

FREE

# The Appalachian VOICE

June/July 2018



## Remarkable Pollinators

Often tiny in size, these bees, birds, butterflies, moths and more play an enormous role in nature

.....  
Keeping Bees • Hazards of Herbicides  
Make Your Yard a Pollinator Paradise

### ALSO INSIDE



Adventures at Hidden Rocks



The Cost of Coal Cleanup



Pipeline Resistance Grows



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## A note from our executive director

In late May, a Virginian named Fern set up camp on a tree platform to block construction of the Mountain Valley Pipeline. This came after the U.S. Forest Service barred another tree-sitting pipeline protester's access to food, water and medical care, and a judge imposed fines on two women who established a treetop camp in their own backyard, forcing them down.

By supporting the profiteering aims of a private fracked-gas pipeline company and monopoly utilities over the clear will of the people, the government agencies abetting these projects are standing on the wrong side of history.

The movement to stop the Mountain Valley and Atlantic Coast pipelines has vast, and increasingly broad, backing across geographic and ideological divides. Legal challenges to both projects have traction, and a growing bipartisan chorus of state legislators and local officials is

sounding the alarm.

The governors of North Carolina, Virginia and West Virginia should join Virginia Sen. Tim Kaine and U.S. representatives from both parties in calling for federal regulators to reconsider the improperly approved projects. And they should halt construction while this vital assessment takes place.

States also have the authority — and responsibility — to protect their own waters. Unfortunately, Virginia and West Virginia have so far deferred to the federal government's improper use of a one-size-fits-all water quality permit without scrutinizing any of the numerous pipeline water crossings — many on very steep, erosion-prone slopes.

These states owe it to their citizens to conduct a rigorous state reviews of the pipelines' effects on water quality. In fact, Virginia Gov.

Northam promised a stream-by-stream review of water crossings on the campaign trail last year, which the state has failed to deliver.

Residents along both pipeline routes are documenting violations and testing water quality, providing more evidence that these projects cannot be built without putting people, water and ecosystems at risk. It's time for state leaders to act.

For a just future,

*Tom*

Tom Cormons, Executive Director

*P.S. Our April/May issue focused on natural gas fracking, frack waste, pipelines, and proposed petrochemical plants and gas storage hubs. We're grateful to the extraordinary volunteers who helped boost our distribution of that special issue across the region from 65,500 to 72,500 copies. Read it online at [appvoices.org/thevoice/gas-issue](http://appvoices.org/thevoice/gas-issue)*

## GET INVOLVED environmental & cultural events

### Star Party

June 15, 8-10 p.m.: The Nature Foundation and Charlottesville Astronomical Society host a stargazing party with high-powered telescopes. Bring chairs and binoculars. Refreshments available. \$8/members, \$10/non-members. Roseland, Va. Visit: [tnwf.org](http://tnwf.org) or call (434)-325-8169.

### Home Energy Block Party

June 16, 10 a.m.-2 p.m.: Appalachian Voices hosts a block party to celebrate results of the Home Energy Makeover Contest. Enjoy activities about energy efficiency for all ages and refreshments. Free. West Jefferson, N.C. Visit: [tinyurl.com/home-energy-party](http://tinyurl.com/home-energy-party) or call (828) 262-1500.

### Bird Walk

June 16, 9-10 a.m.: Join Blackwater Falls State Park's naturalist on a one-mile walk to learn the basics of bird watching. Davis, W.Va. Visit: [tinyurl.com/wvbirdwalk](http://tinyurl.com/wvbirdwalk) or call (304)-259-5216.

### Rhododendron Festival

June 16-17, 10 a.m.-5 p.m.: Celebrate the world's largest natural rhododendron gardens with food, arts and crafts booths and music at Roan Mountain State Park. Roan Mountain, Tenn. call (423)-772-3303 or Visit: [roanmountain.com/rhododendron-festival](http://roanmountain.com/rhododendron-festival).

### Tom Butler at Grandfather

June 21, 6-8p.m.: Visit Grandfather Mountain and hear Tom Butler of the Foundation for Deep Ecology present an illustrated lecture and argument for wilderness preservation. Stop by the Appalachian Voices table! \$20 general admission. Linville, N.C. Call (828) 733-2013 or visit [grandfather.com/events](http://grandfather.com/events).

### Solar Fest

July 6-8: Join Keeper of the Mountains Foun-

ation for their fifth fully solar-powered music festival, this time at Cantrell Ultimate Rafting. There will be trips down the New River, music, educational activities and workshops. \$20-55. Fayetteville, W.Va. Call call (304)-205-0920 or visit: [tinyurl.com/solar-fest-2018](http://tinyurl.com/solar-fest-2018).

### Forest Herbs Weekend

July 6-8: Learn identification and ecology of local medicinal plants and participate in a forest farming project at Yew Mountain Center. \$50, under 13 free. Hillsboro, W.Va. Visit: [www.yewmountain.org/forest-herbs.html](http://www.yewmountain.org/forest-herbs.html) or call (304)-653-4079.

### Kill the Dam Invasive Plants

July 7, 9-1 p.m.: Join Appalachian Trail Conservancy in honoring the 50th anniversary of the National Trails System Act by removing invasive plants. Includes lunch, music and a naturalist-led walk. Free. Fontana Dam, N.C. Visit: [tinyurl.com/plant-service-day](http://tinyurl.com/plant-service-day) or call (304)-535-633.

### STAY Summer Institute

July 12-15: The Stay Together Appalachian Youth Project hosts a weekend of group activities including art, music, storytelling and political discussion to celebrate 10 years of youth organizing. Age 30 and under for full event, over age 30 welcome beginning Friday evening. \$0-150. New Market, Tenn. Visit: [bit.ly/stay10years](http://bit.ly/stay10years)

### Whippoorwill Festival

July 13-15: Learn and share earth-friendly skills and promote sustainable living with workshops, speakers, folk music, dancing, food and community. \$20-130. Beattyville, Ky. Call (703)-994-2786 or visit [whippoorwillfest.com](http://whippoorwillfest.com)

### Floyd Energy Fest

July 14, 10 a.m.-5 p.m.: SustainFloyd and Apple

See more at [appvoices.org/calendar](http://appvoices.org/calendar)

Ridge Farm host the second Floyd Energy Fest at Chantilly Farm, featuring energy-related activities, speakers and vendors. \$5-10. Floyd, Va. Visit: [chantillyfarm.com/wp/event/floyd-energy-fest](http://chantillyfarm.com/wp/event/floyd-energy-fest) or call (540)-353-5898.

### Canoe the Big Sandy

July 21, 11a.m.-4 p.m.: Learn about John's Creek in the Big Sandy through a natural and historical interpretive canoe trip. \$25. Advanced registration only. Prestonsburg, Ky. Visit: [kentuckytourism.com/canoe-the-big-sandy](http://kentuckytourism.com/canoe-the-big-sandy) or call (606)-889-1790.

### Virginia Highlands Festival

July 27-Aug. 5: Enjoy 10 days of arts, music, food and fun. There will be many free daily workshops and activities, an antique market and outdoor adventures. Free, some ticketed events. Abingdon, Va. Visit: [vahighlandsfestival.org](http://vahighlandsfestival.org) or call (276) 623-5266.

### Energy Summit 2018

July 30-Aug. 1: Appalachian State University hosts current and future leaders of energy policies and practices to discuss the theme, Leadership for Good. \$. Boone, N.C. Visit: [sustain.appstate.edu/initiatives/energy-summit/2018](http://sustain.appstate.edu/initiatives/energy-summit/2018) or call (828)-262-2659.

### Southeastern Permaculture Gathering

Aug. 3-5: Celebrate nature and community by learning permaculture skills at the 25th annual gathering. There will be work-trade, camping, food and workshops. \$5-130. Burnsville, N.C. Visit: [southeasternpermaculture.org](http://southeasternpermaculture.org)

# Across Appalachia

## Conservation Groups Purchase Land in Western North Carolina

This spring, two land trust groups purchased a total of 190 acres of unprotected land, waterways and habitats in North Carolina.

The Southern Appalachian Highlands Conservancy, which protects over 71,000 acres of North Carolina and Tennessee, added areas in Buncombe and Henderson counties along the Eastern Continental Divide in April. The new properties include 155 acres of thriving forest at Strawberry Gap and 15 acres of rocky bluff at Stony Point.

"We are proud to have purchased this previously unprotected portion of the landscape around Hickory Nut Gap, which is a visible landmark to so many people from various vantage points," said Carl Silverstein, the conservancy's

executive director, in a blog post.

The purchase was funded by the nonprofit organization Conservation Trust for North Carolina and conservation supporters Fred and Alice Stanback.

With support from the Foothills Conservancy, a land trust group based in Morganton, N.C., the Tuttle Forest Foundation purchased 20 acres of land in Caldwell County that adjoins with the 288-acre Tuttle Educational State Forest.

Tuttle Forest Foundation, a nonprofit educational organization, worked to secure this tract of land for 20 years to expand their free, public outdoor education efforts at Tuttle Educational State Forest. — *By Shelby Jones*

## Managing GenX Contamination

On May 17, North Carolina House Democrats and House and Senate Republicans filed separate legislation to address the emerging contaminant GenX. The proposals differ in funding allocated to the N.C. Department of Environmental Quality.

House Bill 968 offers the NCDEQ over \$14 million, while Senate Bill 724 proposes more than \$1.3 million for the agency. Both bills would address the department's permitting backlogs.

GenX is a fluorinated chemical compound used by companies like Chemours (a subsidiary of DuPont) to manufacture products such as food packaging, cleaning products, GoreTex fabric and non-stick pans.

On May 9, the Cape Fear Public Utility Authority Board approved new water treatment methods for its Sweeney plant in Wilmington, N.C., to prevent chemicals

like the potentially cancer-causing GenX from infiltrating municipal water supplies.

Upgrading the plant to the new granular activated carbon treatment system would take about two years and require customers to pay a 7 percent increase in total water and sewer bills — costs that the utility hopes to recoup through litigation against Chemours, the manufacturing plant tied to GenX contamination around Wilmington.

Between August 2011 and February 2018, similar filters were installed at drinking water wells in West Virginia and Ohio near a Chemours facility; sampling has shown the filters to be effective at removing GenX-related chemicals from the water. In April, the U.S. Environmental Protection Agency announced that the compound was found in wells near the Petersburg, W.Va., Chemours facility. — *By Hannah Gillespie*

## Lawsuit Challenges Logging Sale in Cherokee National Forest

Conservation groups filed suit against the U.S. Forest Service on March 15 for allegedly allowing unlawful, high-impact logging in Polk County, Tenn., along Tumbling Creek in the Ocoee Ranger District of the Cherokee National Forest.

The filing groups — the regional Heartwood organization, Sierra Club Tennessee Chapter and Tennessee

Heartwood — are represented by the Southern Environmental Law Center, a nonprofit law firm. The groups are concerned with the Dinkey Sale, which would allow logging on 534 acres.

The three conservation groups expressed concern over potential irreparable damages to native wildlife and water quality at Tumbling Creek, which they described as one of the healthiest

streams and watersheds in the area. A logging project on the steep slopes of Tumbling Creek would increase the risk of soil erosion and runoff.

"The public came forward and said, 'We don't want to see these kinds of erosion problems on our lands ever again,' but the agency simply refuses to learn from its mistakes. They are sweeping literal dirt under the rug," said staff at-

torney Sam Evans of the Southern Environmental Law Center in a press release.

Four other conservation groups — Cherokee Forest Voices, Mountain-True, The Wilderness Society and Wild South — shared similar concerns with the agency.

The Cherokee National Forest public affairs office declined to comment due to current litigation. — *By Shelby Jones*

## Health Improves in Allegheny County, Pa., After Shenango Coke Plant Closes

On May 8, the DTE Energy-owned Shenango Coke Works facility on Pennsylvania's Neville Island was demolished. The Pittsburgh-area plant, which baked coal to produce coke for steel-making for 54 years, was closed in January 2016 following years of com-

munity protest and multiple air and water violations.

The plant, which was named one of Allegheny County's largest polluters, paid more than \$2 million in penalties for pollution violations between 1980 and 2012.

An Allegheny County Health Department study presented in March found a reduction in certain emergency room visits in the year following the plant's closure. Visits for asthma and chronic obstructive pulmonary disease dropped 37.9 percent, and 26.5 percent for cardiovascular diseases including heart attacks and strokes.

The study also found an 11 percent decrease in airborne particulate matter in the year following the plant's closure, as well as a 37 percent decrease

in benzene and a "modest decrease" in hydrogen sulfide. However, the health department did not feel comfortable attributing the drop in ER visits to the changes in air quality alone.

Members of the community group Allegheny County Clean Air Now are working to convince DTE to open a solar facility on the former coke works site. — *By Hannah Gillespie*



**About the Cover**  
A bee prepares to pollinate an azalea flower in the Cedar Mountain, N.C., backyard of photographer Rob Travis. View more of his work at [robtravis.com](http://robtravis.com). Inset photos courtesy of Virginia-TraillGuide.com, Kevin Ridder and Appalachians Against Pipelines

**Recently released**  
**Madam's Creek** by Betsy Reeder  
is a historical novel, set in the Civil War era, that tells a poignant tale of hardship and redemption while celebrating Appalachian culture and the familiar beauty of the New River landscape.

For more detail, see **BetsyReederWriter.com**.

Copies are available as paperback or e-book from Amazon, Barnes & Noble, and from Canterbury House Publishing.



## Summit Stresses Sustainability in Climbing

In April, the Access Fund, a national nonprofit advocacy group that promotes climbing and conservation, held a summit and workshop on sustainable climbing management at Breaks Interstate Park along the border of Virginia and Kentucky.

The two-day workshop was centered on how rock climbing is growing in the Appalachian region and how climbers and land managers can work together to ensure that the sport has a positive environmental and economic impact.

Nearly 50 climbing advocates, representatives from local climbing organizations and universities, local community leaders and land managers attended from across the East Coast. Through round-room discussions, presentations and demonstrations, attendees explored the upsides and challenges of managing climbing, including wildlife and cliff ecology, fixed anchor replacement, stewardship, trails and a host of other topics.

Brian G. Clark of Eastern Kentucky University presented the results of eco-

nomics impact surveys conducted in the Red River Gorge in Kentucky and Chattanooga, Tenn., which show that regions in Appalachia with public access to world-class climbing can see substantial local economic benefits. A similar study is underway at the New River Gorge in West Virginia.

Breaks Interstate Park Superintendent Austin Bradley told attendees he was excited to see increasing visitation from climbers, whitewater paddlers and other outdoor recreation enthusiasts. Zachary Lesh-Huie with the Access Fund discussed how economic benefits from outdoor recreation at Breaks could boost local business income and park visitation alike.

Visitors to Breaks Interstate Park can experience one of the deepest river gorges in the East, world-class kayaking, and a variety of park amenities and activities. Climbers are treated to high-quality, interesting southern sandstone with a number of easily accessible route-climbing opportunities.

Workshops and summits such as this one aim to ensure that as climbing visitation increases, measures to mitigate impacts and to sustainably develop new and exciting climbing routes are established. To learn more about sustainable climbing management, visit [accessfund.org](http://accessfund.org) — *By Aaron Parlier*



Attendees hang from Prospector's Roof for a group photo during the two-day Access Fund climbing summit. Photo by Zachary Lesh-Huie

## Study Connects Acid Rain to Global Temperature

Joe Carrara, a biology Ph.D. candidate at West Virginia University, has found a way to improve climate change predictions using Appalachian forests.

To do this, Carrara studied the impact of increased levels of acid rain — caused when pollution mixes with atmospheric water — on forest ecosystems at the Fernow Experimental Forest in Parsons, W.Va. Due to its long history of coal-fired power plants, West Virginia has experienced some of the highest rates of acid rain in the United States.

Carrara found that increased acid rain causes decreased decomposition of carbon in the soil, which ultimately affects the rate that carbon dioxide is

returned to the atmosphere.

“Any small change in the rate at which carbon dioxide is released back into the atmosphere from soil can have huge impacts on atmospheric carbon levels, and ultimately the temperature of the Earth,” Carrara wrote in an email.

Carrara states that if atmospheric carbon dioxide levels increase, the temperature of the Earth also increases.

Increased carbon dioxide is also an issue for lakes and rivers. A study published in January showed a link between high concentrations of the gas in the atmosphere and the rapid acidification of freshwater lakes. — *By Hannah Gillespie*

## Fifth Grader Spurs Change at WCU

In North Carolina, Cullowhee Valley School fifth grader Liam Tormey made an impression on judges and Western Carolina University officials at February's Western Regional Science and Engineering Fair. Tormey's testing of the Tuckasegee River revealed that rainfall had resulted in sediment coming from WCU property into the river. Sediment affects water quality and is a danger to wildlife in and around the river.

This discovery prompted WCU Chief

Sustainability Officer Lauren Bishop to reinforce stormwater runoff prevention and provide more buffers to avoid harmful sediment pollution in the future. — *By Sara Crouch*

## New Public Lands Open in Northeast Kentucky

On April 12, the Kentucky Department of Fish and Wildlife opened 323 acres for public use in Lewis County. The land, known as Old Trace Creek Wildlife Management Area, surrounds a stream that the agency is currently restoring.

The agency's Stream Team Program purchased the private property and plans to restore it back to its original flow, contour and meander, according to Nathan Gregory, Northeast Region coordinator for the Kentucky Department of Fish and Wildlife Resources.

The area is open to hunting, fishing, hiking and wildlife observing, but does not allow high-impact uses such as ATVs or horseback riding. The dense upland hardwood forests provide habitat for species like turkey, squirrel, deer, rabbit and grouse.

Access to the area is free, but proper licenses and certifications are required for hunting or fishing on the property. — *By Shelby Jones*

MACED seeks a communications coordinator who will enhance MACED's impact by capturing and sharing MACED's work and mission.

This position will be based in MACED's Berea, Ky., office.

Visit [www.maced.org](http://www.maced.org) for details. EOE.

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# Hiking the Highlands

## Adventures Await at Hidden Rocks

Breathtaking vistas for hikers and a variety of routes for climbers

By Becca Bauer

Just a 30-minute drive from Harrisonburg, Va., shaded rhododendron tunnels lead hikers and climbers to stunning sandstone cliffs, offering sweeping views of the mountains. The Hidden Rocks trail is not only a delightful hiking path, but also a great destination for climbers of all abilities.

This trail is located in the North River Ranger District of the George Washington and Jefferson National Forests and is designated for hiking only. It is appropriate for children and dogs, although during spring you may have some wet stream crossings.

The first half-mile of the trail runs through the woods just 30 feet from Hone Quarry Road. Luckily, the road is quiet and not highly trafficked so it is easy to feel as if this entire hike is deep in the woods. Eventually, the trail turns further into the forest, blossoming through rhododendron tunnels characteristic of Southern Appalachia. After a well-defined stream crossing, the trail veers left and begins to follow Rocky Run closely. After a half-mile of walking, there will be a clearly visible split in the trail.

Climbers looking for the Lower Hidden or Hidden Cracks climb-



At top, a climber rappels down the towering sandstone cliffs of Hidden Rocks, one of several climbing options. Above, the trail, offers shade and beautiful foliage. Photos courtesy of VirginiaTrailGuide.com.

ing areas should take a right and go steeply up the hill. This is also the route to an awe-inspiring view of the surrounding national forest on top of the sandstone cliffs.

After a quarter-mile of relatively steep uphill trekking, hikers will ar-

rive below Lower Hidden and Hidden Cracks cliffs. The base of the cliff is majestic with towering, slightly overhanging, blocky sandstone. Looking all the way to the top almost strains the neck; some climbing routes are as high as 80 feet!

Lower Hidden cliffs has 15 established climbing routes ranging in difficulty from easy to strenuous. The climbing grades range from 5.5 to 5.11-plus, so there is a little something here for everyone. One hundred and fifty yards uphill from Lower Hidden cliffs is the Hidden Cracks climbing area, which has 11 established routes also ranging from 5.5 to 5.11-plus. Almost all routes at both climbing areas are accessible by a top rope setup and can also be climbed traditionally.

Climbers who intend to lead climbs along the impressive and intimidating 80-foot sandstone cliffs will find a variety of traditional routes, and those who are setting up a top rope to climb will find hangers that are shared for multiple climbs. Anyone who plans to set up a top rope needs to have sufficient gear to extend over the edge as trees and the anchors are not right on the edge of the cliffs.

To access the view at the top without climbing, follow a trail on the far left side of the cliff. The path is fairly easy to find and has boulders and stairs to walk on. The shaded, flat forest above Lower Hidden cliffs is a pleasant place to hydrate, eat lunch and absorb

### HIDDEN ROCKS TRAIL

**Trail length:** 3.3 miles roundtrip  
**Difficulty:** Moderate  
**Directions:** From Interstate 81 take U.S. Route 33 W to Virginia State Route 613, make a left. Follow Virginia State Route 257 W to Hone Quarry Road and make a right. Trailhead is nearly a mile further on the right and begins on the right side of the parking lot with trail marker #511.  
**Contact:** Call North River Ranger Station at (540) 432-0187  
**Other notes:** Trail #511, yellow blaze. This is a hiking-only trail, no horses or bikes.  
**Amenities:** One mile away, Hone Quarry Campground is open year-round, \$5/night. 10 sites with vault toilets.

the peacefulness of the forest. If people are climbing, be sure to not touch or walk near ropes on top of the cliffs for the safety of the climbers and yourself.

Retrace your steps back to where the trail divided and follow the left path to a cliff called Hidden Roofs. This is a secluded place to visit after your hike to Lower Hidden and Hidden Cracks in order to extend your hike by another half-mile round trip. It also is a magnificent roof for those climbers who are looking for a more difficult traditional route — 5.13-plus — than those at Lower Hidden or Hidden Cracks. After visiting Hidden Roofs, return to the parking area on the same main trail.

In order to keep these natural places marvelous and open for all, follow some of the key Leave No Trace Principles such as picking up your trash and disposing of all waste properly, being considerate of other visitors, and leaving what you find so that others can enjoy the same small, special treasures on the trail. For more information on Leave No Trace, visit LNT.org.

Hidden Rocks is an alluring place to escape from daily life any time of the year. In the summer, take advantage of the rhododendron tunnels for needed shade from the hot sun. In the fall, it is a wonderful place for viewing leaf colors — the top of the cliffs and the trail itself will be full of color. In the winter, it is quiet and serene. During spring, this trail is full of water and life.

No matter what time of year, make sure to check with the ranger station before you camp or hike to be sure there are no restrictions.


Happy hiking and climbing! ♦



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# Environmental Protection Agency Aims to Deregulate Coal Ash

By Kevin Ridder

In April, dozens of environmental advocates and concerned citizens traveled to a hotel conference room just outside Washington, D.C., where the U.S. Environmental Protection Agency held their one and only public hearing on a major policy rollback. On the chopping block were components of the 2015 Coal Combustion Residuals Rule, which established the first federal monitoring and cleanup requirements for coal ash, the toxic byproduct of coal-fired power plants. The public comment period, typically 90 days, was halved to 45 days.

EPA Administrator Scott Pruitt stated in a press release that the proposed changes would allow states to “incorporate flexibilities into their coal ash permit programs,” and the EPA estimated that the proposed changes would save utilities up to \$100 million a year in compliance costs. But Lisa Evans, senior administrative counsel with nonprofit law firm Earthjustice, says the proposed change “follows directly the request of industry.”

A public comment submitted by Earthjustice on behalf of itself and 18 other organizations points out the most dangerous portions of the rollback, which includes allowing states — and potentially the owners of coal ash sites — to set their own “alternative” standards for groundwater contaminant levels. This could lead to states or utilities setting artificially lenient standards to avoid remediation.

Additionally, Earthjustice’s comments noted the rollback could allow coal ash ponds that don’t meet federal stability standards to remain open and would remove the requirement for plant operators to take immediate action to stop a spill, should one occur. The changes could also remove the 2015 requirement preventing coal ash storage near “drinking water aquifers, in wetlands, fault areas, seismic impact zones and unstable areas.”

Once a coal ash dump is closed, according to Earthjustice, states could allow the dump’s owner to monitor nearby groundwater for five years instead of the 30 years that the 2015 rule requires.

Staff from nonprofit organization Appalachian Voices — the publisher

of this newspaper — shared testimony from Belmont, N.C., resident Amy Brown and several others who were unable to travel to the nation’s capital on a Tuesday morning.

“With the decisions that Scott Pruitt has made or is considering making, I’m left wondering if he or anyone else at the agency knows anything about the nightmare that we have been through,” Brown’s testimony read. “Our well water was tested in February 2015 because of how close we live to these open coal ash dump pits containing cancer-causing waste. The results showed that my water wasn’t safe to drink, and it was recommended that I not use it. My family relied on bottled water for 1,097 days, until finally I was hooked up to city water last Thursday.”

The United States produces 140 million tons of coal ash every year, according to the Sierra Club, a national nonprofit environmental organization. Utilities commonly store the material on-site in dry landfills or mixed with water in massive sludge ponds that can be hundreds of acres in size. Most of these storage pits are unlined, meaning toxins like lead, arsenic and mercury could seep into groundwater.

The 2015 coal ash rule required power plant owners across the country to begin drilling wells on-site near their dumping grounds to see if groundwater was being affected. The owners



Coal ash ponds at the Tennessee Valley Authority's Gallatin Fossil Plant on the banks of the Cumberland River. A federal judge ordered TVA to move its coal ash to a lined landfill after internal TVA documents revealed decades of leaks and pollution. Photo by Nancy Pierce/Southern Environmental Law Center, Flight by Southwings

submitted their first reports this March.

After reviewing data for roughly 100 coal ash sites, the Sierra Club and partners found “unsafe levels of arsenic, cobalt, lithium and sulfate at most sites and unsafe levels of radioactivity at one in five sites,” according to a May blog post. The EPA’s rollback proposed removing the requirement for utilities to release this data to the public.

Duke Energy, the Tennessee Valley Authority, Dominion Energy and American Electric Power — owner of Appalachian Power — were among the utilities who reported groundwater contamination at on-site monitoring wells, according to the Associated Press.

The news organization reported that a general consensus among power company executives was that further

studies were needed to see if the coal ash basins are indeed the cause of the groundwater contamination and if drinking water supplies are at risk.

## Leaching into Groundwater

To close coal ash dumping grounds, utilities often prefer to employ the cheaper “cap-in-place” method — essentially leaving the coal ash where it is with an earthen cap and thin, synthetic liner on top intended to prevent rainwater from seeping in. However, coal ash contaminants can still leach into the groundwater, and some coal ash ponds sit below the groundwater table — greatly increasing the risk of contamination.

“It’s not a closed system,” Duke University professor and coal ash researcher Avner Vengosh told Blue Ridge Public Radio in March. “It’s an open system. For people living next to coal ash ponds, there is a potential of this contaminated groundwater to flow towards drinking water wells. So we have now a potential of groundwater flow. It could take decades, it could take years, it could be tomorrow when [that] contaminated groundwater would arrive in drinking water wells.”

Many environmental groups, including Appalachian Voices, advocate instead for moving the ash to dry, lined

Continued on next page

## Coal Ash

Continued from previous page

storage away from waterways, an option that is much more expensive. Another option is recycling coal ash for use in concrete — however, air pollution from reprocessing the coal ash into a suitable material is a concern for communities.

Pruitt’s proposed changes to the rule have cast uncertainty on whether there will be any future federally mandated groundwater monitoring or cleanup efforts. According to Earthjustice’s public comment on the changes, “state regulators, or even the owner and operators of the dumps themselves, EPA suggests, could certify that cleanup is not necessary.”

Lisa Evans with Earthjustice says the rollbacks are “reckless and unconscionable.”

“This is a time where the EPA should examine the current coal ash rule and strengthen it, based on the evidence that the sites are leaking and endangering nearby communities,” says Evans. “There’s no legal basis that justifies the significant rollback that Pruitt is attempting. As a result, when the final rule is issued, we will contest it in court.”

Putting states back in charge of coal ash management is dangerous, according to Frank Holleman, senior attorney with nonprofit law firm Southern Environmental Law Center. “The entire reason we have a national coal ash rule is that the state agencies failed to protect us from disasters like TVA’s Kingston spill and Duke Energy’s Dan River disaster,” said Holleman in a press release.

## Virginia

On March 30, Virginia Gov. Ralph Northam extended the state’s year-long moratorium on coal ash basin closures

until July 2019. The moratorium was intended to persuade utilities to pursue closure methods other than cap-in-place.

“This gives the state and Dominion another year to reach an agreement over how to most effectively clean up their coal ash sites,” says Sierra Club Virginia Chapter Director Kate Addleson. “But it doesn’t yet require them to do anything like clean closure, which would essentially move all the coal ash residue to lined, capped landfills far away from any of our bodies of water. The bill also gave Virginia a start on recycling coal ash with a pilot program.”

Nate Benforado, an attorney with the Southern Environmental Law Center, says while he’s “happy that there’s another delay, it does seem time to come to resolution of this issue so we can actually see progress being made.”

Benforado says that “Dominion has never shown whether cap-in-place will actually work at these sites.” Experts brought in by SELC to analyze Dominion’s own data concluded that the unlined pits are already polluting water supplies and would leak for decades if they are simply capped.

In addition to the moratorium, Virginia’s Department of Environmental Quality urged EPA Administrator Pruitt not to weaken the 2015 coal ash rule.

“Without a commitment of a federal permitting program and direct oversight by EPA, Virginia cannot support any revision to the EPA [coal ash] rule that would allow owners or operators so-called ‘flexibilities,’” the Virginia agency’s public comment reads. “Without federal backing, Virginia



The Sierra Club’s Virginia Chapter co-hosted a December 2017 rally in Richmond, Va., to tell Dominion Energy to move their coal ash out of unlined pits. Photo by Adrienne Eichner

remediate all of the state’s coal ash sites — a move that the agency said went further than the federal law.

According to TDEC spokesperson Kim Schofinski, it is unclear the extent to which a rollback of the federal coal ash rule would

believe that ‘flexibility’ simply means an excuse to pollute in the absence of adequate state programs.”

In a press release, Gov. Northam stated Virginia’s “ability to enforce these fair and strong standards will be much greater if EPA maintains its commitment to them.”

According to Benforado, it’s a good sign that Virginia wants to keep these “minimum standards” in place — but there is still a lot of work to be done. “We weren’t necessarily doing the best job enforcing the laws on the books even before these attempted rollbacks,” he says.

If the federal rule is rolled back, Benforado says, a future state administration may weaken the state’s safeguards.

## Tennessee

In 2008, coal ash gained national attention when a dike restraining more than 1 billion gallons of the toxic sludge near Tennessee Valley Authority’s Kingston Fossil Plant burst, damaging dozens of homes and clogging the Clinch and Emory rivers.

After the 2015 federal coal ash rule was passed, the Tennessee Department of Environment and Conservation ordered TVA to investigate, assess and

affect cleanup in Tennessee.

“While we do not anticipate federal law changes affecting the order or coal ash corrective action in Tennessee, which are currently subject to existing state law, it would be premature for us to speculate on the impacts of potential federal rule changes,” Schofinski wrote in an email.

After the 2009 coal ash spill, TVA began dewatering its older coal ash ponds and capping them in place, as well as storing new coal ash in dry, lined landfills instead of wet impoundments. The utility projects all wet coal ash sites will be closed by 2022.

TVA told the USA Today Network-Tennessee in March that the proposed federal rule changes “would have no immediate impact” on this process.

The old, unlined coal ash dumps at TVA’s Gallatin Fossil Plant on the banks of the Cumberland River, however, will need to meet a higher standard. In August 2017, TVA was ordered by a federal judge to move more than 13 million cubic yards of coal ash from the ponds to a lined landfill due to Clean Water Act violations. The utility appealed the decision, arguing that the cost and

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Southern Environmental Law Center Senior Attorney Frank Holleman, second from right, testifies before a U.S. Senate committee in April on why the federal Clean Water Act should continue to protect waterways from industrial groundwater pollution like coal ash. “The polluters will know that, if this pollution is left to the state agencies alone, the polluters will get off the hook,” Holleman stated. Photo by Alexa Williams/Southern Environmental Law Center

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## Coal Ash

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potential pollution from moving the ash were too great.

Cleanup of the Gallatin site — which under the 2015 federal coal ash rule was supposed to take place as soon as possible following Nov. 1, 2018 — has been pushed to Nov. 1, 2020 due to Pruitt's rollback. TVA must still complete the cleanup by the end of 2023.

## Kentucky and West Virginia

In early 2017, Kentucky put forward a plan that would have allowed utilities to self-regulate coal ash storage and disposal, with little public input. Franklin Circuit Court Judge Phillip Shepherd overturned the plan in January 2018, stating that the changes “are not supported by any rational basis or substantial evidence,” according to the Louisville Courier Journal.

Documents obtained by WFPL News in Louisville, Ky., show that utilities had months of correspondence with state officials, whereas the public got a single public hearing and standard public comment period.

The state of West Virginia has not yet adopted the federal coal ash rule, a West Virginia Department of Environmental Protection spokesperson noted. Instead, the agency regulates coal ash and monitors groundwater for the state's impoundments under a state solid waste management rule. Regardless, Lisa Evans with Earthjustice says, “the companies still have to comply with the federal requirements.”

In a public comment to the EPA, Vivian Stockman with nonprofit organization Ohio Valley Environmental Coalition lambasted the agency's proposed rollbacks.

“In West Virginia, we have seen time and again that polluters will skimp or pass on cleanup efforts when regulators look the other way,” the comment reads. “If enacted, EPA's proposal to gut cleanup requirements would mean polluters could avoid cleanup, and that would mean continuing water contamination.”

## North Carolina

In February 2014, a Duke Energy coal ash pond in Eden, N.C., spilled 39,000 tons of coal ash into the Dan River, prompting the state legislature to



As part of a settlement with citizen groups in 2014, American Electric Power paid nearly \$100,000 and agreed to bring water pollution levels from this coal ash pond in Winfield, W.Va., back within legal levels. Photo by Vivian Stockman/Ohio Valley Environmental Coalition, Flight by Southwings

pass the Coal Ash Management Act later that year to monitor the cleanup and closure of impoundments across the state.

At press time in late May, the state Department of Environmental Quality was drafting new rules that would more closely align with the federal standards. The impact of the EPA's regulatory rollback on North Carolina's revised rules is uncertain. Dave Rogers with the Sierra Club's Beyond Coal Campaign says that the DEQ's draft rules are “designed to work hand-in-hand” with Pruitt's proposed weakening of the federal coal ash regulations.

“Any weakening of the federal standards, and adoption of such weakening by North Carolina, puts communities near coal ash dumps at risk,” Rogers wrote in an email.

According to Rogers, a strict EPA coal ash rule is necessary because it provides a “strong federal backstop in case anything does change at the state level as we've seen and experienced in North Carolina.”

Appalachian Voices' North Caro-

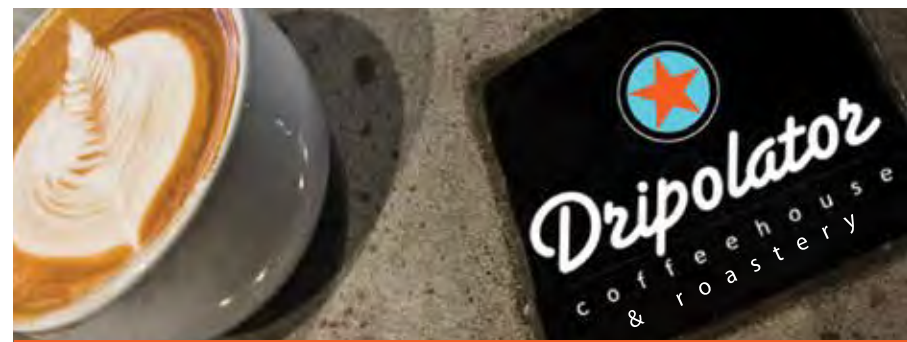
lina Field Coordinator Ridge Graham says, “Ideally, the state rules will provide DEQ the authority to protect public health and the environment and enforce their own regulations in a way that can't be manipulated by Duke Energy's political pressure.”

The DEQ is scheduled to submit the final draft to the state Environmental Management Commission in July, which will be followed by a 60-day public comment period.

Environmental advocate and Greensboro, N.C., resident Caroline Armijo questions the changes to the state and federal rules.

“Why do they need to be changed? I'm just concerned that most of our government action works in Duke's favor,” Armijo says. “We don't want the rules to be weakened in any way, because we want to clean up the community and protect our community members.” ♦

For updates on state and federal coal ash rules, visit [appvoices.org/frontporchblog](http://appvoices.org/frontporchblog)



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## This Green House

### An Innovative Biochar System

By Dave Walker

The kiln at Against the Grain Farm in Zionville, N.C., is fired, turning biomass — wood, sorghum stalks, and animal bones — into biochar, a soil amendment similar to charcoal. Hot gas is released through the process, flowing from a tube through a plant dehydrator to heat a thermal water tank. The heated water drawn from the tank passes through small irrigation tubes below rows of vegetable plant starts, heating the young plants inside the farm's passive solar greenhouse, which is designed to collect heat from the sun in the winter.

When the biochar is removed from the kiln, it isn't yet ready to be added to soil. Biochar's value as a soil amendment comes from providing a porous home for beneficial microbes. At Against the Grain Farm, the biochar is inoculated with these microbes by soaking in compost tea, a nutrient-rich liquid formed by steeping aged compost or worm castings in water. This charges the medium like a battery.

“Soil is the soul of the farm. It is the bridge of what's deeper down in the subsoil and everything that happens above — weather, climate, the solar system,” says Holly Whitesides of Against the Grain Farm. “Adding compost and making it a foundation of our farm increases our production and offsets the risk of disease, pests and weather, helping us meet expenses on our small farm.”

This combination of different technologies into one system is a result of Appalachian State University's Nexus Project. Between 2013 and 2018, Nexus brought together a team of professors and students to design the system at their site in Boone, N.C., and then shared the model with small-scale farms in the community.

Each design is unique to the farm but employs technology that can be built in local communities and is low-cost and user-friendly. The Nexus system focuses on biochar production but also has solar thermal panels to



heat water when the kiln is not in use, an efficient storage tank for the heated energy, a root-zone heating system for plants, and a dehydrator for the gas exhausted from the kiln.

Biochar is made by interrupting the decay or burning of wood or other types of biomass. By heating the source material in a chamber with limited oxygen, 50 percent of the wood or other biomass is turned into a stable carbon form that does not break down.

“It's non-biodegradable in human scale terms,” says Dan Hettinger, biochar facility manager at Living Web Farms in Mills River, N.C. “Otherwise if it rotted or was burned, it would release that carbon into the atmosphere as carbon dioxide. We are literally sequestering carbon and we have third-party verification that this process is carbon negative.”

Living Web Farms, which has been working on biochar systems for the last five years, uses the biochar on its pasture with cover crops and livestock. According to a blog post by Hettinger, Living Web Farms yields an average of 7,400 pounds of biochar each week, which could sequester 5,189 pounds of carbon. Hettinger calculated that his 60-mile, round-trip work commute emits about 290 pounds of carbon weekly, which means the farm sequesters roughly 18 times more carbon each week than is created by his commute.

At Watauga County's Against the Grain Farm and at nearby Springhouse Farm, the Nexus team worked with farmers to integrate the existing farm infrastructure into a daily system that allows them to create multiple benefits from the biochar-making process.

Both farms are highly diversified, each growing over 50 different varieties of vegetables for farmers' markets, restaurants and their farms' weekly subscription boxes. Both farms are also certified organic and focus on building the soil.

While Against the Grain Farm and Springhouse Farm are just beginning to explore the multiple uses of their new Nexus biochar systems, Springhouse Farm has already seen a 60 percent reduction in its propane use by transitioning to root zone heating from the farm's blower heater. This allows the farm to more economically establish its own plant starts during the winter while reducing its carbon footprint.

As the Nexus team continues to work with Springhouse Farm and Against the Grain Farm to incorporate the systems into everyday farm life, the team is also experimenting to find the most efficient biomass feeder stocks for biochar, according to Dr. Ok-Youn Yu, principal investigator for the Nexus Project and a professor at Appalachian State University. Animal



At left, from l-r: the biochar kiln at Against the Grain Farm; a finished 10-pound batch of biochar; and the food dehydrator at Springhouse Farm, with a rooftop solar thermal array and biochar kiln behind. Above, tubes running through the greenhouse at Springhouse Farm use excess heat from the biochar process to warm seedlings. Photos courtesy of Nexus Project/ASU.

bone, sorghum waste, wood chips, and Christmas trees are all being tested to understand how those biochar products improve soil health.

Yu says, “Nexus research on greenhouse heating systems serves community by enhancing access to fresh local produce, farmers by increasing their income throughout the year, and the local environment and economy by conserving fossil-fuel energy and expense while reducing greenhouse gas and smog emissions normally associated with greenhouse heating and transportation of non-local produce.” ♦

For more information about the Nexus system, visit [ok.tec.appstate.edu/biomass](http://ok.tec.appstate.edu/biomass). For Dan Hettinger's blogs and videos about how to make a biochar system, visit [livingwebfarms.org](http://livingwebfarms.org).



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# The Fight for Representation

By Sarah Kellogg

Springtime in Stokes County, N.C., is warm and green, with hardwood trees leafing out, fields full of flowers, and small white churches nestled among the greenery. The rural nature of the county does not seem to have changed much in the past 100 years. Horses still wander in the pastures, and folks still know their neighbors. But for one small community in the county, things are finally changing, after a decades-long fight for voting rights and clean water.

Walnut Tree is a community of 73 homes located in Stokes County on the outskirts of the town of Walnut Cove. Built in the early 1970s as affordable housing, Walnut Tree residents bought houses with the expectation that they would soon be annexed into the town of Walnut Cove. Forty-five years later, in February 2018, they finally were.

Walnut Tree is a predominantly African-American community, while Stokes County is mostly white. Mortgages for the houses of Walnut Tree were originally offered by the Farmers Home Administration, a former federal agency, as part of an effort to increase homeownership among African-Americans in the South. Although African-American residents in the area did move from renting to owning their own homes through the program, people in the Walnut Tree neighborhood soon found serious issues with the water, which was supplied by a private system.

"It smelled bad, like rotten eggs," explains David Hairston, president of the Walnut Tree Community Association and leader of the most recent fight for annexation. "It was discolored too."

Not only was the water unusable, discolored and sediment-laden, it was also expensive. Residents of Walnut Tree

paid about twice as much for their water as those within town limits. Until being annexed, Hairston, who recently became a board member of Appalachian Voices, the publisher of this newspaper, paid \$108 every two months just to keep the water in his mother's house turned on. Now he pays \$84 every two months for town water, which doesn't smell, and that cost includes trash pick-up.

The water was so bad that in 1995, the Farmers Home Administration advised that it would suspend any new loans for houses in the Walnut Tree development until there was "a dependable and acceptable source of water." To this day, many of the lots in Walnut Tree remain empty because developers would not build knowing the water quality was so poor.

Twenty years ago, Stokes County received a \$260,000 grant for a new private water system for Walnut Tree that was built and then sold by the county to the Town of Walnut Cove for a small fee. Walnut Tree was at that point connected to town water, but still residents found the water unusable and the bills exorbitantly high. Additionally, their concerns about the water and its source — was it actually coming from the town well? — were ignored by town officials.

In addition to suffering from poor water quality, residents also dealt with air quality issues caused by the neighboring coal-fired power plant, Duke Energy's Belews Creek Steam Station. Since the neighborhood was built, residents of Walnut Tree were exposed



Ada Linster, one of the first property owners in Walnut Tree, celebrating with friends after the community was officially annexed into the Town of Walnut Cove. Photo courtesy of Amanda Dodson, The Stokes News

to coal ash — the toxic by-product of burning coal — which in the '70s and '80s fell visibly on houses, cars, gardens, and, according to some residents, was even disposed of in large, uncontained piles within the neighborhood.

Disproportionately burdened by pollution and ignored by town officials for decades, the fight for annexation was not just about water, it was also a fight for representation. Without annexation into the town of Walnut Cove, Walnut Tree residents were unable to vote in local elections for the town board of commissioners and the mayor. Politically, they were powerless to change the water system, and though they petitioned the town for annexation four times, each time the proposal was voted down by the town commissioners that Walnut Tree residents could not vote for.

Ada Linster moved into her home in Walnut Tree in 1972 and has been a leader in the fight for annexation ever since. "Back then," she explains, "we wanted to be annexed so we could have clean water and have the service

that was actually promised to us. But it was also a civil rights issue, they did not want a black person on their board in Walnut Cove."

"The reason that they didn't want to annex the people in the Walnut Tree is because it is a predominantly black neighborhood," Hairston agrees, "and they didn't want the votes at the time."

Those larger civil rights issues manifested in tangible ways: in 2014, Hairston discovered that the Town of Walnut Cove had shut down Walnut Tree's playground, where Hairston himself had played as a child.

"The kids had nowhere to play!" recalls Hairston.

"Annexation would have given the children more of a say-so of what was going in our area, instead of things being taken away from us," says Linster. "They took away their playground and we couldn't even vote."

Motivated by his late mother's wishes, Hairston raised money for a new Walnut Tree playground, receiving grants from several foundations and donations from residents and businesses in Walnut Cove and the surrounding area. The new playground was completed in 2017.

"Everybody helped us get that playground," Hairston remarks, "except the Town of Walnut Cove."

For residents of Walnut Tree, the issue of annexation took on new life in 2015 when the Town of Walnut Cove approved core sample drilling to test for natural gas deposits in the Walnut Tree community. Despite the objections of Walnut Tree residents and their

*Continued on next page*

## The Fight for Representation

*Continued from previous page*

concerns about fracking, without the ability to vote, they were unable to stop the test. Of the core samples drilled around the state at the time, only the one taken from Walnut Tree showed signs of a natural gas deposit.

"That put us all on notice and we all started working as a group again," Linster recalls. "We started having meetings, and that's when everyone could see the light again, because before that we didn't have any light."

Over the decades, Walnut Tree residents watched the Town of Walnut Cove annex several other, predominantly white, subdivisions, but still in January 2017, their petition for annexation was denied by a vote of 3 to 2, with the white members of the town board of commissioners voting no. So, in September 2017, with help from the University of North Carolina Center for Civil Rights and the Raleigh-based law firm of K&L Gates, the Walnut Tree Community Association along with independent residents, including



Dave Webster and his wife, unable to drink the water in their home for the past 20 years, will no longer have to rely on bottled water thanks to the annexation. Photo by Charles Leftwich, courtesy of The Stokes News. After the Town of Walnut Cove took down the Walnut Tree playground, Walnut Tree residents rallied to build a new playground, above. Photo by Sarah Kellogg

Linster, filed suit against the Town of Walnut Cove.

Led by Hairston, the community also started organizing for the upcoming local elections.

"Before the lawsuit was settled, we started a write-in campaign," Hairston explains. "Even though we were not in the town limits we participated in the election system that year by going out and bringing people into the polls to vote that actually live in the town of Walnut Cove. We got 90 percent of the black people that live in the town limits to come out and vote, and persuaded

the good old Democratic people and some Republicans that supported us. We had three write-in candidates and all three won, including the mayor who won by about 30 votes."

Replacing the town commissioners meant Walnut Tree stood a much greater chance of annexation, and in 2018, the lawsuit was settled by consent decree, which allowed the newly elected Board of Commissioners to vote on the issue. This time, the community finally saw victory with the board unanimously voting to annex Walnut Tree into the town of Walnut Cove.

According to Linster, the path to

annexation "has been a very long journey, a journey that I think I deserved, a journey that we all deserved. This was a victory, this showed that the barrier has been broken. They finally walked in and picked up a black neighborhood, instead of a white one."

To other communities fighting for their rights, Hairston had this to say: "Come together. When you come together and you fight the fight together and you are determined not to lose, you will win. There will be setbacks, but don't ever let a setback stop you. Know that as long as you are fighting that fight, eventually you will win." ♦



## Building Art and Community While Cleaning Up Coal Ash

A public art project underway in Walnut Cove, N.C., is intended to raise awareness of the hazards posed by coal ash and to create a community gathering space. Caroline Rutledge Armijo, the project leader, is working with scientists at North Carolina Agricultural and Technical State University to encapsulate the ash in polymer and use it to sculpt large lilies for public display.

By using coal ash as a building material, The Lilies Project aims to demonstrate an alternative to storing the toxic substance in unlined impoundments like the one at Duke Energy's nearby Belews Creek Steam Station.

The lilies theme honors the late composer Jester Hairston from Belews Creek, N.C., who wrote and sang the music for the 1963 film "Lilies of the Field."

Another primary goal of the project is to build community in southeastern Stokes County. Since its January kickoff, members of The Lilies Project have participated in the Clean the Cove litter pickup day as well as ongoing efforts to clean up coal ash. Participants also held an oral history event and film screening in March, and plan to collect and share stories from community members. — By Molly Moore

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# Remarkable POLLINATORS

Of the world's more than 240,000 species of flowering plants, approximately 75 percent rely on pollinators. These crucial creatures help transfer pollen from male to female flower parts and ensure the survival of the next generation of plants — and the animals that depend on them. Pollinators include insects like bees and butterflies in addition to birds, bats and other animals.

Some of these pollinators are drawn to flowers because of the nutritional value of the pollen itself, while others are lured by nectar, resins and fragrances. As they travel from flower to flower,

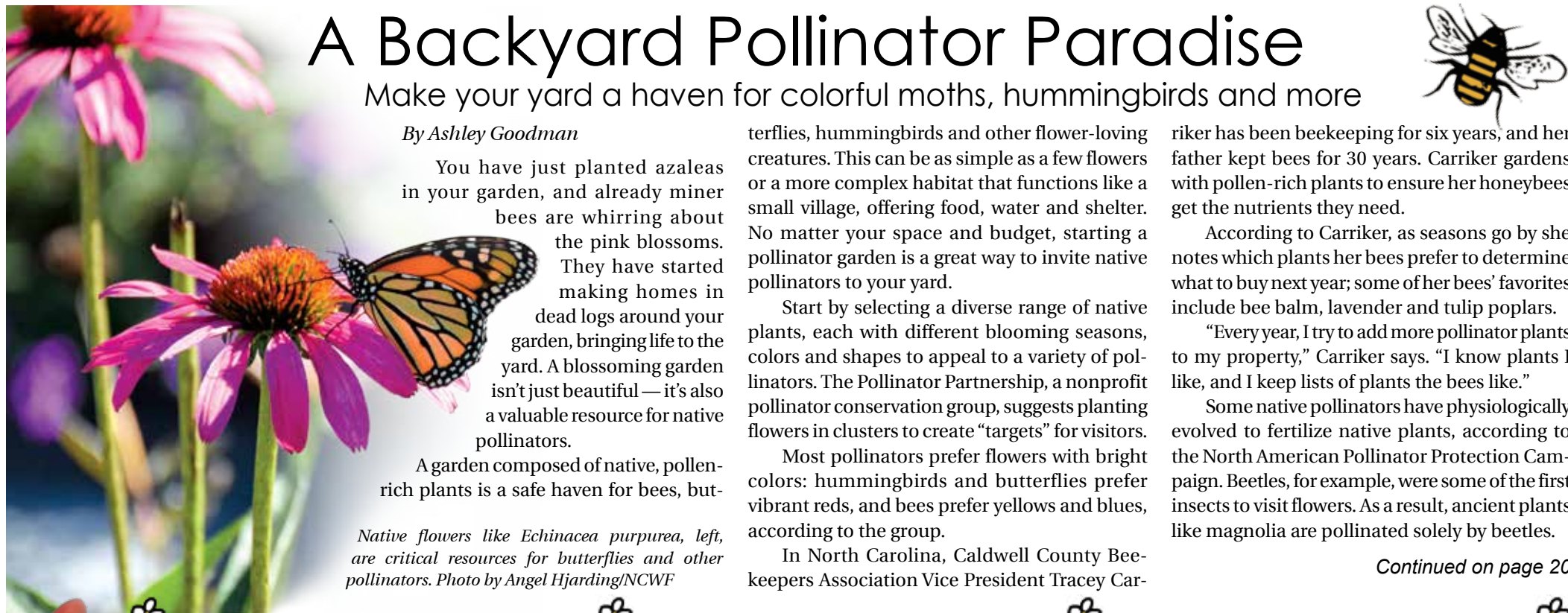
they move pollen within individual flowers and also from one plant to another. Some plants rely on a particular pollinating companion — the magnolia family, for instance, which includes the Fraser magnolia and tulip poplar, is exclusively pollinated by beetles.

But while pollinators are a vital link in the natural world, they are also increasingly at risk. There is much that science does not know about the various bees, like honeybees and bumblebees, that are managed by beekeepers for agricultural purposes. Even less is known about how native, wild insects are faring. According to a National Research Center review, for those

North American pollinators where long-term data is available, population numbers are trending “demonstrably downward.”

Yet between cultivating native flowers and eliminating herbicide and pesticide use — or at the very least, adhering to best practices for those chemicals — there are a number of ways people can assist the countless bees, bats, birds, butterflies, beetles, flies and more that keep Appalachia blooming.

On the following pages, meet some of the region's pollinator species and learn more about what residents can do — and are already doing — to help.



## A Backyard Pollinator Paradise

Make your yard a haven for colorful moths, hummingbirds and more

By Ashley Goodman

You have just planted azaleas in your garden, and already miner bees are whirring about the pink blossoms.

They have started making homes in dead logs around your garden, bringing life to the yard. A blossoming garden isn't just beautiful — it's also a valuable resource for native pollinators.

A garden composed of native, pollen-rich plants is a safe haven for bees, but-

terflies, hummingbirds and other flower-loving creatures. This can be as simple as a few flowers or a more complex habitat that functions like a small village, offering food, water and shelter. No matter your space and budget, starting a pollinator garden is a great way to invite native pollinators to your yard.

Start by selecting a diverse range of native plants, each with different blooming seasons, colors and shapes to appeal to a variety of pollinators. The Pollinator Partnership, a nonprofit pollinator conservation group, suggests planting flowers in clusters to create “targets” for visitors.

Most pollinators prefer flowers with bright colors: hummingbirds and butterflies prefer vibrant reds, and bees prefer yellows and blues, according to the group.

In North Carolina, Caldwell County Beekeepers Association Vice President Tracey Car-

riker has been beekeeping for six years, and her father kept bees for 30 years. Carriker gardens with pollen-rich plants to ensure her honeybees get the nutrients they need.

According to Carriker, as seasons go by she notes which plants her bees prefer to determine what to buy next year; some of her bees' favorites include bee balm, lavender and tulip poplars.

“Every year, I try to add more pollinator plants to my property,” Carriker says. “I know plants I like, and I keep lists of plants the bees like.”

Some native pollinators have physiologically evolved to fertilize native plants, according to the North American Pollinator Protection Campaign. Beetles, for example, were some of the first insects to visit flowers. As a result, ancient plants like magnolia are pollinated solely by beetles.

Continued on page 20

## Meet Appalachia's Pollinators

By Hannah Gillespie and Ashley Goodman

Long before Europeans brought honeybees to North America, native bees pollinated much of the continent's plants. According to the U.S. Forest Service, native bees are more efficient pollinators of native crops. This is due to their unique ability to perform buzz pollination, a process where a bee uses a rapid vibration movement to loosen pollen. This allows them to pollinate pumpkins, cherries, blueberries or cranberries, among others.

There are a variety of native bees — some nest underground, while others find or construct holes in wood and rocks. Some species of bees specialize in pollinating distinct plants.

While bees pollinate 80 percent of flowering plants, many other animals and insects help pollinate flora, from bats and birds to butterflies and even beetles.

Below are several of the extraordinary native bees, birds, bugs and butterflies who play vital roles in pollination in Appalachia.

**Conservation Sources** — The International Union for Conservation of Nature is a coalition that tracks global conservation statuses. The IUCN's Red List of Threatened Species includes: Least Concern, Near Threatened, Vulnerable, Endangered, Critically Endangered, Extinct in the Wild and Extinct. The nonprofit Xerces Society ranks at-risk pollinators as: Vulnerable, Imperiled, Critically Imperiled and Possibly Extinct.

### BIRDS, BUGS & BUTTERFLIES



#### Diana Fritillary

(*Speyeria diana*)

**RANGE:** Southern Appalachians and Ozark Mountains

**HABITAT:** The edges and openings of rich, moist mountain forests

**IDENTIFICATION:** Males' wings are black on the lower half and orange with black veins and spots on the outer half. Females' wings are black with white spots in the outer wing and blue spots on the hindwing. Underwings

are green with no spots.

**WHAT THEY POLLINATE:** Species include milkweed, ironweed and red clover

**CATERPILLAR HOST PLANTS:** Violets

**WHEN:** June through September

**FUN FACTS:** This butterfly is named after Diana, the Roman goddess of the moon and hunting, and protector of women.

The Diana fritillary is the state butterfly of Arkansas.

**CONSERVATION STATUS:** Vulnerable, Xerces Society

#### Ruby-throated Hummingbird

(*Archilochus colubris*)

**RANGE:** Throughout the United States

**HABITAT:** Primarily wooded areas and grasslands, but they also frequent colorful flower gardens

**IDENTIFICATION:** Ruby-throated hummingbirds are bright emerald or golden-green on the back and crown with gray and white underparts. Males have an iridescent red throat.

**WHAT THEY POLLINATE:** Wildflowers like cardinal flower, trumpet creeper, penstemons, bee balm and phlox

**WHEN:** March through July

**FUN FACTS:** Their wings beat over 50 times per second. Hummingbirds make nests from spider webs, grass and plant fibers, which are lined with plant down and camouflaged in dead leaves and lichen.

**CONSERVATION STATUS:** Least Vulnerable, IUCN Red List



#### Hummingbird Clearwing Moth

(*Hemaris thysbe*)

**RANGE:** Eastern United States and across Canada

**HABITAT:** Open and second-growth habitats, gardens and suburbs.

**IDENTIFICATION:** This moth has an olive green back and a reddish-brown abdomen. Its wings are clear, with a black or brown border, and are nearly invisible when they fly. Males have a flared “tail” like that of a hovering hummingbird.

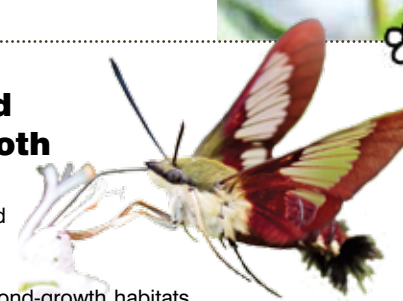
**WHAT THEY POLLINATE:** Red clover, lilac, snowberry and blueberry, among others

**CATERPILLAR HOST PLANTS:** Dwarf and coral honeysuckle, snowberry, hawthorns, cherries and plums

**WHEN:** March to October

**FUN FACTS:** These moths are easily confused for hummingbirds thanks to their thick, fuzzy bodies and ability to hover. But their antennae, clear wings and lack of a beak will give them away. The moths are 1.75 to 2.25 inches long, while hummingbirds average 3 to 5 inches long.

**CONSERVATION STATUS:** Not assessed, IUCN Red List



#### Hairy Flower Chafer Beetle

(*Trichotinus piger*)

**RANGE:** Throughout the Eastern United States

**HABITAT:** Open areas with flowers near woodlands

**IDENTIFICATION:** This beetle has a dark black or brown body with two horizontal pale stripes on each wing. Its upper thorax and abdomen are covered with dense hair which pokes out from beneath the beetle's wings and collect pollen.

**WHAT THEY POLLINATE:** Flowers include Queen Anne's lace, New Jersey tea, hydrangea, dogwood and Indian hemp, also known as hemp dogbane

**WHEN:** April through August

**FUN FACTS:** Beetles in this genus are known as bee-like flower scarabs because the pollen-collecting capability of the hair on their bodies resembles that of bees.

**CONSERVATION STATUS:** Not assessed, IUCN Red List



### BEEES

#### Blue Orchard Mason Bee

(*Osmia lignaria*)

**RANGE:** Throughout the United States

**HABITAT:** Mason bees live around forest edges and nest in holes within dead wood. They use clay to seal entrances and create partitions between eggs.

**IDENTIFICATION:** Dark metallic blue in coloring. Males are 9 to 10 millimeters, whereas females are 10 to 11 millimeters.

**WHAT THEY POLLINATE:** A wide variety of fruit trees and berry bushes, plus flowers in the rose family

**WHEN:** March through May

**FUN FACTS:** They carry pollen on their bellies, rather than their



hind legs, which makes them effective pollinators. It takes 250 to 300 female orchard mason bees to pollinate an acre of orchard. Males are stationed at the entrance to the nest to give the more productive females a better chance of surviving a predatory attack.

**CONSERVATION STATUS:** Not assessed, IUCN Red List

#### Eastern Carpenter Bee

(*Xylocopa virginica*)

**RANGE:** Eastern United States and Southern Canada

**HABITAT:** Females use their jaws to cut deep holes in thick wooden structures. The female will deposit her eggs and some pollen grains for each larvae to eat once it hatches. A male guards the entrance from other males. There are typically one or two generations per hive per year.

**IDENTIFICATION:** Both males and females have black heads, a thorax with short yellow hairs and a bald spot in the center, and an abdomen that is glossy, black and hairless.

**WHAT THEY POLLINATE:** Flowers and vegetables such as eggplants and tomatoes. This bee is a generalist, meaning it can pollinate multiple species.

**WHEN:** March to August, hibernates in winter

**FUN FACTS:** The Eastern carpenter bee performs buzz pollination and is known to steal nectar for food without pollinating the plant. These bees are solitary and do not form colonies.

**CONSERVATION STATUS:** Not assessed, IUCN Red List

#### Azalea Miner Bee

(*Andrena cornelli*)

**RANGE:** Eastern United States

**HABITAT:** In early spring, females dig holes in dry soil to store pollen and eggs and may reuse these nests. The young remain in the nest until they emerge as adult bees the next spring.



**IDENTIFICATION:** Distinguished by its dark coloring, slender body and widely spaced hairs on hind leg.

**WHAT THEY POLLINATE:** Azalea flowers and other species of rhododendron

**WHEN:** March to September, most active between April and May

**FUN FACTS:** Azalea miner bees are not aggressive, and they, along with other ground-nesting miner bees, are among the first bees to emerge in the spring

**CONSERVATION STATUS:** Not assessed, IUCN Red List

#### Rusty Patched Bumblebee

(*Bombus affinis*)

**RANGE:** Historically in the Upper Midwest and Eastern North America, their range has declined by an estimated 87 percent recently. Currently the species may be present in the Midwest, Northern Virginia and West Virginia.

**HABITAT:** Near or within woodlands. Typically resides in abandoned rodent nests located one to four feet underground.

**IDENTIFICATION:** Worker and male bees have a distinctive patch on their yellow abdomen — queens do not. All other abdomen segments are black.

**WHAT THEY POLLINATE:** Cranberry, tomato and pepper plants, among others

**WHEN:** March to October, most active May through August

**FUN FACTS:** They perform buzz pollination and typically pollinate within one kilometer of their nest.

**CONSERVATION STATUS:** Endangered Species, U.S. Fish and Wildlife Service; Critically Endangered, IUCN Red List



**Photo credits** — Diana Fritillary, Dr. Thomas G. Barnes, U.S. Fish and Wildlife Service; Ruby-throated Hummingbird, Bill Wakeham; Hummingbird Clearwing Moth, Neal Lewis, Shenandoah National Park; Drone Fly, Dimitris Barelos; Hairy Flower Chafer Beetle, Elizabeth Sellers; Blue Orchard Mason Bee, Lynette Elliot; Eastern Carpenter Bee, Rollin Coville; Azalea Miner Bee, Brian Valentine; Rusty Patched Bumblebee, Clay Bolt.





By Hannah Gillespie

Richard Reid began beekeeping in Blacksburg, Va., in 1973 when his landlord asked him to tend to a few hives on the property. To learn the practice, Reid took classes from an entomologist at Virginia Tech. Now, he owns and operates Happy Hollow Honey, which consists of 100 to 250 colonies.

However, his journey hasn't been without struggle.

In 1995, Reid gave up beekeeping for a time after parasitic varroa mites completely wiped out his bees.

"Shortly thereafter, a swarm moved in and actually lived there for 12 years without me touching them or interfering with them at all," says Reid. "So I thought the bees were doing pretty well with varroa mites. Since I always really liked [beekeeping], about 10 years ago I got back in it again. And this time, much more intensively than prior to that. So I have been expanding since 2008 and this is sort of the new phase of beekeeping for me."

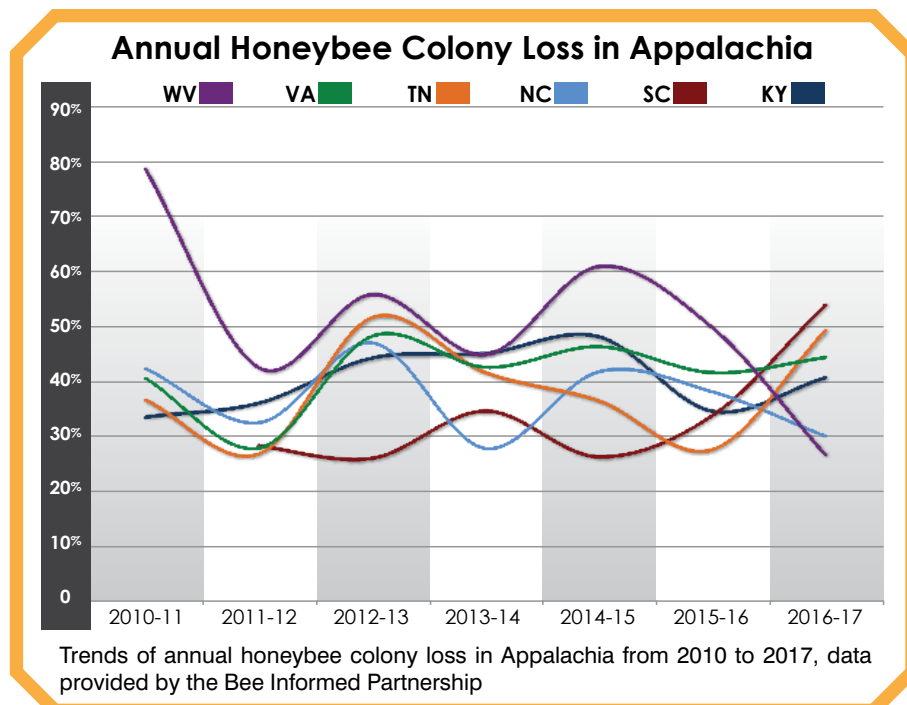
Other long-term beekeepers echo this rocky timeline, full of extreme losses and gradual recoveries. Since the late 1980s, honeybees' health has suffered due to a variety of factors, including parasites, pathogens, pesticides and poor nutrition.

According to The Bee Informed Partnership, a nonprofit public research collaboration, the number of bee colonies in the Appalachian region has been declining by roughly 25 percent each year since 2010. With recent honey bee losses and developments in treatments, the role of informed beekeepers is increasingly important. At the same time, there is a growing

demand for products from the hive, including local honey.

Charlie Parton has kept bees for nearly 40 years in Maryville, Tenn. In the past two decades, Parton has worked to expand his colonies and served two terms as the president of the Tennessee Beekeepers Association. Now, he sells honey and honeybees.

"An old beekeeper used to tell me, 'some people are bee-havers and some are bee-keepers.' And back then, you could be a bee-haver because we didn't have all the issues with mites and maybe some of the pesticides from emissions," Parton says. "So basically the bees thrived, [and] we had to do very little as far as treatments or anything like that. It was just a completely different world in beekeeping then compared to now ... unlike today where [beekeepers have] got to be on top of every new development."



### Is it Colony Collapse Disorder?

The term "colony collapse disorder" emerged in 2006 to describe the phenomenon where the majority of adult worker bees disappear from the hive.

James Wilkes operates his family-owned Faith Mountain Farm in Creston, N.C., where he sells honey and baked goods and has kept bees for 11 years. He is the CEO of Hive Tracks, a recordkeeping application for beekeepers, and is also a computer science professor at Appalachian State University.

Wilkes says that after a hive experiences collapse disorder, "usually there's brood left and a queen and a few adult bees, whereas two weeks before there was a bee population in the hive and all the pieces [were] functioning well. You know you have done everything that you normally do and still you experience loss."

In a 2012 article in the North Carolina State Beekeepers Association's publication *Bee Buzz*, N.C. State University Extension Apiculturist David Tarpy states, "When it comes to recent findings dealing with honey bee health, these reports can actually be oversimplified, where anything dealing with honey bee mortality is immediately equated with [colony collapse disorder]. This is just simply not the case!"

James Wilkes echoes the sentiment that the phrase "colony collapse disorder" is overused.

"Honey bee health is still a big issue, honey bees are still dying, but one thing that's happened is beekeepers are pretty creative," says Wilkes. "Beekeepers have responded to the losses by replacing those losses, by growing more bees, and the bee population themselves have recovered and not continued to decline. It's kind of becoming the way that you keep bees. You are intimately involved."

### Threats to the Hive

The U.S. National Agricultural Statistics Service found parasitic varroa mites to be the primary colony stressor in 2016.

According to Kentucky State Apiarist Tammy Horn Potter, the varroa mite arrived in the United States in the late 1980s. The mite lives on, feeds on and transfers viruses to the bee at every life stage. Bees are defenseless to this parasite without attentive beekeepers that use chemicals to kill the mites.

"It requires more hands-on time," says Virginia beekeeper Richard Reid. "It's good to breed from your own queens that tend to deal with mites really well and are good honey producers. You pick out the ones that have all the good traits and you breed new queens from those. It's quite easy once you get the hang of it and equipment to put them in to expand and start new colonies."

Another threat to hives comes from the small hive beetle, which usually invades around June or July. According to Horn Potter, the female beetle will lay eggs throughout the hive. When these eggs develop, they feed off the hive's pollen and honey, and then defecate, which causes the bees to abandon the hive.

The use of pesticides is another major threat to bees. According to the Xerces Society for Invertebrate Conservation, an international nonprofit organization, insecticides can be lethal and at the very least affect bees' foraging and nesting habits.

This is a more pressing problem in areas where the landscape is dominated by industrial-scale agriculture.

"In some areas, like where we are in the mountains ... we don't have any big agribusiness here, and I'm not seeing pesticide use as any kind of problem to speak of," says Reid. "Bees are sampling their whole area, many thousands of acres, and bringing little pieces of that

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## Keeping Bees

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back to their own hives."

However, Wilkes of Hive Tracks suggests that the pesticide issue can be minimized by controlling the location of bee yards. He has experience facilitating conversations with beekeepers and pesticide users.

Tammy Horn Potter advises people to consider the hours that they spray pesticides, if they cannot be avoided. Kentucky's mosquito spraying program, for instance, operates between 8 p.m. and 4 a.m. "That whole idea is to give the product time to dry before pollinators are flying," she says.

The Xerces Society also suggests limiting the application of pesticides to the target plants to prevent drift.

In addition to pesticides and parasites, sometimes honeybee troubles come from poor nutrition.

"Bees need to have pollen for protein," says Reid. "They need it for raising young, healthy bees. They also need to have nectar in order to overwinter and create honey. Some years aren't very conducive to good nutrition, when the weather is hot and rainy, so you end up with deficits that may compromise the bees' health."

### The Bee Economy

According to Horn Potter, honey bees arrived in the United States with European settlers in the 1600s.

"Throughout the 17th and 18th centuries, honey provided a sweetener and was used for its soothing quality in cough syrups," says Horn Potter. "It's also antibacterial, so it could help deal with surface wounds. Beeswax was critically important as far as waterproofing boots, coats and candles."

The practice of beekeeping as it is known today became widespread on mountain farms by the mid-20th century, according to Timothy Osment, a masters graduate from Western Carolina University.

"This whole industry of growing bees, selling bees has gone through the roof," says Wilkes. "That, coupled with [the number of] hobbyist beekeepers exploding because everybody's interested in bees, which is great."

"There's a pretty big movement on eating local and knowing where your food comes from," says Tennessee



beekeeper Charlie Parton. "We need to keep that alive and part of that is local honey."

Local honey is in high demand, according to Parton. "I can never produce enough local honey," he says. "I lost 50 percent of my bees this winter so this is a rebuilding year for me. So that means people are not going to have enough local product."

Honey's purported health benefits are also driving demand. "I have numerous people that buy honey from me," Parton says. "They'll tell me, 'My doctor told me to get some local honey to help my allergies.'"

In addition to the widespread belief that local honey can provide immunity to seasonal allergies, honey can also be used to boost energy or as a topical treatment for scalp conditions and wounds, according to a website run by Dr. Joseph Mercola, an osteopathic physician.

Horn Potter believes the Appalachian region has bee-related economic opportunities beyond honey produc-

Facing page: new beekeepers examine hives as part of the Appalachian Beekeeping Collective. Photo provided by Appalachian Headwaters. At left, honeybees feed on honey from their hive. Below, James Wilkes demonstrates how to use *HiveTracks*, a record-keeping software he created for beekeepers. Photos courtesy of James Wilkes.



tion. She pushes for expanding the queen production industry, which involves growing and selling queens, as well as getting Appalachian beeswax for cosmetics to the rest of the country.

"The cosmetics [industry] won't touch beeswax from hives in the United States because of how many chemicals can be found inside," says Horn Potter. "We continue to have to import wax from Africa for our cosmetics industry."

Proper pesticide management would lead to higher quality wax, Horn Potter says, and is essential for this industry to bloom in Appalachia.

According to Everett Oertel, former apiculturist with the U.S. Department of Agriculture, the queen-rearing market began in Massachusetts in 1861. In recent decades, developments have been made to produce hybrid and artificially inseminated bees.

With the latest colony losses, "we are always short of queens every single year," says Horn Potter. "To me, this region would produce a really good quality queen."

### A New Bee-ginning

Atop a vast open field in the mountains of West Virginia, at least 50 bee-

hive boxes mark where new beekeepers are learning the practice as part of the Appalachian Beekeeping Collective.

Appalachian Headwaters is a nonprofit organization founded in 2016 to focus on restoration of mine lands in the region. The Appalachian Beekeeping Collective was created out of this in 2017 as an economic development opportunity for southern West Virginia. The program provides supplies, support and training to low-income and displaced workers, among others.

This year, the program has worked with 35 trainees. According to Kate Asquith, director of programs at Appalachian Headwaters, they hope to add an additional 75 trainee beekeepers in 2019.

The organization is now processing and promoting the collective's honey to high-demand markets that would otherwise be inaccessible to small-scale beekeepers. This year will be the first time their honey is sold.

"By selling it out of the region and with good marketing, we hope that we're able to help people get a much larger benefit from their work," says Asquith. "The next phase of our work is starting to work with people who have skills already and helping them to expand their businesses so we really work with all sorts of beekeepers."

The honeybee's decline and inconsistent recovery shows the need for informed beekeepers is growing. Colony losses due to bee health problems can be prevented or recouped with attentive management by beekeepers.

"If you want to get into beekeeping," says Richard Reid, "join a local club, take a class and have fun." ♦

## Appalachian Bee Legends

In John Parris' "Mountain Bred," a book of Appalachian folktales and legends, he dedicates a chapter to the Appalachian folklore surrounding beekeeping. In 1967, Parris spoke with county farm agent Paul Gibson who stated that some believe "if a colony of bees swarm, you've got to get out and ring a bell or beat on a dishpan before they'll settle."

German and English colonists in the Appalachian region began a practice of "telling the bees," according to Tammy Horn Potter's book *Bees in*

America. It is believed that when a beekeeper dies, someone must tell the bees or they will leave or die. In Kentucky, this telling was done through a song.

Parris recounted a similar belief that if the beekeeper dies, the bees will die too, unless they are moved. In 1975, he verified this with Eliza Jane Bradley, a Cherokee, N.C., native who was the recent widow of a master beekeeper. "The Old Man died about 3:30 in the morning," Bradley recalled. "Right away we sent to Bryson City for the undertaker. And the very next

thing, I told one of my boys that the bees would have to be moved. He and another fellow went out — it was still dark and cold — and moved the bees. There was 23 stands. Since then I've lost but two ... Now, I know, as sure as I'm a-settin' here, if them bees hadn't of been moved there wouldn't be a one out there now. I know what I'm talkin' about."

In other Appalachian folklore, the "news bee" appears as an omen, according to history buff Dave Tabler's *Appalachian History*

website. It is said that if a yellow news bee perches on someone's finger, it is good luck. On the other hand, a black news bee signifies imminent death.

The species known as the news bee is not technically a bee but a type of fly. The yellowjacket hoverfly — *Milesia virginien-sis* — is named for its ability to hover over flowers. It is often mistaken for a hornet because of its aggressive flying and buzzing, but unlike hornets and bees, it only has two wings instead of four.



Photo by Mark Robinson



# Hazardous Spray

Residents and beekeepers work with electric cooperatives to opt out of herbicide applications

By Ashley Goodman

Residents in Claiborne and Union counties in Tennessee, were taken by surprise when strangers showed up in their yards and began spraying chemicals under their power lines in 2016 and 2017. Shortly after, crops, bees and even pets began dying — and community members began experiencing a myriad of health issues.

The strangers were subcontractors with Powell Valley Electric Cooperative, which residents allege utilized excessive herbicide spraying when clearing vegetation from its power line right-of-ways.

Herbicides can have harmful effects on people and pollinators. Glyphosate, for example, a chemical used by PVEC and found in the herbicides Roundup and Rodeo, is one of many herbicides proven to negatively impact bees' health and behavior.

In response to the public's concerns about herbicide impacts on humans and the environment, some utilities are taking steps to manage the chemicals more responsibly — and are beginning by engaging with communities.

## Chemicals and Concerns

According to its website, Powell Valley Electric Cooperative has over 3,500 miles of power lines that serve more than 31,500 member-owners in Northeast Tennessee and Southwest Virginia. Since Powell Valley is an electric cooperative, it is a nonprofit entity and the residents who receive energy from the co-op are also the its members and owners.

Lisa Strickland, a beekeeper and organic farmer in Harrogate, Tenn., recalls spraying occurring in nearby communities — including Sharps Chapel and Cumberland Gap — in June 2016. The following June, her community was again impacted by spraying that also took place in surrounding areas.

PVEC was not obligated to notify member-owners about when and where herbicide spraying would occur; as a result, many residents had no idea the sprayers were coming.

"I'd been in my garden, and I came in for lunch," Strickland says. "I went back outside to find strange people popping out from behind my utility building. It literally scared the life out of me."

In the months following, Powell Valley member-owners from Sharps Chapel, Cumberland Gap, Hancock and surrounding towns complained of health problems, withered crops, dead pets and decimated pollinator populations.

Residents reported rashes, high blood pressure and even hospitalization for kidney problems after touching or eating sprayed plants and crops or swimming in nearby bodies of water.

Sharps Chapel resident Mike Shelley told USA Today that soon after he and his dog swam in a nearby lake following the June 2016 spraying, he was hospitalized for unidentified kidney problems, and his dog was euthanized due to kidney failure.

Beekeepers in Claiborne County believe the spraying killed their bees, according to Strickland.

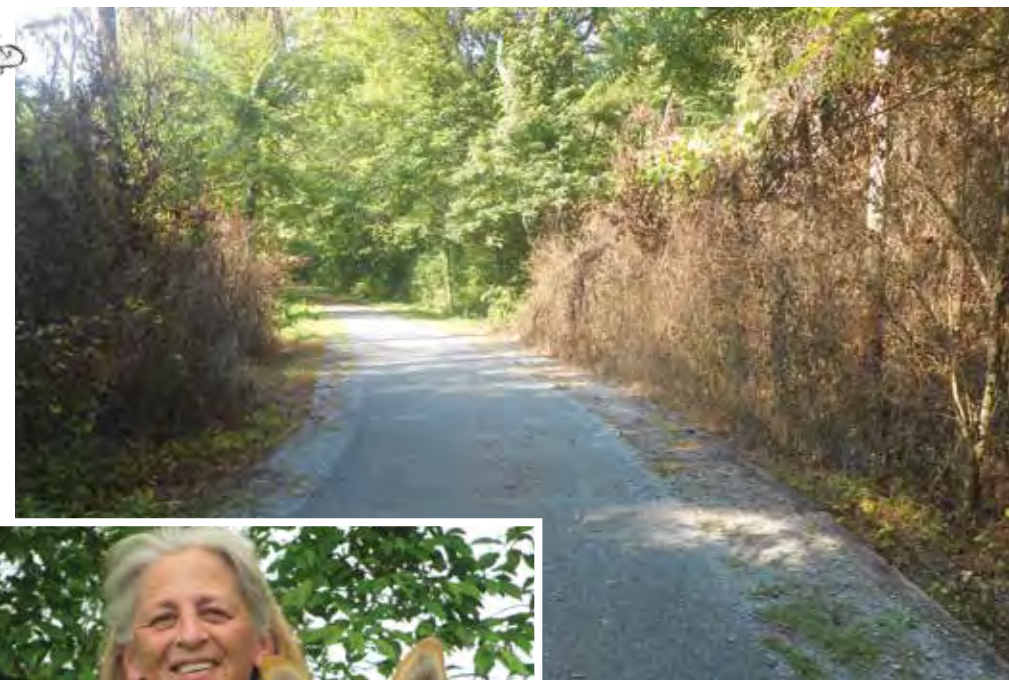
Jay Heselschwerdt, a local beekeeper, told WVLT-8 News that 34 of his 38 hives died after Powell Valley Electric Cooperative sprayed herbicides on his property in 2017, and that he believes the chemicals were the cause.

## Herbicides and Pollinators

Rodeo, Method 240SL, Escort SPX, Arsenal and Aquafact were the chemical products sprayed in 2016, according to a list released by Powell Valley staff to USA Today.

Strickland says the chemicals sprayed in 2017 were Arsenal, Roundup Custom, Milestone VM, Garlon 3A and Enhance.

According to research conducted by chemical manufacturers, the majority of the herbicides are "non-hazardous," but Aquafact, Enhance and



A nature trail in Cumberland Gap, Tenn., shows signs of herbicide spraying in July 2017, above. At left, Lisa Strickland and her dog Lola. In June 2017, herbicides were sprayed on Strickland's yard 10 feet from her seedlings and 20 feet from her chicken pen. Lola was unharmed. Photos provided by Lisa Strickland.

Garlon 3A may cause a range of health problems for people and animals.

While Aquafact is listed as "not classified," its manufacturer warns that the product is highly toxic to aquatic species and may cause birth defects in humans. The manufacturers of Aquafact and Enhance both cite possible respiratory tract, eye and skin irritation, though Enhance is classified as "non-hazardous."

Garlon 3A is the only chemical listed as "hazardous." The chemical causes extreme eye irritation and may damage kidneys through prolonged or repeated exposure.

Although scientists may have studied the herbicides' individual impacts on humans or pollinators, the interaction among combined chemicals has largely gone unresearched.

Multiple herbicides can overwhelm a bee's defenses. Honeybees use a specific enzyme to detoxify chemicals they ingest. If the enzyme is being used to detoxify one chemical, it may not be able to fully detoxify another, resulting in poisoning, according to BeeAware, an informational organization for beekeepers.

Further, native bees are often smaller and more susceptible to chemi-

cals than honeybees, according to the West Virginia Pollinator Handbook. Even when they don't die of herbicide and pesticide interaction, the chemicals can affect their reproduction and pollination habits, impacting the overall health of their nests.

The herbicides Rodeo and Roundup are both composed mostly of glyphosate, a broad-spectrum herbicide that kills a variety of weeds. Glyphosate was declared "probably carcinogenic" by the World Health Organization's International Agency for Research on Cancer in 2015.

The U.S. Environmental Protection Agency lists glyphosate as "practically nontoxic" to honeybees — but other studies indicate it can still have negative health effects on pollinators.

A 2014 study by the University of Buenos Aires found that after exposure to glyphosate — in this case through glyphosate-laced sucrose — honeybees exhibited reduced sensitivity to the scent of sucrose, leading to a decreased ability to find food, and poorer memory and learning performance.

As worker bees struggle to find their way home or locate food, the study suggests this may lead to an in-

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## Hazardous Spray

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creased likelihood of colony collapse disorder, a phenomenon in which a majority of worker bees disappear from the hive and abandon the queen.

Herbicide use is not only widespread in electric cooperatives. In Tennessee, as in other states, highway agencies, railroads and other utilities employ similar herbicide combinations.

## Holston Electric Opts For Communication

When they heard about the herbicide spraying in Powell Valley, members of the neighboring Holston Electric Cooperative decided to increase communication between member-owners and staff in their own co-op.

The Heritage Beekeepers of Hawkins County, a group with members of both Powell Valley and Holston electric cooperatives, initiated the discussion with Holston Electric in August 2017. They asked the the co-op for a policy that would allow concerned residents to opt out of right-of-way herbicide spraying and manage vegetation independently.

Heritage Beekeepers Vice President Becky Johnson says their requests were met within months. An opt-out policy was made available, and Holston Electric announced in a news release that employees would visit members' homes and hang door knockers indicating what areas would be treated.

There are still problems to overcome, according to Johnson. Holston Electric primarily informs member-owners about spraying schedules via Facebook, a channel not all residents have access to. Johnson also stated that Holston was reluctant to discuss details of their spraying practices during conversations with Heritage Beekeepers representatives and the state apiarist.

Nonetheless, member-owners' communication with the cooperative was an important step for humans and bees alike, according to Johnson.

"It's about time that people stand up for their rights and their animals' rights to be paid a voice," Johnson says. "The bees are a link to everything, they're linked to the plants that grow, to other forms of wildlife and livestock, to the obvious honey. They help connect so many different aspects of our everyday life."

## Working Toward Cooperation

With public concern about chemical use on the rise, Powell Valley and Holston Electric aren't the only utilities in Appalachia whose customers are sparking conversation about protecting pollinators.

In French Broad Electric Cooperative, which serves seven counties in North Carolina and Tennessee, beekeeper and member-owner Rachell Skerlec said she has heard complaints in her community about over-spraying.

"People definitely are concerned about if it will turn up in waterways, if it'll linger in the environment," Skerlec says. "I am a beekeeper and people in the beekeeping club are concerned it might contribute to honeybee losses."

Skerlec has been a beekeeper for 10 years, and experienced almost no annual bee losses in her four years in Cape Coral, Fla. But in the six years she has lived in North Carolina, Skerlec has seen bee losses every winter but 2017 to 2018.

According to Skerlec, she started opting out of pesticide use in spring 2015, just before she got goats to maintain the co-op's right-of-way on her property naturally. Despite concerns about the use of chemicals, Skerlec says she also understands the difficulties French Broad Electric faces with vegetation management.

"This area is mostly mountainous and wooded, and they were explaining to me that it's a real challenge to keep that power reliably supplied," Skerlec says. "It's so important to have those right-of-ways maintained so if something goes wrong, they can very quickly access what they need to access to get power to the people. When they explained the amount of time and money it would take trying to do this area with just manpower versus chemicals, they very quickly painted me a picture that made me realize the scale of the challenge they're up against."

Skerlec describes French Broad as respectful and communicative, and noted that she feels comfortable coming to them if problems arise in



Lynn and Tim Tobey's property in Sharps Chapel, Tenn., was sprayed by Powell Valley Electric Cooperative in 2017 and photographed here in May 2018.

the future. French Broad Electric Cooperative did not respond to multiple phone calls.

This year, Powell Valley Electric Cooperative is working on opening up communication, according to Assistant Manager Bo Goodin and Director of Apparatus Maintenance Travis Tolliver.

Like the Holston and French Broad electric cooperatives, in early 2018 Powell Valley instituted an herbicide opt-out policy after consulting with a small group of member-owners.

According to Lisa Strickland, who was involved in the meeting, the member-owners worked with the cooperative to write and implement the opt-out policy as well as notification procedures for the general public and specifically for beekeepers. The group also encouraged Powell Valley to upgrade its website.

Since then, Powell Valley has included spraying schedules on their website, in their community magazine and twice in their bills: one general notification about the upcoming spraying season followed by specific information about spraying times in certain areas, according to Tolliver.

"We try to notify every beekeeper in our system," Goodin says. "We talk to some of the people who are in organizations like beekeepers' clubs, and we notify those especially prior to herbicide treatments."

They've been very receptive to work with. They're working with us, and we're trying to work with them just as well."

Moving forward, Strickland says she hopes to continue discussion with Powell Valley and encourage them to hire a right-of-way supervisor who is versed in forestry and environmental science so this problem is not repeated for a third consecutive year.

"It is important that members of any cooperative understand that they are actually member-owners and do govern how their cooperative operates through their cooperative's bylaws," Strickland says. "With Powell Valley we continue to engage members of the community and help them understand that they do in fact have a choice. They do have a voice, and that voice truly does matter and will make all the difference in the way that our cooperative manages its right-of-ways and so much more." ♦



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## A Backyard Pollinator Paradise

Continued from page 15

Native plants are adapted to the climate, soil and pollinators they co-evolved with. They also require less water and are better equipped against native pests than non-native species, making them good choices for gardeners seeking hardy, low-maintenance plants.

In urban residential areas, homogeneous lawns and shrubs lead to fewer native plants, according to Carriker.

“Pollinating insects need variety. That’s why it’s really important to research your area and see what good pollinator plants [there] are to plant those for bees,” says Carriker.

### Pollinator-Friendly Yard Maintenance

Once you have planted your garden, there are a few other ways to make your yard a pollinator oasis.

Nearby trees and shrubs can block wind, offer areas for pollinators to roost and hide from predators, and sometimes serve as host plants for

### ONLINE EXTRAS

**July 21-29 is National Moth Week:** Help scientists track moths at a mothing party! Participants lure moths with light and food, photograph their visitors, and submit photos to one of the National Moth Week’s 19 partners, who use the data to study moth populations and educate the public. For details, visit [apvoices.org/moth-parties](http://apvoices.org/moth-parties).

“**Our Native Bees**” is a book by Paige Embry that explores native North American bees and reveals captivating facts about these important pollinators. Read Hannah Gillespie’s review at [apvoices.org/our-native-bees](http://apvoices.org/our-native-bees).

### Bee Misconceptions Debunked

- ⚡ Wasps are not bees, and neither are they pollinators. They are carnivores and some species are very aggressive.
- 🍯 Only 45 of the 20,000 bee species produce honey.
- ♂ Male honey bees do not forage for nectar or pollen, but focus on mating with the queen.
- ♂ The lifespan of bees ranges from two to three weeks for male miner bees and four years for honeybee queens.
- 🐝 Honeybee workers can only sting once. Their stinger is attached to the end of their digestive system and remains in the skin, so using their stinger is fatal.
- ♂ Male bees cannot sting and not all female bee species can sting. When bees do sting, it is usually out of self-defense.

caterpillars.

Make sure your garden still has adequate access to sunlight. Since butterflies are cold-blooded, the North American Butterfly Association suggests placing your garden where it will receive at least six hours of sunlight a day.

Butterflies also require shallow puddles or moist soil. Puddling areas allow butterflies to soak up water, salts and nutrients.

Mud can also provide home-building material for ground-nesting bees and wasps, while logs offer nesting space for some species, like carpenter, leafcutter and mason bees.

As you maintain your garden, avoid pesticides and herbicides, which can negatively impact pollinator health. Don’t be afraid of a few weeds — they can be homes for young pollinators.

Many caterpillars depend entirely upon specific host plants like milkweed. Weeds like thistle, clover and dandelion can also benefit pollinators when more nectar-rich flowers, such as azaleas, aren’t in bloom, according to the West Virginia Pollinator Handbook.

Mowing and weed-eating can eliminate those food sources, destroy eggs and larvae, and damage

ground-nesting insects’ homes. The West Virginia Pollinator Handbook suggests avoiding mowing when flowers are in bloom and to only mow one-third of the lawn at a time.

Herbicides and pesticides can also pose a threat to pollinators. Glyphosate, the main ingredient in the popular herbicide Roundup, destroys milkweed, the monarch caterpillar’s primary food source. This is contributing to the monarch butterfly’s decline, according to a 2012 study in the journal *Insect Conservation and Diversity*.

While some poisons warn about risks posed to honeybees, combinations of multiple chemicals can have unforeseen effects, and the risks to native bees often go unmentioned. According to the West Virginia Pollinator Handbook, native bees can actually be more susceptible to health risks related to pesticide and herbicide use than honeybees. (Read more about the impact these chemicals have on pollinators on page 18.)

If pesticides are necessary, apply to plants directly to avoid drift, and don’t apply while plants are in bloom. Early morning or night application can prevent drift, as wind velocity is typically lower. Nighttime application, when bees are not foraging, can also limit bee mortality, according to the West Virginia Pollinator Handbook.

Introducing native plants to the area can provide habitats for insects that help control pests and weeds naturally.

Some herbs also drive away unwanted insects. Lavender, which at-



Aster, iris, cardinal flower, bee balm and butterfly milkweed are among the flowers that *The Butterfly Highway*, a program of the N.C. Wildlife Federation, recommends for the mountains. Photo by Angel Hjarding/NCWF

tracts bees, simultaneously repels bugs like flies and mosquitoes. Other pest-repelling plants include basil and chrysanthemum.

### Garden Networking

Once your garden is accepting visitors, there are many opportunities to help the pollinator community at large.

The Butterfly Highway, a North Carolina Wildlife Federation

project, allows gardeners to register their gardens as points along the “highway” and collect data on visiting pollinators to help track the insects’ habits and migration patterns.

Though most of the highway’s 1,700-plus gardens are in North Carolina, pollinator-friendly spaces have also been registered in Virginia, South Carolina and Tennessee. To join the Butterfly Highway, visit [ncwf.org/butterfly-highway](http://ncwf.org/butterfly-highway).

On a larger scale, the National Pollinator Garden Network’s Million Pollinator Garden Challenge connects 695,190 pollinator gardens across the United States and into Canada.

The Million Pollinator Garden Challenge partners with individuals and organizations to track pollinators’ progress and growth regionally, and uses the data to pinpoint areas of greatest need for future gardens. View a map of registered pollinator places at [pollinator.org/mpgmap](http://pollinator.org/mpgmap).

The map displays a range of oases for pollinators nationwide, though there are still many gaps across Appalachia. But each backyard that hosts colorful flowers like bee balm, lavender and azaleas will help sustain another generation of bees, butterflies, hummingbirds and more — as well as the vibrant ecosystem that depends on them. ♦



## Pipeline Resistance Grows on Multiple Fronts

By Kevin Ridder

On her 57th day of blocking Mountain Valley Pipeline construction crews from reaching the fracked gas pipeline’s route on Peters Mountain, a protester known as “Nutt” willingly left her monopod stationed in the center of Pocahontas Road in Giles County, Va., after being without food for several days. The road leads to a section of the pipeline’s route that burrows underneath the Appalachian Trail.

“If we rely on one location, one tactic or one group of people to stop this pipeline, we will fail. But we’re not,” she wrote in a May 23 post on the Appalachians Against Pipelines Facebook page. “I know that as this one facet of the struggle draws to conclusion, more people in other places are gaining momentum.”

“Nutt.” “Ink.” “Deckard.” Theresa “Red” and Theresa Minor Terry. Fern MacDougal. These are only six of at least 10 individuals who have taken to the trees at various points along the Mountain Valley Pipeline’s route since February. On June 1, MacDougal was forcibly evicted from her tree-stand by law enforcement and charged with four misdemeanors after a 12-day tree-sit, according to Appalachians Against Pipelines. Shortly after, law enforcement prepared to extract Deckard — the last remaining person at the first tree-sit. Deckard descended willingly after 95 days and was arrested.

Atlantic Coast Pipeline opponents continue to occupy Three Sisters Resistance Camp in the pipeline’s path in Buckingham County, Va. And in Huntingdon County, Pa., Ellen Gerhart, her daughter Elise and supporters are still resisting the Mariner East 2 Pipeline on their property. They hosted a tree-sit until April 8, when the company cut down the trees, which were temporarily vacated. Ellen Gerhart faces up to six months in jail without trial and possible restitution to the company for her role in the protest.

Community and environmental groups including nonprofit organization Appalachians Against Pipelines, the publisher of this newspaper, have filed numerous legal challenges against

the fracked gas pipelines. In March, the Federal Energy Regulatory Commission denied environmental groups’ request to suspend construction on the Mountaineer XPress Pipeline. The companies behind the Mountaineer XPress, NEXUS and Rover pipelines state they expect to begin service in 2018. The company behind the Atlantic Sunrise pipeline, which began operating in September, states full service is expected in mid-2018. And while construction has been stalled at points along the Mountain Valley, Atlantic Coast and Mariner East 2 pipelines, it has not been stopped.

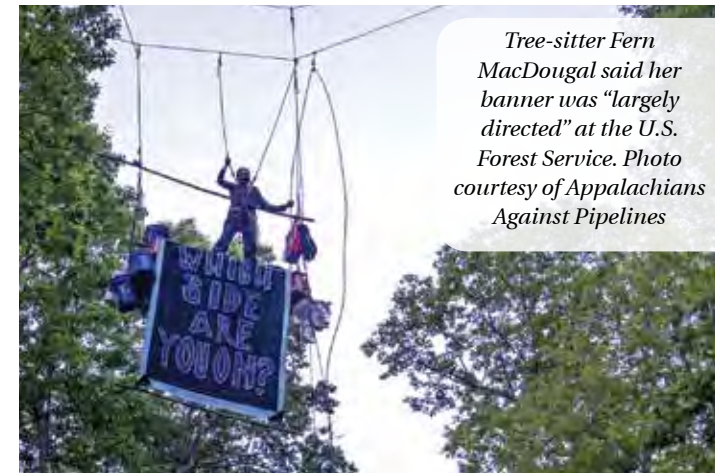
Dominion Energy broke ground on the 600-mile Atlantic Coast Pipeline in West Virginia in May. However, construction will have to wait until the fall in other areas due to a tree-clearing deadline intended to protect migratory birds and bats.

FERC extended Mountain Valley developers’ tree-felling deadline in parts of the Jefferson National Forest to May 31, where tree-sitters have blocked clearcutting in some areas.

Mountain Valley Pipeline developers unveiled plans in April to extend the 303-mile fracked gas pipeline by an additional 70 miles into Rockingham and Alamance counties in North Caro-



After several days of heavy rain in Franklin County, Va., erosion controls at a Mountain Valley Pipeline construction site failed and caused a mudslide, blocking this road. Photo by Dylan Williams



Tree-sitter Fern MacDougal said her banner was “largely directed” at the U.S. Forest Service. Photo courtesy of Appalachians Against Pipelines

MacDougal took up camp about a mile down the same access road suspended high above the ground. “Which side are you on?” read a banner hanging from her platform, quoting the regional labor song by Florence Reece.

According to WDBJ7, Virginia state Sen. Chap Petersen filed a federal first amendment lawsuit

against the Forest Service for prohibiting anyone to come within 200 feet of the pipeline’s right-of-way or enter some access roads in the Jefferson National Forest. The closure made it difficult to reach the protest and prevented supporters from supplying Nutty and MacDougal with food, water and medical treatment.

When three supporters attempted to cross the boundary to resupply Nutty, according to Outside Magazine, agency officials reportedly ordered them to the ground before putting one in handcuffs and leg shackles and arresting all three.

In a press release, the Forest Service stated the closure “was enacted to protect public safety due to hazards associated with constructing the Mountain Valley Pipeline.”

The agency has also come under fire for allowing Forest Service officials and Mountain Valley security to drive ATVs on the Appalachian Trail, where motor vehicles are typically prohibited.

At the Little Teel Crossing tree-sit in Franklin County, Va., the protester known as “Ink” was injured on May 25 when Mountain Valley workers cut into trees Ink was clipped to. According to the Little Teel Crossing Facebook page, which posts updates from the tree-sitters, security crews and U.S. marshals told the workers to keep cutting even when told that Ink would be hurt.

Facing contempt charges, Ink descended the tree-sit on May 28 after 38 days. A tree-sitter named “Sprout” took up camp adjacent to Ink’s former position that same day but was forced to come down hours later when U.S. marshals delivered a notice of contempt and an order to appear in court later that day, according to the tree-sit’s Facebook page. Little Teel Crossing

### On The Front Lines

A few days before Nutty descended from her monopod, Fern

Continued on page 24



# Cost of Cleanup

Despite problems with the current system, coal companies are being granted more leeway in paying for mine reclamation

By Kevin Ridder

At the edge of Tennessee's most recent mountaintop removal coal mine, silk flowers and overturned vases lay amid gravestones in a 128-year-old cemetery yards from the mine's permit boundary. Mist from a rainy March day dots the bright petals. Beyond the still-in-use cemetery, ponds of gray sludge hold sediment and runoff from the mountain-turned-rubble.

"They've done this since November of last year; that's how fast they move," says DJ Coker, a Campbell County, Tenn., resident and member of nonprofit group Statewide Organization for Community eMpowerment. "It was like any other mountain, just look around. It was naturally flowing. Now it's that."

Below the ridge and a half-mile beyond Cooper Ridge mine's permit boundary sits Clairfield Elementary School. According to a local doctor who asked not to be named, 70 to 80 percent of the school's approximately 100 students have a breathing disorder. Coker expresses concerns about how a hauling route spraying gravel and coal dust into the air will affect the children.

Coker and others visited the Claiborne County, Tenn., mine to test the water quality and see if Kopper Glo, the mine's operator, was properly managing sediment runoff from the recent coal mining activities. As of this March, only 11 acres of the nearly 1,500 acres permitted for the mountaintop removal mine were disturbed. By the time mining is finished, the land will likely look completely different — and Coker is skeptical about the efforts coal companies put into meeting requirements to restore the land to its previous state.

"They'll throw grass seed down, and then they'll plant random trees that don't even belong here and hope for the best," Coker says. "They'll make a mountain out of dirt that's not even a mountain, it's just a dirt hill."

The federal Surface Mining Control and Reclamation Act of 1977 and corresponding state regulations include requirements for reclamation,

including regrading the land, replanting vegetation and addressing any remaining water pollution. But these requirements only work well when properly enforced by regulators.

Coal mines opened after the federal surface mining law went into effect have been required to post bond money to ensure that regulatory authorities will be able to reclaim the land after mining if the operator fails to do so. A company can receive the full bond amount back as long as an inspector approves the reclamation results.

But because reclamation can be expensive, especially when unforeseen pollution issues arise, companies have a financial incentive to do the bare minimum, and they will often choose the cheapest method of reclamation and even postpone the process for years.

Coker points to a former coal mine on a mountain some distance away, where it looks as if someone had sliced out a square of trees and left patches of green and tan grass in its place — no substitute for the rich forest that had once been there.

"People will be like, 'well, they did what they could.' And that's not the case," Coker says. "They could've done better, they could do better. But they don't, and people just accept it."

However, community members like Coker can request citizen inspections and put pressure on inspectors to identify problems and hold companies accountable for land restoration. According to Coker, if people didn't watch every step



The Cooper Ridge mountaintop removal coal mine and nearby signs in Claiborne County, Tenn. Photos by Kevin Ridder

of the way, companies "would leave it the way it was and not try to reclaim it."

"The Earth gave [coal companies] something to make money with," Coker says. "The least they could do is make the Earth look like it was before they destroyed it."

## After the Mine Closes

Save for his three years of service in the Vietnam War, Larry Bush has lived in the mountains of Southwest Virginia his entire life. A coal miner for 13 years and a federal mine inspector for 13 years after that, he has seen his community transform over the decades — and not for the better. On a park bench in the small town of Appalachia, Va., Bush recalls hearing there used to be 35,000 people a day going through the town.

"Every building was full. You could go at 3 o'clock in the morning and get a haircut," he says. "They had bars, they had that hotel up there, and everything was just booming all the time, 24 hours a day. And now, half the buildings are — they're gone, deserted. No industry or nothing to bring them back."

To Bush and other residents of nearby Exeter, Va., the bleak moonscape of the massive coal mine adjacent to the community is a daily reminder of the lasting effects of a dying industry.

"To be able to look back from when I was 6, 7, 8 years old and know what it was back then and see how it is now ... just depresses the hell out of me — and a lot of other people too, I'd as-

sume," Bush says. "But I don't want to go nowhere else, you know ... I'd like to see it made better, as best as it can be made."

The original intent of the 1977 federal mining law was to accomplish the reclamation Bush and Coker hope for, but this does not always happen. When the coal market was stronger, many states allowed coal companies to accumulate huge amounts of reclamation liability, putting off the physical restoration work longer. Now, with the industry lagging and many mines sitting inactive and unreclaimed, regulatory agencies have little choice other than to negotiate with coal companies for whatever amount of land restoration they can get — or make taxpayers pick up the reclamation cost.

## Problems with Bonding

In 2017, Central Appalachian strip mine coal production was approximately 74 percent lower than its high point in 2008, according to data from the U.S. Mine Safety and Health Administration. As the coal industry overall has declined over the past several decades, the lack of coal company funds made available to clean up the mess has become apparent, according to an April report released by The Alliance for Appalachia, a regional coalition of nonprofit organizations including Appalachian Voices, the publisher of this newspaper.

The report names two central problems with the bonding system. The first is simply that bond funds are often not high enough to cover the actual cost of reclamation, especially long-term treatment of polluted water. The second problem involves alternative bonding methods

Continued on next page

## Cost of Cleanup

Continued from previous page

like self-bonds and pool bonds.

Self-bonding is an inherently risky practice that follows the philosophy of "too big to fail." Companies that employ this strategy merely have to prove that they have the financial resources to cover all reclamation, and do not have to post a bond. If one of these companies goes bankrupt, however, then taxpayers could be fully responsible for the cleanup costs.

From August 2015 to April 2016, three of the nation's largest coal companies, with approximately \$2.4 billion combined in self-bonds, went bankrupt, putting taxpayers at risk of picking up the tab. In August 2016, former President Barack Obama's administration issued an advisory to state regulators to "not accept new or additional self-bonds for any permit until coal production and consumption market conditions reach equilibrium, events which are not likely to occur until at least 2021."

Since mid-2016, the amount of reclamation costs that companies hold in self-bonds nationwide has dropped 75 percent, according to data compiled by Climate Home News. But last October, President Donald Trump's administration rescinded Obama's advisory, creating the possibility for a resurgence of risky self-bonding. Shortly after emerging from bankruptcy, Peabody Energy's CEO stated in March 2017 that the company "believes it continues to qualify for self-bonding" and will consider using it in the future "should circumstances warrant."

While several states are moving away from the practice, Virginia is struggling to because of the roughly \$25 million held in self-bonds by A&G Coal Corporation,

## Tennessee Changes Mining Regulations

Tennessee Gov. Bill Haslam recently signed a law intended to transfer coal mine regulatory authority from the federal government to a new state division. The law would also allow valley filling, a common practice in mountaintop removal coal mining in which all of the rubble created by blasting is dumped over hillsides. In the long term, funding for the new regulatory division would rely partially on non-guaranteed federal grants and partially on coal industry production taxes. Tennessee only has three mines producing coal, which environmental groups expect would lead to public tax dollars making up the difference.

## Coal Mining Under Trump

On June 1, President Donald Trump ordered Secretary of Energy Rick Perry to stop coal and nuclear plants from closing, citing national security and grid reliability. A draft White House memo with a plan to bail out those plants by forcing grid operators to purchase coal and nuclear power for two years was released the same day.

In a statement, PJM-Interconnection — which manages much of the Eastern electric grid — said, "Any federal intervention in the market to order customers to buy electricity from specific power plants would be damaging to the markets and therefore costly to consumers."

Mary Anne Hitt, director of environmental group Sierra Club's Beyond Coal campaign, decried the announcement in a statement.

"This is an outrageous ploy to force American taxpayers to bail out coal and nuclear executives who have made bad decisions by investing in dirty and dangerous energy resources," the statement read.

Dozens of coal plants were shuttered in 2017, according to Forbes, and Mother Jones stated that "at least 14 coal-fired plants are scheduled to close" in 2018.

In January, the Federal Energy Regulatory Commission denied the Trump administration's proposed subsidies for coal and nuclear power plants. Policy firms Energy Innovation Group and Climate Policy Initiative projected the subsidies could cost taxpayers as much as \$11.8 billion a year.

Trump has promised to bring a resur-

gence to the coal industry. But while preliminary numbers show a slight bump in Central Appalachian coal jobs to date, not much has changed nationally.

Preliminary employment numbers for the first quarter of 2018 show an 11.4 percent increase in Central Appalachian coal jobs since 2016, or 1,824 jobs. This is less than half of the region's employment numbers from 2011, when coal jobs entered a six-year freefall. Overall, from 1984 to 2017, Central Appalachian coal jobs declined by over 77 percent, according to data from the U.S. Mine Safety and Health Administration.

Nationwide, coal production increased by 6 percent in 2017, but coal jobs only grew by 2 percent, or 918 jobs. Preliminary numbers for the first quarter of 2018 show a loss of 700 jobs, nearly back to the low nationwide levels of 2016.

This mismatch between production and employment gains can be attributed to widespread automation in the industry, especially at large western surface mines that provide nearly half the country's coal.

Coal consumption in the United States has dropped roughly 2 percent from 2016 levels, according to estimates from the Rhodium Group, an independent research organization — but the report shows that production of coal used for steelmaking



Photo: NASA/Aubrey Gemignani

rose in 2017 due to an increase in exports.

According to the U.S. Office of Surface Mining Reclamation and Enforcement, Pennsylvania, West Virginia, Kentucky and Virginia all experienced increases in new mining permits issued between July 2016 and June 2017 compared to new permits issued in the previous fiscal year.

However, this doesn't necessarily mean more mining. Even though these states had more new permits, the acreage covered by them is nearly 45 percent less than the previous year's new permits.

On the policy front, the Trump administration has repealed several coal-related regulations meant to protect communities and the environment. In February 2017, Congress overturned the Stream Protection Rule, a rule passed late in 2016 and backed by Appalachian Voices. The rule was projected to protect or restore an estimated 6,000 miles of streams and 52,000 acres of forest over 20 years.

In January 2018, The New York Times exposed Trump's close ties to the coal industry when it published an "action plan" the CEO of Murray Energy Corp. sent the administration in March 2017 outlining policy goals for Trump's first year.

Robert Murray's plan included repealing the Obama administration's Clean Power Plan, which was projected to reduce power plant carbon pollution by 32 percent below 2005 levels by 2030. U.S. Environmental Protection Agency Administrator Scott Pruitt proposed repealing the plan in October.

which is owned by West Virginia Gov. Jim Justice.

Virginia also has a troublesome situation with pool bonds, where a group of companies put a fraction of their estimated reclamation costs into a shared pool of funds. If one of these companies goes bankrupt, funds from the pool are put forth to cover reclamation costs — but if several companies go under at once, the pool could quickly dry up.

As of April 2017, Jim Justice had accumulated roughly \$134 million in mine cleanup costs he has yet to address in Virginia, according to the state's Coal Surface Mining Reclamation Fund Advisory Board. This dwarfs the state's bond pool, which contains approximately \$8.8 million, according to Climate Home News. The inactive coal mine behind Larry Bush's community is owned by Justice.

"Virginia is in between a rock and a hard place," says Matt Hepler, Central Appalachian environmental scientist with Appalachian Voices. "They are bending over backwards to help Justice stay afloat,

because if he sinks, the pool bond fund sinks with him. So they are working to get as much reclamation out of him as they can, even though he is way behind on his already-agreed-to commitments and is racking up new violations."

While he doesn't think the region will ever be the way it was before or during coal's heyday, Larry Bush believes properly reclaiming the mined areas with an eye on increasing tourism would go a

long way to getting communities like his back on their feet. To do that, however, Bush says "we need to hold [coal companies'] feet to the fire" when it comes to enforcing reclamation efforts.

"Primarily, I think the companies ought to be held to task," Bush says. "Right to the very last shovel of dirt that's pushed up."

"If you take out an oak tree, put back an oak tree and make it grow," he adds. ♦



Larry Bush stands beside a strip mine near his home of Exeter, Va. Photo by Kevin Ridder





# Pipeline Resistance

Continued from page 21

landowners Carolyn and Ian Reilly have been fined \$1,000 each for allegedly supporting the tree-sit.

Along the Mountain Valley Pipeline's path in Roanoke County, Va., Theresa "Red" Terry and her daughter Theresa Minor Terry staged a 34-day tree-sit on their property, which has been in their family for seven generations. They descended on May 5, after a judge told them they faced forced removal by U.S. marshals as well as a \$1,000 fine to be paid to Mountain Valley for every day they remained past that day. Red's husband, Coles Terry, III, was fined \$2,000, and the Terrys face trespassing charges as well as the possibility of paying tens of thousands of dollars in fines for delays to the project and the 24/7 police presence, according to WFIR Radio.

"I find that funny that I was on my land, and they're charging me with

trespassing ... We didn't ask for a police presence, MVP did," Red told WFIR Radio on May 11. "We didn't ask them to try to starve us down, MVP did."

Although Roanoke County police prevented the Terrys' supporters from supplying them with food and water for two weeks, rations were provided after an article ran in The Washington Post, according to the publication.

"I don't know what the tipping point would be or what critical mass it would require [to stop the pipeline], but it's not going to happen by people not doing anything," Deckard from the Peters Mountain tree-sit in West Virginia told The Independent on May 5.

## On the Legal Front

In mid-May, a federal court cancelled a key permit for the Atlantic Coast Pipeline involving the project's impact on endangered species. Dominion stopped construction along 100 miles of the pipeline's route in Virginia and West Virginia until the U.S. Fish and Wildlife Service issues a revised permit. According to The Exponent Telegram, Dominion stated construction in other areas will move forward as planned.

As of press time on May 31, the Pennsylvania Department of Environmental Protection had issued the Mariner East 2 Pipeline 54 notices of violation. On May 24, StateImpact Pennsylvania reported that a state judge shut down construction in the Philadelphia suburbs on Mariner East 2 and Mariner East 2X as well as the operation of Mariner East 1, citing an "imminent risk to the public." Mariner East operator Sunoco has appealed the decision and plans to continue constructing the pipelines elsewhere along their route.

Nonprofit citizen group Bold Alliance is challenging the Federal Energy Regulatory Commission's notices to proceed with construction of the Mountain Valley Pipeline. In May, FERC denied a rehearing of the notices, and Bold Alliance asked a federal court for both a rehearing and a stay on the pipeline's construction.

On May 23, the Army Corps of Engineers indefinitely suspended portions of a 404 Clean Water Act permit needed for construction of the Mountain Valley Pipeline after a coalition of environmental groups, including Appalachian Voices, asked the agency to stay the full permit for further review.

## History, Health at Stake in Buckingham County

John Laury has been researching cemeteries near his home in Union Hill, in Buckingham County, Va., where slaves and their descendants were buried long ago, some of whom are likely his forebears. It's difficult because most graves are unmarked, forgotten.

In Dominion Energy's federal application to build the interstate fracked-gas Atlantic Coast Pipeline, including a massive compressor station in Union Hill, the company overlooks the deep history of the community, founded by freedmen and still predominantly African-American. This cultural "erasure," says anthropologist Lakshmi Fjord, is a form of racism.

Laury and Fjord were among those who spoke in late May to the Governor's Advisory Council on Environmental Justice, which met in Buckingham County to hear from concerned citizens. The council was formed in 2017 to examine how certain segments of the population are disproportionately impacted by pollution and to make policy and legislative recommendations.

The descendants of slaves and freedmen "have been living here continually for generations," says Fjord. "It's that continuity of history that's important."

Read more on the Appalachian Voices Front Porch Blog at [appvoices.org/blog](http://appvoices.org/blog). — *By Cat McCue*

The partial suspension applies to crossings of the Gauley, Greenbrier, Elk and Meadow rivers, which Mountain Valley's records show would not be able to be completed within the required 72-hour limit. Under the general nationwide permit used by the Army Corps, if even one of the water crossings can not be completed in 72 hours, the entire permit is supposed to be invalidated.

"This admission by the corps provides further evidence that blanket permits cannot protect water quality from large pipeline projects like the Mountain Valley Pipeline," said Appalachian Voices' Virginia Program Manager Peter Anderson.

The corps did not commit to waiting for a court ruling before reinstating the permit, according to nonprofit law center Appalachian Mountain Advocates, which filed the stay request. The center has filed a federal motion seeking a full suspension of the permit.

The partial suspension came weeks after West Virginia regulators cited Mountain Valley for failing to control erosion and a few days after a mudslide from the pipeline's construction site blocked a road in Franklin County, Va. Six landowners in Franklin County are suing Mountain Valley for property damage caused by the mudslide.

Citizens monitoring water quality with the Mountain Valley Watch network reported the mud-covered road. According to WVTF public radio, citizens had reported at least 15 erosion control violations as of May 25. In Southwest Virginia resident Linda Sink's case, WVTF reports a spring near her water supply may have been breached. Sink told the station that

the spring, which is roughly 3 tenths of a mile from the Mountain Valley Pipeline, "never runs muddy and it was running blood red, muddy."

In an April 30 Washington Post op-ed, Appalachian Voices Executive Director Tom Cormons and former Virginia Congressman Tom Perriello called on Virginia Gov. Ralph Northam's administration to halt the projects and conduct a further review of water impacts.

In the op-ed, Cormons and Perriello underscored the governor's power to ensure Virginia waterways are protected instead of deferring to the Trump Administration's nationwide permit. "During his election campaign, Northam wrote the DEQ requesting that it do its own analysis of water impacts, not rely on the federal permit," the op-ed reads. "Now he is in charge and can make this happen with a phone call to his DEQ director."

Roanoke County resident Jacki Lucki's land near the path of the Mountain Valley Pipeline was highlighted in a May report by environmental consulting firm Downstream Strategies showing that both the Atlantic Coast and Mountain Valley pipelines threaten Virginia's groundwater supplies.

"I live amid a mountain sanctuary that has been lovingly protected for generations and is now threatened by this pipeline project," said Lucki in a Natural Resources Defense Council press release. "The governor and state agencies should put a halt to it, so we can continue to enjoy safe drinking water." ♦

For updates, visit [appvoices.org/blog](http://appvoices.org/blog). For info about water monitoring, visit [appvoices.org/pipeline-monitoring](http://appvoices.org/pipeline-monitoring)

# The Energy Report

## Tennessee Valley Authority Changes Rate Structure, Adds New Charge

On May 10, the Tennessee Valley Authority Board of Directors passed a highly debated change to their rate structure. TVA reduced wholesale energy rates by five cents per kilowatt-hour but added a new grid access charge.

Local power companies that purchase energy from TVA will individually decide whether to pass the rate structure on to their customers, which could mean a new fixed charge for consumers in addition to costs based on the amount of energy used.

The rate changes will go into effect

in October, and according to a TVA presentation, TVA will not be required to go through another public process to increase the grid access charge in the future.

TVA received widespread criticism on the proposal from social justice and environmental groups and agencies, such as the Sierra Club, the NAACP, the Southern Alliance for Clean Energy and the State of Tennessee Department of Environment and Conservation, as well as from citizens, politicians and Appalachian Voices, the publisher of

this newspaper.

A fixed charge can increase the percentage of customers' income that goes to their energy bills by giving ratepayers less control over their bill. This will be detrimental to low-income families and small businesses, according to Rory McIlmoil, Energy Savings Program Manager at Appalachian Voices, who says that "many families in Tennessee already pay 20 percent or more of their annual income on energy costs."

Fixed charges also decrease residents' financial incentive to make

energy-efficient home upgrades or install solar panels, as a smaller portion of their bills will be based on how much energy is consumed. The NAACP and the Tennessee Small Business Alliance, among others, have also argued that the rate change favors large commercial energy users over the average citizen.

— *By Sara Crouch*

## Solar Advocates Lose N.C. Court Case

On May 11, the North Carolina Supreme Court handed down a single-word decision — "Affirmed" — ending a two-year legal battle over control of solar panel installation in the state.

The suit involved solar panels that NC WARN, an environmental advocacy group, installed on the roof of Faith Community Church, a predominantly African-American church in Greensboro, in 2015. The organization paid \$20,000 to install the panels and then sold the church electricity at the rate of five cents per kilowatt-hour. According to InsideClimate News, this rate is well below the 11 cents per kilowatt-hour that utility giant Duke Energy charges its customers.

The method that NC WARN used to finance the project, known as a third-party power purchase agreement, is banned in North Carolina and laid the groundwork for Duke Energy's legal challenge. The state's utilities commission ruled against NC WARN's right to act as a utility by selling electricity to customers. After an appeal, the N.C. Supreme Court upheld this ruling.

"It's very unfortunate that Duke Energy remains able to protect its monopoly against clean competition and to keep stifling the growth of cheaper solar power across North Carolina," Jim Warren, executive director of NC WARN, told InsideClimate News. — *By Elizabeth E. Payne*

## Anti-Solar Bill Stalls in Kentucky Legislature

Despite significant lobbying by the state's utility companies, the Kentucky legislature declined to pass House Bill 227, which would have allowed state regulators — and perhaps the state's utilities — to set new rate structures that could have harmed efforts to expand residential solar in the state.

"It's a relief to wake up knowing that the utilities' effort to destroy rooftop solar in KY has been defeated, again," tweeted advocacy group Kentuckians For The Commonwealth after the session ended without passage of the bill. — *By Elizabeth E. Payne*

## Coal Company Loses Road Waiver Request in Ohio

In Ohio, a judge upheld Athens County Commissioners' decision to deny a coal company's request for a waiver that would allow mining alongside a public road.

Judge George McCarthy's May ruling came after Oxford Mining Company, LLC, appealed a prior decision, but the company could appeal again.

The company's road request accompanies its proposed 300-acre Johnson Run mine. Oxford has received a federal draft

## New Studies Document Rise of Black Lung Disease

In a study published in March, University of Illinois at Chicago researchers found more than 4,000 cases of severe black lung, also known as progressive massive fibrosis, over the last 50 years. More than half of the cases were found in the last 16 years, with the frequency of the fatal disease increasing from year to year. As much as 30 percent of cases occurred in the coal-mining states of Kentucky, Virginia and West Virginia.

A study published in May found an increase in the rate of black-lung-related lung transplants, 79 percent of which occurred in the last decade. — *By Hannah Gillespie*

## Virginia Uranium Mining Ban Goes to Supreme Court

In May the Supreme Court announced that it will hear mining companies' attempt to overturn Virginia's ban on uranium mining in the next court session.

Virginia put the ban into effect due to concerns about radioactivity in 1982. The plaintiffs — Virginia Energy Resources, Inc. and similar companies — claim that the ban

violates the 1954 Atomic Energy Act, which gives the federal government the final say on matters of nuclear safety. Yet the 1954 act is specific to federal land, and the Pittsylvania, Va., deposit in question is on private land. The deposit is estimated at 119 million pounds, and is worth around \$6 billion. The Trump Administration has supported the plaintiffs in this case. — *By Sara Crouch*

## Duke U Delays Gas Plant, Considers Hog Waste

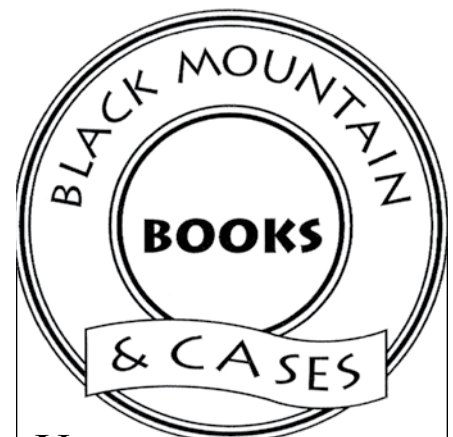
Duke University has indefinitely delayed construction of a combined heat and power plant that would have run on natural gas. The university's commitment to going carbon neutral by 2024, paired with student backlash surrounding the proposed plant, has spurred the university to instead consider powering parts of campus with methane captured from industrial hog farm waste, called "biogas." Biogas has high levels of methane, a powerful greenhouse gas. Using biogas for energy reduces the amount of methane released into the atmosphere.

The student-led Duke Climate Coalition praised this change. Activists also urged the university to include communities near hog farms in the decision-making process, according to Energy News Network. — *By Sara Crouch*

## Appalachia's Environmental Votetracker

115<sup>TH</sup> 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](http://congress.gov). ● = pro-environment vote ✗ = anti-environment vote ○ = no vote

	Kentucky			Tennessee			North Carolina		Virginia			West Virginia				
	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
<b>HOUSE</b>																
<b>H.R. 2, known as the Farm Bill</b> , allows the EPA to approve pesticides without considering endangered species, shrinks a program that pays farmers for adopting conservation practices, expands the types of logging and other forest activities that are exempt from environmental review and restricts access to food stamps, among other provisions. <b>YES 198 NOES 213 NV 17 ... FAILED</b> *the Farm Bill vote became tied to immigration bills	●	○	✗	✗	●	✗	✗	✗	✗	●	✗	✗	✗	✗	✗	✗
<b>H.Amdt 597 to H.R. 2</b> would require forest management agencies to either approve or disapprove logging proposals without considering alternatives and would limit judicial review of forest agency actions. <b>YES 224 NOES 191 NV 12 ... PASSED</b> *the bill it was attached to failed, but it is now part of any future 2018 Farm Bill	✗	○	✗	✗	✗	✗	✗	✗	✗	○	✗	✗	✗	✗	✗	✗

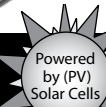


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# Inside Appalachian Voices

## A Sunny Welcome for Austin Counts

Our Norton, Va., office is thrilled to welcome our new Southwest Virginia Solar VISTA, Austin Counts! Born and raised in the Southwest Virginia mountains, Austin obtained a B.S. in Environmental Sciences at the University of Virginia's College at Wise in 2017. With experience in the biofuels industry and environmental research, he seeks to delve further into the environmental field and scientific community while improving the future for his home region. As our AmeriCorps VISTA member, Austin will be assisting our New Economy Program in all its activities including sharing information about solar energy with local communities and helping interested residents and businesses access the benefits of clean, local renewable power.

## Blocking an Energy Monopoly Move

In a win for consumer access to clean energy, the Virginia State Corporation Commission — the body responsible for regulating monopoly utilities — rejected a Dominion Energy proposal that would have eliminated competition when it comes to selling renewable energy to large commercial customers. "The more options customers have when purchasing clean energy, the better," said Peter Anderson, our Virginia Program Manager. The Southern Environmental Law Center represented Appalachian Voices in this case.

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## Southwest Virginia Solar Workgroup Receives Award



The Southwest Virginia Solar Workgroup received the first Torchbearer award at the 2018 SWVA Economic Forum held in May on the campus of UVA-Wise. The honor, accepted on behalf of the workgroup by co-conveners Adam Wells of Appalachian Voices and Mark Moormans of People Incorporated, is a new annual award designated to a group that is working for economic progress for the region.

The Solar Workgroup was formed as a result of conversations that began at the inaugural Southwest Virginia Economic Adam Wells of Appalachian Voices and Mark Moormans of People Incorporated accepted the Torchbearer award on behalf of the Southwest Virginia Solar Workgroup at the 2018 SWVA Economic Forum.

Forum in 2016; its goal is to create a locally rooted solar industry in Southwest Virginia as an economic development catalyst. In 2017 the workgroup released the Roadmap for Solar Development in Southwest Virginia, which identified strategies to advance the four goals of the workgroup: establishing commercial-scale rooftop solar projects, workforce development, education and outreach, and state-level policy changes.

The workgroup was nominated for the Torchbearer award by the economic forum planning committee as an exemplary effort that emerged from the event and has had deep impact on the region while including a broad set of stakeholders.

## Contest Brings Energy Efficiency Upgrades to N.C. Home

The winners of our High Country Home Energy Makeover Contest were announced in May.

The grand prize winner, Amy Cook of Boone, N.C., will receive \$4,000 worth of energy-saving home improvements. Though Amy's house is small at about 600 square feet, her winter electric bills have exceeded \$300 per month. The prize will cover some of the home's needed upgrades, which may include crawlspace insulation or a new, efficient heat pump, resulting in lower energy costs and a warmer home for Amy in the winter.

Four finalists from Alleghany, Ashe and Watauga counties also received free home energy audits. The assessments, performed by local business reNew Home Inc., helped the finalists determine which energy upgrades would save the most energy and make their homes

more comfortable and healthy.

Our North Carolina Energy Savings team organized the contest to bring awareness to the burden of unaffordably high energy bills in the region, where some families are spending as much as 30 percent of their income on home energy costs.

The electric cooperative serving North Carolina's High Country, Blue Ridge Energy, has access to federal funding to help residents make energy efficiency improvements, like the ones offered by this contest. Unfortunately, to date the co-op has not applied for any of those funds.

## Membership for the Win!

Our Membership for the Win campaign has gotten off to a rousing start! At the end of each month through October, we're holding a drawing for folks who become members at the \$35 level or above. In April we gave away a gorgeous Patagonia backpack, and in May a new member won two tickets to FloydFest. For June, we're drawing for a special Blue Ridge Outdoors swag bag and Patagonia backpack. Stay tuned to our website or follow us on Facebook to learn about July's giveaway! Join now at [AppVoices.org/for-the-win](http://AppVoices.org/for-the-win)



# Inside Appalachian Voices

## Mike McKinney: Environmental Educator With an Impact

### Member Spotlight

By Hannah Gillespie

Growing up in Orlando, Fla., during the construction of Disney World had a major impact on Mike McKinney.

Seeing his hometown transform from a lush natural area to an urban development strengthened his appreciation for the environment. He went on to pursue degrees in biology, geology and environmental science, and earned a Ph.D. in geology and ecology from Yale University.

"Of course, when you care about the environment, you want to be an educator because you want to reach out to as many people as possible," says Mike.

Mike, who now lives in Knox-



ville, Tenn., works at the University of Tennessee as a professor of evolutionary biology and environmental science, the department head of earth and planetary sciences, the director of the environmental studies program and an advisor to the student environmental club.

Since 2009, as part of a service component of his courses, he gives students the option to help him distribute The Appalachian Voice. Mike keeps a list of 20 places that they frequent, which include Mast General Store, Whole Foods, The Fresh Market and Three Rivers Market.

"As an environmental studies professor, I think it's kind of an obligation for me to distribute (The Appalachian Voice)," says Mike, "I think I would be a hypocrite if I didn't promote the distribution of this kind of information. We don't really have an (environmentally-focused) paper in our region so it really fills an important niche."

In Knoxville, Mike works with graduate students to create more

sustainable cities and bring urban wilderness into highly populated areas where people can easily visit. He also conducts biodiversity surveys on endangered cave ecosystems and studies mussel and land snail conservation.

"As a geologist, I can tell you that the Appalachians are the oldest mountain chain in the world," says Mike, "And as a result they not only inspire a lot of respect in me, but that means it has a lot of biodiversity, because evolution has had a long time to create a lot of new species."

As the environmental club advisor on campus, Mike works with students on energy policy campaigns against mountaintop removal coal mining.

"Increasingly, I'm really concerned about climate change and the impact it's going to have on the mountains because I see that a lot in the Smokies," says Mike. "We see a lot of problems with the Fraser fir and hemlocks from climate change and that drives invasive species too."

While Mike keeps himself busy, he enjoys hiking throughout the Appalachian region in his spare time. A few of his favorite spots include the Appalachian Trail in Hot Springs, N.C., Big South Fork National River and Recreation Area in Oneida, Tenn. and Frozen Head State Park in Wartburg, Tenn.

Between educating students, researching biodiversity and hiking, nature plays a major role in Mike's life. We are grateful to have him and his students as part of the Voice volunteer distribution team.

## Pipeline Pushback Continues with Water Monitoring and Lawsuits

As the fights against new fracked-gas pipelines in our region press forward, we're continuing our legal challenges to the Mountain Valley and Atlantic Coast pipelines along with a variety of partners. On May 22, we joined a new lawsuit calling on the U.S. Court of Appeals for the Fourth Circuit to immediately halt the Mountain Valley Pipeline's construction across waterways because the company's own documents show it cannot meet the requirements of its Army Corps permit.

We're also working with over 10 teams across western Virginia (and even east of Richmond) to monitor over 50 sites on creeks and rivers that the Atlantic Coast and Mountain Valley pipelines propose to cross. Along with partners Wild Virginia and West Virginia River Coalition, we're using a pipeline water monitoring protocol developed by Trout Unlimited to train interested local residents in how to inspect water quality at these precious headwater streams and major rivers. Volunteers are taking measurements for pH, water temperature, conductivity, flow, and turbidity to catch any changes to the waterway.

The Atlantic Coast Pipeline is expected to file for an air pollution permit for its proposed compressor station in Buckingham County, Va., this summer. To stay informed, visit [appvoices.org/blog](http://appvoices.org/blog) or join our email list at [appvoices.org/signup](http://appvoices.org/signup).

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Learn more about energy efficiency and our work at [appvoices.org/energysavings](http://appvoices.org/energysavings)

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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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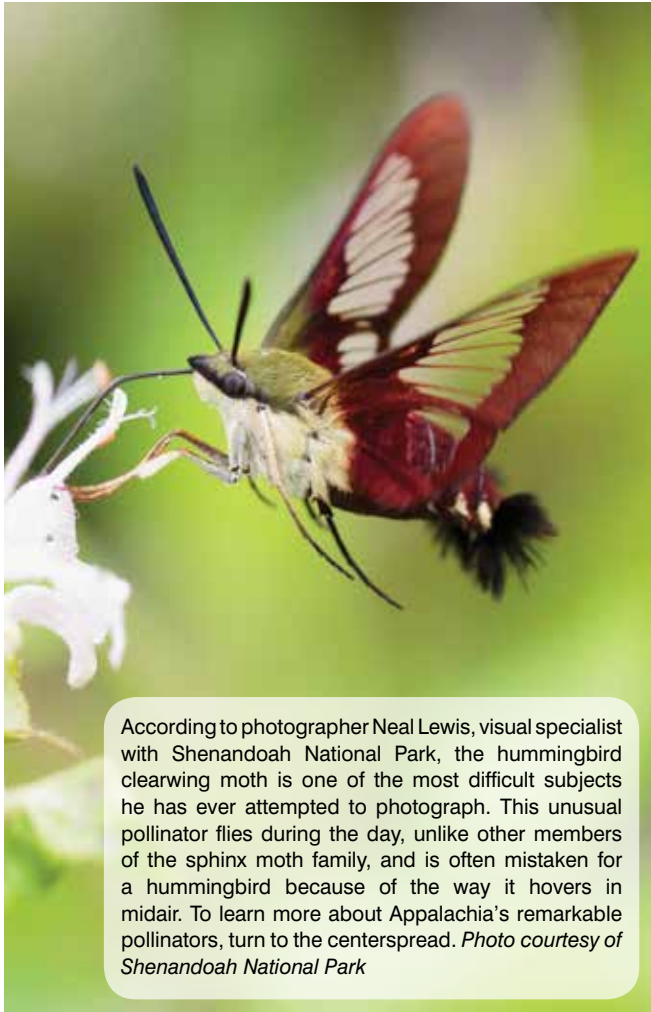
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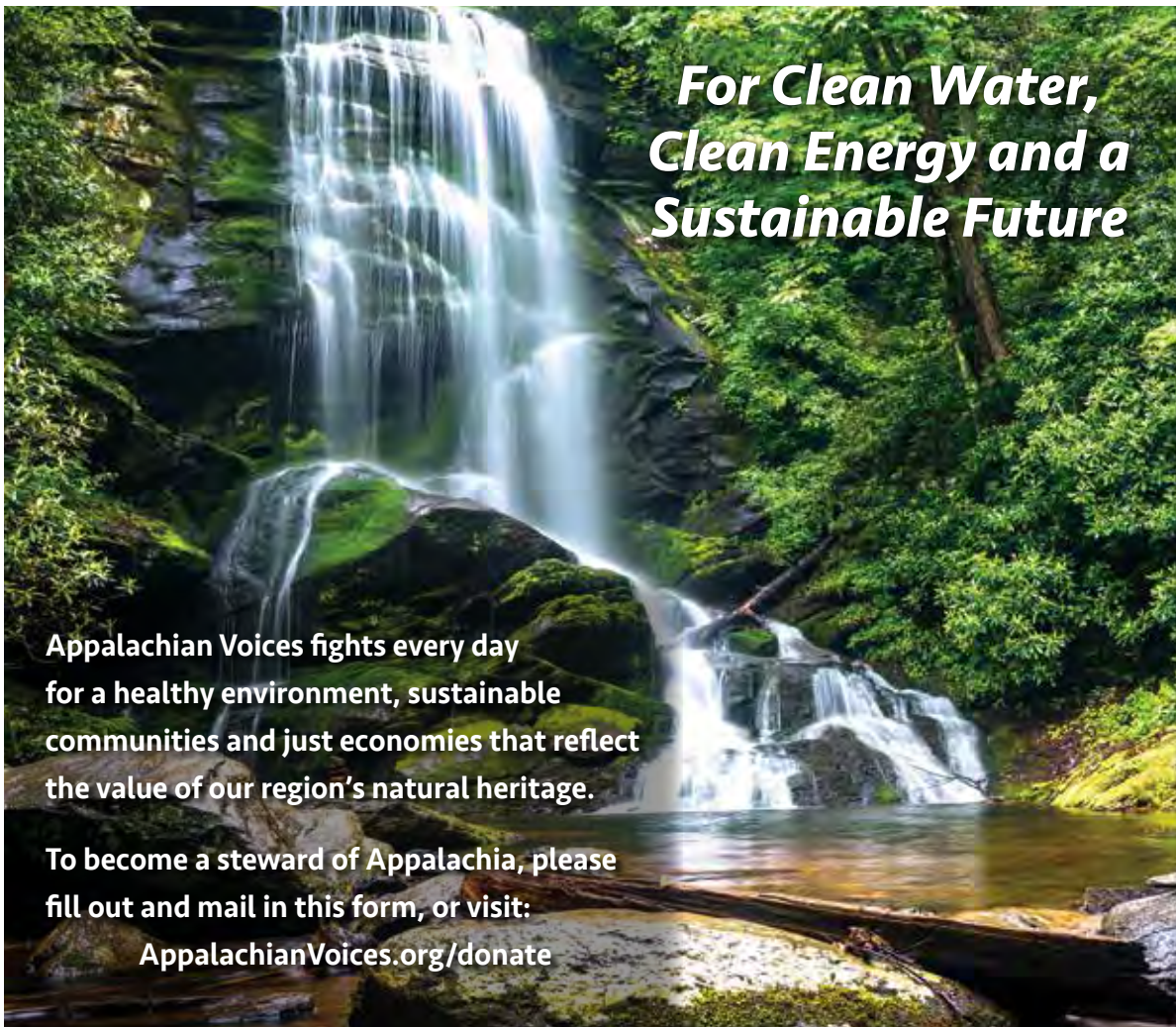


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According to photographer Neal Lewis, visual specialist with Shenandoah National Park, the hummingbird clearwing moth is one of the most difficult subjects he has ever attempted to photograph. This unusual pollinator flies during the day, unlike other members of the sphinx moth family, and is often mistaken for a hummingbird because of the way it hovers in midair. To learn more about Appalachia's remarkable pollinators, turn to the centerspread. *Photo courtesy of Shenandoah National Park*



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