVoices BUSINESS LEAGUE

New & Renewing Members June - July 2017

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Making a Difference in East Tennessee

Member Spotlight Lucy and Rich Henighan

Rich and Lucy Henighan, members of Appalachian Voices since 1999, are making a difference in rural Tennessee.

After living in Southwest Virginia, they moved to Seymour, Tenn., in July 1977. They live on five acres in an old farmhouse where they raised two daughters, several dogs and now care for a small garden and orchard.

"We grow corn, tomatoes, black eyed peas, cucumbers, beans and apples," says Lucy. "We grow a lot of what we eat."

Rich and Lucy helped start the Seymour Farmer's Market in 2000 and have watched it grow from half a dozen vendors to much more. Lucy is on the board and explains that it is not just about the food — it has also proven to have a positive and lasting impact by connecting people within the community.

She has been president of The Friends of the Seymour Library for the last seven years. Each month, the group hosts a program where they share cultural aspects of the region. They also host a popular music series where musicians provide a free live concert outside of the library.

The couple are also members of Statewide Organizing for Community Empowerment, also known



as SOCM. "They focus on statewide social, economic, and environmental justice issues," says Rich.

Protecting clean air and water was a natural instinct for Lucy, as her family had always cared for the environment. "I can't imagine a time when I wasn't concerned," she says.

Rich became aware of environmental issues while growing up in the 1960s. "When we lived in Southwest Virginia, we saw the devastation of the strip mining and knew people who were active in opposing it," says Rich. "Those connections were important. I got more interested in natural history after living in a rural area."

The Henighans spend their time visiting state parks and searching for wildflowers, and try to stay away from the beaten path.

They frequent Pickett State Park on the Cumberland Plateau, near the Big South Fork River area. "There are a lot of rock houses, which are overhanging caves, and the park has the largest arches east of the Mississippi River," says Rich.

Developing a sustainable economy is crucial for the future of Appalachia, according to the Henighans.

"I'm encouraged by the number of young people of the region that have taken on the notion of protecting the history, crafts," says Rich. "And the food!" Lucy chimes in. "Building on those kinds of things are important," he adds.

When it comes to reading The Appalachian Voice, Rich likes to read natural history articles and stories about places to hike or boat where he has never been. Lucy said that reading the newspaper is encouraging and gives her a broader perspective.

The Henighans feel that Appalachia should be protected because it is unique. "There is something special about the mountains. The power of it is hard to put in words," says Rich.

"If you love nature, you don't need any other reason to protect it," he says.

NC Counties Pass Resolutions in Favor of Energy Efficiency

In June, the Buncombe County, N.C., Board of Commissioners passed a resolution encouraging its local electric provider, French Broad Electric Membership Corp., to develop a tariffed on-bill financing program that would help the co-op's members afford home energy efficiency improvements.

Our Energy Savings team has been advocating for the Pay As You Save (PAYS) model of tariffed on-bill financing in Western North Carolina and East Tennessee since 2014, with the goal of reducing energy waste and improving comfort for people living in the many older and inefficient homes in our region.

Buncombe County follows Mitchell and Yancey counties in passing resolutions to support the co-op's



Buncombe County Board of Commissioners

development of this innovative program. If implemented, the program stands to help thousands of French Broad EMC members pay their energy bills and afford improvements to their homes that may otherwise be difficult to finance.

To learn more or get involved in our energy efficiency campaign, visit appvoices.org/energysavings

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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This detail from "Grasshopper Among the Mushrooms" by Linda Sipress Goodwin was captured in Cades Cove, Tenn., within the Great Smoky Mountains National Park. The image was a finalist in the Flora and Fauna category of the 14th Annual Appalachian Mountain Photography Competition. Submissions for the 15th annual competition are due by 5 p.m. on Nov. 17, 2017. Visit appmntnphotocomp.org for details.

20

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Photo by Kent Mason

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