

West Virginia Highlands Conservancy
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The Highlands Voice

Since 1967, The Monthly Publication of the West Virginia Highlands Conservancy

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Mountain Valley Pipeline Hits Another Snag

By John McFerrin

The Mountain Valley Pipeline faces another setback, this time over a failure by the Fish and Wildlife Service to comply with the Endangered Species Act. The United States Court of Appeals for the Fourth Circuit has ruled that the Fish and Wildlife Service did not properly evaluate threats to the endangered Candy Darter and Roanoke Logperch.

The Federal Energy Regulatory Commission (FERC) makes the overall decision on whether the pipeline goes forward. The law assumes that FERC does not know enough about endangered

species to make an informed opinion on the effect the pipeline would have. It requires that the Fish and Wildlife Service issue what is called a Biological Opinion, giving its view on whether the pipeline “is likely to jeopardize the continued existence of the [endangered] species.”

In this case, the Fish and Wildlife Service issued a Biological Opinion. It determined that the Mountain Valley Pipeline would affect the Virginia Spirea, the Roanoke Logperch, the Candy Darter, the

(More on p. 3)

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Thoughts from our President

By Larry Thomas

Off-Road Vehicles Pose a Threat to West Virginia Public Lands

West Virginia Highlands Conservancy has a long history of opposing Off-Road Vehicle (ORV) use on our West Virginia federal and state public lands. As reported previously, the Conservancy Legislative Committee, along with the West Virginia Environmental Council and other environmental organizations, has kept an eye out during this legislative session for any legislation to permit the use of Off-Road Vehicles on West Virginia Federal and State public lands. As predicted, seven bills were introduced, all linked and laying the foundation for a comprehensive program to allow the use of off-road on our West Virginia public lands.

The Public Lands Committee “Off-Road Vehicle (ORV) Recreation on West Virginia Public Lands” project is posted on the Allegheny Blue Ridge Alliance’s Conservation Hub [WV Public Lands ORV | ABRA Conservation Hub \(arcgis.com\)](https://arcgis.com) highlights the growing threats ORVs pose to the environmental integrity of our West Virginia public lands. Sponsored by the West Virginia Highlands Conservancy, the project includes information and an interactive online map to help

educate the public and legislators regarding the impacts of ORV use on West Virginia’s public lands. The project’s web page points out that “there are universal effects and severe environmental impacts on many fronts” if ORVs are permitted to operate on public lands, citing a comprehensive study on the issue conducted by the U.S. Geological Survey (USGS). The USGS study discusses the negative impacts that often result from ORVs being permitted to be used on public lands, including effects on soils, vegetation, wildlife habitats, water quality and the Socioeconomic Implications of ORV use

Concerns over the environmental damage that can result from ORVs being operated on certain lands is not limited to West Virginia. On January 19, the *Virginia Mercury* ran a major story on the environmental damage that ORVs are causing to a system of trails in Southwestern Virginia. The article reported on the three-year fight that a local citizens group, the Clinch Coalition, has had with the Virginia Department of Environmental Quality over erosion and sediment control problems caused by ORVs to the trail system

The 2022 West Virginia Legislature

Once again activities at the legislature have taken front row in the environmental community. The Conservancy Legislative Committee along with the West Virginia Environmental Council and other environmental organizations kept an eye out on good as well as bad legislation. See the article in this month’s Highlands Voice.

Committee Activities

WVHC committees are working on other projects and issues including rerouting of a section of Corridor H, partnering with WV Sun to promote solar installations, preparing recommendations that individuals can do to combat climate change, reviewing Forest Service projects and commenting thereon, preparing for the 2022 Dolly Sods Stewards program activities, monitoring water pollution and mining issues, and planning a Fall Review in October. Committees are always looking for members, so if you are interested, let us know. The WVHC committees are listed here in the Highlands Voice.

5 Tricks and Tips: Prepping for the Season Change - Information from Leave No Trace

Spring doesn’t officially begin until March 20th, but that doesn’t mean we can’t experience Spring-like conditions before then. When the weather warms up, there are a few things we can do to help keep our trails and natural resources in great shape. Read the trips here. [5 Tricks and Tips: Prepping for the Season Change - Leave No Trace \(Intl.org\)](https://www.leaveoutdoors.com/5-Tricks-and-Tips-Prepping-for-the-Season-Change-Leave-No-Trace-Intl-org/)

2022 continues to be another busy year for the Conservancy as we are protecting our highlands of West Virginia and we will keep you informed, as events occur, through *The Highlands Voice*, Facebook, and Instagram.



Damage caused by illegal ORV use on National Forest lands.

More about the Mountain Valley Pipeline (Continued from p. 1)

Indiana Bat, and the Northern Long-eared Bat. It ultimately concluded, however, that the Pipeline would not jeopardize the existence of these species.

A group of citizen organizations—including the West Virginia Highlands Conservancy—appealed the decision by the Fish and Wildlife Service to the Court of Appeals. This decision invalidating the Fish and Wildlife Service's Biological Opinion was the result.

As proposed, the Mountain Valley Pipeline would stretch 302 miles from West Virginia into Virginia. It would cross more than 11,000 streams and disturb 6,951 acres of land, including 4,168 acres of soils that have potential for severe water erosion. Nearly one quarter of the proposed pipeline will cross slopes that are greater than 30%.

Both the Candy Darter and the Roanoke Logperch are particularly susceptible to erosion and the resulting siltation. The Roanoke Logperch makes its living rummaging around on gravelly stream beds, flipping over little rocks, gobbling up whatever bugs it finds. It lays its eggs on gravel stream beds as well. If the gravel is covered with silt, it can't do either of these things.

The Candy Darter is also intolerant of sedimentation. Its historic decline has likely been related to excessive sedimentation. It faces the additional problem of being a homebody. Faced with excessive sedimentation, the Roanoke Logperch will move to another area if possible. The Candy Darter will not.

In cases such as this, involving technical matters, it is the general policy of the courts to defer to agency expertise. If the agency—such as the Fish and Wildlife Service—carefully considered all the relevant information, the court will not second guess the conclusion the agency comes to.

While the Court in this case recognized its duty to not second guess the Fish and Wildlife Service, it concluded that the Service had

not considered and evaluated relevant information. Because of this, it vacated the Biological Opinion.

The groups had also raised questions about the way the Fish and Wildlife Service had considered the Indiana Bat. Because of its ruling on the fish, it was not necessary that it consider the Fish and Wildlife Service's evaluation of the Indiana Bat. The opinion does contain language that indicates that the Court doesn't think the Service did such a hot job on the Indiana Bat either.

The Court did address one question that hangs over the entire pipeline: are we really going to stop a multi-million project that is almost finished over a couple of little fish? The Court's answer was yes. If that is what the law says then that is what the Court is going to do. Citing a precedent from the United States Supreme Court, it said We recognize that this decision will further delay the completion of an already mostly finished Pipeline, but the Endangered Species Act's directive to federal agencies could not be clearer: 'halt and reverse the trend toward species extinction, whatever the cost.' *Tenn. Valley Auth.*, 437 U.S. at 184.

This is not a hard no for the construction of the Mountain Valley Pipeline. It never is. The Court did not conclude that the Endangered Species Act made it impossible for the pipeline to be constructed. It did not conclude that the Fish and Wildlife Service could not make a proper evaluation and decide that the pipeline could be constructed without violating the Endangered Species Act. The Court just decided that, so far, it hadn't done so. It sent the Biological Opinion back to the Fish and Wildlife Service to try again.

The only hard no will come not from a Court or an agency but when the developers decide that, if it is this hard to comply with the law, maybe the Mountain Valley Pipeline was not such a good idea in the first place.

The West Virginia Highlands Conservancy is a non-profit corporation which has been recognized as a tax exempt organization by the Internal Revenue Service. Its bylaws describe its purpose:

The purposes of the Conservancy shall be to promote, encourage, and work for the conservation—including both preservation and wise use—and appreciation of the natural resources of West Virginia and the Nation, and especially of the Highlands Region of West Virginia, for the cultural, social, educational, physical, health, spiritual, and economic benefit of present and future generations of West Virginians and Americans.

The Highlands Voice is published monthly by the West Virginia Highlands Conservancy, P. O. Box 306, Charleston, WV 25321. Articles, letters to the editor, graphics, photos, poetry, or other information for publication should be sent to the editor via the internet or by the U.S. Mail by the last Friday of each month. You may submit material for publication either to the address listed above or to the address listed for Highlands Voice Editor elsewhere in this issue. Electronic submissions are preferred.

The Highlands Voice is always printed on recycled paper. Our printer uses 100% post consumer recycled paper when available.

The West Virginia Highlands Conservancy web page is www.wvhighlands.org.

Out of Date Legislative Update

By Luanne McGovern

A monthly publication such as *The Highlands Voice* does not come out nearly often enough to keep up with what is going on at the West Virginia Legislature. Things change so quickly that to keep up it would require a publication that comes out weekly early in the session, daily toward the middle, hourly during the last week, and about every twenty minutes on the last day. Committee assignments, status, etc. may be accurate for now but could have changed by tomorrow or even later today.

Some of the top legislative priorities for the WV Highlands Conservancy are: Off Road Vehicle use in public lands, Water Quality and Climate change.

Off Road Vehicles (ORVs) in Public Lands

The West Virginia Highlands Conservancy has long opposed ORVs on public lands, as their use is incompatible with all the other uses of public lands. The Allegheny-Blue Ridge Alliance Conservation has gathered a plethora of materials on the effects of Off Road Vehicles on public lands. For a wealth of information on the adverse effects of ORVs, go to the Conservation Hub <https://conservation-abra.hub.arcgis.com/pages/wv-publiclands-orv>.

SB 560 creates a new class of e-bikes called “Class 2 E-bike”, e-bikes that do NOT require the rider to peddle for the engine to engage. Instead, these bikes are self-propelled motorized e-bikes. Current law allows peddle assist e-bikes on public bike and multiuse trails. If SB 560 is adopted, self-propelled e-bikes would also be permitted on these trails. SB 560 passed the Senate and now has been sent to House Judiciary. There are real concerns about the impacts of a fully motorized off-road vehicle for noise, water quality and habitat protection, maintenance of our trails, and even personal insurance requirements.

Multiple bills have been introduced to help expand the use of ORVs on public lands by Senator Mark Maynard, but so far none of these bills have been discussed in committee. These bills include SB 563, SB 564, SB 565, SB 566, and SB 579. We'll let you know if any of these progress further.

Somewhat related are two bills (SB 485 and HB 4408) that are moving through the legislature. They would expand and extend the lease terms for private companies to develop and operate facilities and recreational activities for all of our state parks and forests. The bills give the Director of the WV Division of Natural Resources the sole authority to decide what kind of recreational activities and facilities can be developed by private companies on our state public lands, and can set those lease terms for a 50 year period. There appear to be no guardrails limiting the types of new facilities and activities allowed. Casinos, racetracks, amusement parks, ORV trails or similar developments could be built on our state's public lands.

Water Quality

Multiple bills have been introduced to chip away at water quality standards. A few are making progress through the legislature.

SB 279 (Authorizing DEP to promulgate legislative rules) was signed into law on February 11, 2022. The law strengthens some water quality standards, but weakens criteria for several suspected carcinogens and toxic chemicals. Legislative oversight of site-specific human health criteria changes will be ceded to the Governor.

HB 2598 (Modifying the inspection requirements and the definition of an above ground storage tank) passed the House and is now in the Senate Energy, Industry and Mining Committee. This bill would lessen the inspection requirements for aboveground tanks in “areas of critical concern”, i.e. upstream of drinking water intakes.

On the positive side, SB 480 (Relating to DEP Office of Oil and Gas) would increase funding for oil and gas inspectors. Currently, the Department of Environmental Protection Office of Oil and Gas (OOG) only has nine inspectors overseeing approximately 75,000 wells and 28,000 tanks across the state. That's one inspector for every 8,000 wells. SB 480 would impose an annual fee of one hundred dollars per well. Low producing wells would be exempt. This fee would produce enough revenue that we could have one inspector for approximately every 4,000 wells. This bill has passed the Senate and is in the House Finance committee.

Climate Change

There are multiple bills that have been introduced to the Legislature on climate related issues, especially alternative energy sources. Nuclear, geothermal, rare earth elements, and carbon sequestration are all being discussed. Depending on where you stand on the various issues, this can be good news or bad news.

SB 4 (Repealing ban on construction of nuclear power plants) was signed into law on February 1, 2022. It repeals the previous law that outlawed nuclear power plants to be built in WV. Related HB 2882 is also being considered.

SB 622 and HB 4491 both deal with regulations around carbon dioxide sequestration, and are likely to pass.

Several bills related to the recovery of Rare Earth Elements and Critical Minerals from Acid Mine Drainage (AMD) are making their way through. The tax credits would provide incentives for AMD system operators to invest in facilities to recover these materials for future use. Research at WVU is showing promising results for the future of recovery of Rare Earth Elements from AMD.

Keeping up with the WV Legislature can be a daunting undertaking. In 2022, the Senate has already introduced over 700 bills and the House has introduced over 1400 bills! The WV Highlands Conservancy has forged great partnerships with the WV Environmental Council, WV Rivers, West Virginians for Public Lands and many other fantastic organizations – all with the goal of keeping West Virginia wild and wonderful – now and for future generations.

Off-Road Vehicle Recreation on West Virginia Public Lands

By Cory Chase

The West Virginia Highlands Conservancy, in partnership with the Allegheny-Blue Ridge Alliance's (ABRA), has just released a [new project page](#) about the harmful effects of Off-Road Vehicles (ORVs, a.k.a. Off-Highway Vehicles/OHVs) on our public lands. It is one of many projects on the [Conservation Hub](#). The new ORV project page contains detailed information on the negative effects to soil, plants, water, air, animals, etc., and also has a statewide interactive map that shows trails on public lands, sensitive habitats, slip potential on different soil types, and stream crossings.

The page also lists laws and state and Federal agencies that can and should be involved in determining the efficacy of these proposals. Please peruse this resource and share with anybody who would benefit from this information. The battle over our public lands is a perennial issue. We hope that this Conservation Hub project remains a useful resource and we intend to update it as time goes on.

This year in the WV Legislature, we have seen proposals that lay the groundwork for a statewide [overlanding](#) program on our public lands (both state parks and state forests). Overlanding typically refers to travel via vehicle to remote locations, usually for camping, often considered "car camping." All of these overlanding proposals link back to Senator Mark Maynard, who is actually a director of the Blue Ribbon Coalition, a national overlanding group which has the website www.ShareTrails.org.

They—rather deceptively—claim to be a group of "outdoor enthusiasts" who work to keep trails open...but if you take a minute to look deeper, they are merely focused on keeping trails open for motorized use. The Blue Ribbon Coalition's Executive Director, Ben Burr, testified at the Senate Natural Resources committee in favor of [SB562](#). During his polished speech, he did not mention ORV's/ATVs once. (See the Natural Resources Committee livestream [here](#), testimony starts approx. 1:24:00)

This bill would scrap the WVDNR's current Adopt-A-Trail program and replace it with a new program that gives more power solely to the DNR Director and takes power away from state park superintendents. On face value, some may see the bill as harmless, but the threatening language includes words like trail "enhancements" and "accessibility projects." This is arguably the foundation for using unimproved roads and converting former hiking and biking trails to overlanding trails. Senate Bills [563](#), [564](#), [565](#), [566](#), and [579](#) are also in concert with Maynard's overlanding program.

On the House side of the Capitol Rotunda, [HB4408](#) aims to swing the door wide open for all state parks and state forests to become more privatized and extends the lease terms to up to 50 years! This bill could also incentivize private investment for things like casinos, mountain roller coasters, fast food establishments, and ATV trails on our public lands. The bill is vague enough that there aren't many safeguards in place and, as of this writing on a cold and blustery day at the end of February, it just passed the 2nd reading on the House Floor and moved on to the 3rd reading. There is a good [fact sheet](#) and an action alert [HERE](#) from our partners at WV Rivers Coalition. Please contact your legislators about these bills and tell them to protect our state parks and state forests.

Note: There are hyperlinks in the online version of the Voice but too many links to print here.



WV Environmental Council and Our Supporters wvecouncil.org

Rare Earth Elements and Critical Minerals from Acid Mine Drainage

By Luanne McGovern

If you’ve been following the news from the 2022 West Virginia Legislative session, you know that recovery of Rare Earth Elements (REEs) from Acid Mine Drainage has been a hot topic. In mid-February, a group from the WV Highlands Conservancy Board went to WVU to discuss their REE research program with Dr. Paul Ziemkiewicz, Director of the WV Water Research Institute.

(See January 2022 *The Highland Voice* article: “Something Useful from Acid Mine Drainage: Is that Possible?” by John McFerrin for background.)

Dr. Ziemkiewicz is a nationally recognized expert on Acid Mine Drainage (AMD) and has been investigating the recovery of Rare Earth Elements for several years. In 2019, he and his team were awarded \$5 million by the U.S. Department of Energy to scale up its successful Rare Earth Recovery Project, which will include building a facility at the acid mine drainage treatment plant near Mount Storm in Tucker County WV.

What are Rare Earth Elements?

Rare Earth Elements are a set of 17 heavy metals that are not really that “rare”. They are actually quite plentiful in the Earth’s crust, but are not concentrated and are difficult to separate. The elements have very similar chemical properties, but each has unique electronic and magnetic properties, and so can fill technology niches in today’s electronics.

How are REEs recovered from Acid Mine Drainage?

Getting from highly dilute concentrations of REEs in AMD to pure elements is a complicated multistep process. The first step would occur at the mine water source, since the water is already being treated before discharge.

Step 1 - pH adjustment and Water Removal:

AMD usually has a pH of about 2.5, and contains a mixture of all types of metals, including iron, aluminum, silica, cobalt, zinc and the REEs. The first step of the process would add lime and increase the pH to about 4.5, which would allow the iron, silica and aluminum to be removed. The second step would increase the pH to about 8.5, which would allow the cobalt, zinc and REEs to be removed. The majority of the water would be removed and then be discharged as usual from the facility. The solids (sludge) would be recovered to become the feed source for the REE refinery. This sludge can contain between 500 and 1000 grams of REEs per ton of sludge.

Step 2 – REE Refining:

The concentrated sludge would then be sent to a centralized REE refinery. Using a multistep (and highly secretive!) process, the REEs would be extracted from the sludge through a variety of acid

leaching, solvent extraction and liquid separation steps. This is part of the technology that WVU will also be piloting at Mt. Storm. The final concentrate is expected to be essentially 100% REEs. There could also be an option to recover Critical Minerals, such as zinc and cobalt.

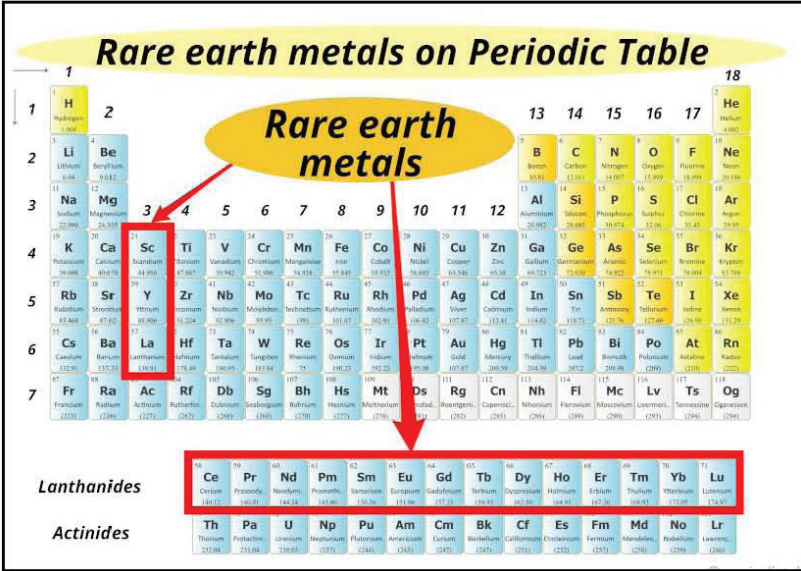
Step 3 – Elemental Separation

Finally, the various REEs must then be separated from each other. Refiners use a variety of chemical, mechanical, electrical and magnetic processes to separate the various minerals into their pure forms. These pure REEs are then used in hundreds of different applications in most high tech products.

As you can see, getting the REEs from acid mine drainage water to your smart phone is a long and complicated process. Dr. Ziemkiewicz envisions that the Step 1 would be accomplished at individual mine sites. For Step 2, the sludge would then be shipped to a centralized refinery – hopefully located within West Virginia. The final concentrate would then be sold to refiners, who would produce the final elemental materials (Step 3). Initial cost estimates for the centralized refinery are in the hundreds of millions of dollars, and would take many years to build and start up.

Given the high cost and long timeframes for development, the WV Legislature is looking at multiple tax incentives to drive this industry forward. HB 4003 establishes that the value of all materials recovered from the AMD belong to the persons treating the water. HB 4025 would grant a 5 year exemption from severance tax on all recovered materials. Both of these bills have passed the House and are under consideration in the Senate. HB 4657 would give tax credits to entities

building
R E E
facilities
in the
state.



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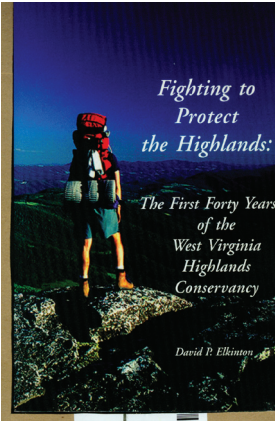
Membership categories (circle one)			
	Individual	Family	Org.
Senior	\$15		
Student	\$15		
Introductory	\$15		
Other	\$15		
Regular	\$25	\$35	\$50
Associate	\$50	\$75	\$100
Sustaining	\$100	\$150	\$200
Patron	\$250	\$500	\$500
Mountaineer	\$500	\$750	\$1000

Mail to West Virginia Highlands Conservancy, P. O. Box 306, Charleston, WV 25321

West Virginia Highlands Conservancy
Working to Keep West Virginia Wild and Wonderful

You may also join on-line at www.wvhighlands.org

GET A GREAT HISTORY BOOK



For the first time, a comprehensive history of West Virginia’s most influential activist environmental organization. Author Dave Elkinton, the Conservancy’s third president, and a twenty-year board member, not only traces the major issues that have occupied the Conservancy’s energy, but profiles more than twenty of its volunteer leaders. From the cover by photographer Jonathan Jessup to the 48-page index, this book will appeal both to Conservancy members and friends and to anyone interested in the story of how West Virginia’s mountains have been protected against the forces of over-development, mismanagement by government, and even greed.

518 pages, 6x9, color cover, published by Pocahontas Press

To order your copy for \$15.95, plus \$3.00 shipping, visit the Conservancy’s website, wvhighlands.org, where payment is accepted by credit card and PayPal. Or write: WVHC, PO Box 306, Charleston, WV 25321. Proceeds support the Conservancy’s ongoing environmental projects.

SUCH A DEAL!

Book Premium With Membership

Although *Fighting to Protect the Highlands, the First 40 Years of the West Virginia Highlands Conservancy* normally sells for \$15.95 plus \$3.00 postage. We are offering it as a premium to new members. New members receive it free with membership. Existing members may have one for \$10.00. Anyone who adds \$10 to the membership dues listed on the How to Join membership or on the renewal form will receive the history book. Just note on the membership form that you wish to take advantage of this offer.

What about Geothermal Energy?

By John McFerrin

Is geothermal energy a possible source of energy for West Virginia?

A modern society needs some way to produce electricity that is available all the time, not just when sun shines or the wind blows. In West Virginia, this perpetual availability—usually called base load—has mostly been provided by coal. As the availability of solar and wind power waxed and waned, coal was always there, chugging away, providing electricity.

Now that coal is in its dotage, West Virginia has begun to search for an alternative. A better system for storing electricity from wind and solar would make them into base load supply. That would take substantial advances in battery or other storage technologies as well as a substantial investment. Burning natural gas provides base load power but it also produces greenhouse gas. West Virginia has some untapped potential for hydro power. Nuclear power has its advocates, as well as those who feel just as strongly that nuclear power is a terrible idea. See the February, 2022, issue of *The Highlands Voice*.

But what of geothermal energy? It certainly has the potential to serve as a base load power source. Is it something that we should be considering?

Geothermal energy is, quite literally, heat from the earth. The earth's core is made up of mostly molten iron with a temperature roughly equal to the surface of the sun. Were we able to tap even the smallest fraction of that energy we could meet the earth's energy needs with plenty to spare.

The big difficulty is, of course, that the earth's core is about 8,000 miles deep. All of that heat is not available.

With currently available technology, about the only places where any of that heat is being used for electricity production are power plants located near hot springs or volcanoes. There are places where water has been close enough to the earth's core to become heated and has found its way through cracks in the earth's layers until it is close to the surface. If it reaches the surface, it usually emerges as hot springs.

In spots where the hot water is close to the surface, the heat can be used to make electricity. As the end of 2019, the United

It is also limited by geography. Some people in California and Alaska were fortunate enough to live where hot water is close to the surface. They were clever enough to use that heat to make electricity. Those who are fortunate enough to live near a source of easily accessible geothermal energy have a ready supply of electricity free of carbon dioxide emissions.

What about the rest of the world, the large fraction of the Earth's surface where there are no hot springs, no volcanoes, no relatively shallow sources of geothermal energy?

For the rest of the world, the geothermal energy is there. It is just a lot deeper and harder to get to. Until some technical problems are worked out, that energy is not available for human use.

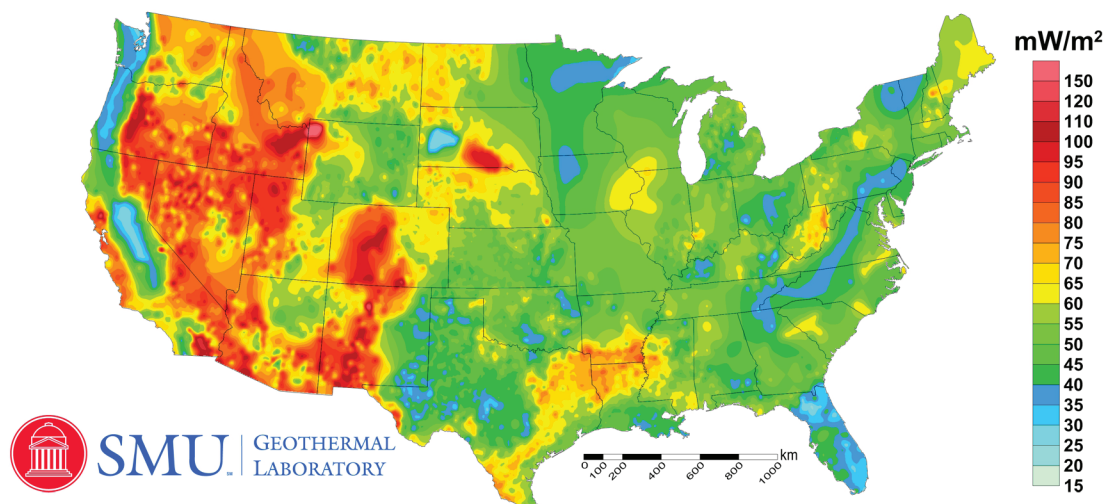
There are possibilities on the drawing board. One is to drill two very deep (4-5 miles) holes and use hydraulic fracturing to connect them at the bottom.

Water pumped down one hole would get heated. When it emerged from the other hole it would be hot enough to be used to make electricity. It is theoretically possible to build a closed system in which the holes from the surface are connected by a series of pipes. Water pumped through these pipes would absorb heat from the hot rocks and return to the surface as water hot enough to make electricity.

The technology still needs to be perfected before any of these techniques for geothermal energy from deep underground sources becomes a reality. Engineers have

(Not finished yet; go to the next page)

SMU Geothermal Laboratory Heat Flow Map of the Conterminous United States, 2011



Reference: Blackwell, D.D., Richards, M.C., Frone, Z.S., Batir, J.F., Williams, M.A., Ruzo, A.A., and Dingwall, R.K., 2011, "SMU Geothermal Laboratory Heat Flow Map of the Conterminous United States, 2011". Supported by Google.org. Available at <http://www.smu.edu/geothermal>.

States had over 3,600 megawatts of installed generating capacity of geothermal energy. All of it is in Alaska, Hawaii, and the Western states; there is nothing east of Colorado.

For spots where there is not enough heat to make electricity, there is a consolation prize. The warm, but not blazing hot enough to make electricity, water can be used to heat buildings. The city of Boise, Idaho, has used it to heat commercial and residential buildings since 1890 and still does so.

Technologically speaking, the electricity that is being produced so far is the easy stuff. The heat is fairly close to the surface and can be accessed with existing technology.

More about Geothermal Energy (Continued from previous page)

gotten a boost from the oil and gas industry; it already knows how to drill holes far into the ground. The oil and gas industry never had to deal with super hot water or super hot rock so the technology would not transfer perfectly but some of it would.

What about West Virginia?

On the face of it, it would appear that West Virginia would be a poor candidate for geothermal energy, at least of the kind that is accessible with current technology. While the more advanced methods for accessing geothermal energy would be possible anywhere, the readily available geothermal energy is usually found where there are hot springs or volcanoes. West Virginia does not have hot springs. With the exception of WVU head basketball coach Bob Huggins (a metaphorical, not an actual, volcano) we don't have volcanoes.

The face of it, however, is not always right. Southern Methodist University

has done some mapping of geothermal resources. On its maps, West Virginia is an anomaly for the Eastern United States. Among all the different colors indicating low temperatures, and thus little geothermal potential, there are some yellows and oranges in Northern West Virginia.

So, are we sitting on a gold mine, an easily accessible source of geothermal energy, a base load electricity source there for the taking? Nobody knows but we are about to find out. Researchers from West Virginia University are drilling a 15,000 foot hole near Morgantown. They will be able to collect data to tell us what the potential for geothermal electricity is.

With West Virginia's lack of hot springs or volcanoes, finding the kind of relatively shallow geothermal energy that existing technology could turn into electricity is unlikely. The water and rock might not be hot enough. Even if the water and rock

are not hot enough to generate electricity, it might be hot enough to provide heat to, for example, the buildings on West Virginia University's campus.

Learn More

For more detail about some of the things discussed in this article, go to a story on the Vox website, <https://www.vox.com/energy-and-environment/2020/10/21/21515461/renewable-energy-geothermal-egs-ags-supercritical>

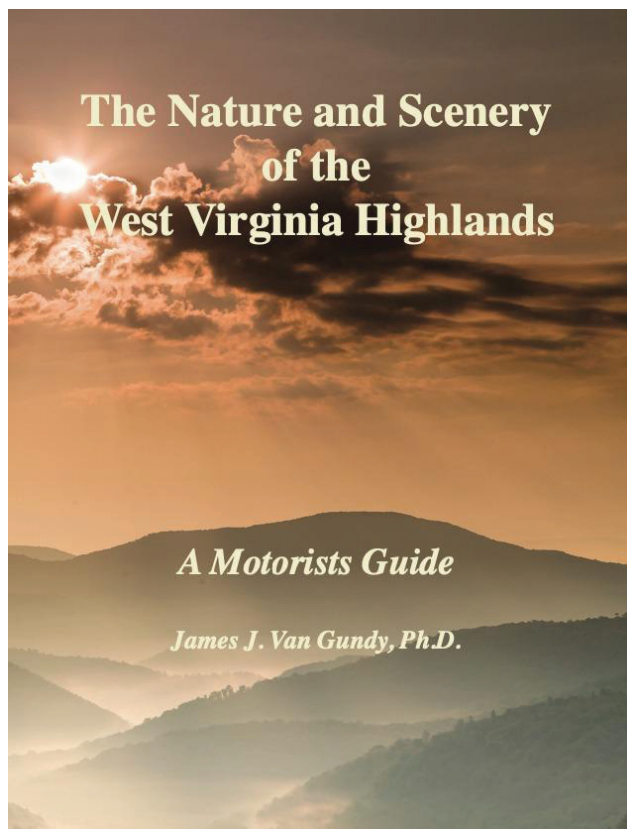
For more general discussion and information about geothermal energy go to www.smu.edu/geothermal. Southern Methodist University has a lab devoted to the topic. There is a lot of information, including multiple heat maps showing temperatures at various depths.

New Guide to the West Virginia Highlands

Jim Van Gundy, former West Virginia Highlands Conservancy Board member and longtime friend of the Highlands Conservancy, has published his book, *The Nature and Scenery of the West Virginia Highlands: A Motorist's Guide*. Chapters on the Highlands' history, climate, geology, botany, wildlife, and more are followed by 32 highway segments and what's to be seen, explored, and understood along the way. This well-written guide will be equally useful to day-trippers and determined explorers, and those of us lucky enough to live here will find there's more to learn and discover. Like the Monongahela National Forest Hiking Guide, it has a striking photograph by Kent Mason on the cover. Side by side, they look like companion volumes.

To order, go to mcclainprinting.com. Select Book Store at the top of the page and search for "nature." It should be available on Amazon in the near future.

For people in the Elkins area, there will be a presentation and book signing at the Elkins Randolph County Community Arts Center on Thursday, March 10th at 7:00 PM. Copies of the book will be available there at the lightly discounted rate of \$25 per copy. Light refreshments will be served.



Supporting the Wilderness Climate:

The First Season of Dolly Sods Wilderness Stewards

Part 4: Impact and Response

By Dave Johnston

In the first three parts of this article, which is based on the presentation I made at the WVHC Fall Review, we looked at the provisions of the Wilderness Act of 1964 as they relate to the values of “wilderness character”, how the Dolly Sods Wilderness was officially created under those principles, how wilderness designation has protected Dolly Sods, and the sources of the increased popularity of Dolly Sods. In this installment I want to look at the impacts of increased visitation at Dolly Sods and how those can be addressed.

In a future article I’ll discuss how the Dolly Sods Wilderness Stewards was organized to respond to those threats, what we have learned from our first season, and what is planned for the future.

Carrying Capacity

It would be useful to look back at the first installment of this series, where the concepts of wilderness described in the Wilderness Act were described. The Statement of Policy for the Act states that wilderness areas are to be “administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness.” One of the key objectives of wilderness is that it be available for people to experience, but at the same time it must be preserved so that the experience is *of* a wilderness.

Every wilderness, and each part of a wilderness, has a maximum carrying capacity, the highest number of visitors that can be accommodated without unacceptable degradation of the resource or visitor experience. There is a science of visitor use management utilized by land managers to assess the levels and thresholds excessive impact and tie them to usage levels. That would make a worthy topic for another article. But for now, suffice it to say that one of the objectives of the Wilderness

Stewards is to provide the data on usage and impacts that the Forest Service can use to make informed visitor use management decisions.

It needs to be stipulated that everyone, even the best intentioned among us, has impact when we visit the wilderness. Every visit by a human has some impact, even by those who are sensitive, careful, experienced, and skilled in backcountry practices. The carrying capacity of an area can be either optimized or diminished by the choices of those visiting.

So the goal of visitor use management is, first and foremost, to promote attitudes and behaviors that tend to be compatible and supportive of wilderness character. Conversely, effective visitor use management also involves identifying the patterns of behavior that tend to have the greatest negative impact, and take steps to minimize their occurrence. Steps to directly limit the number of visitors are available, but normally only instituted when other options have been exhausted.

So one of the key roles that the Wilderness Stewards play is to appeal to the best intentions of most visitors, and try to provide them with the information or motivation (or both) to minimize their impact in the wilderness. Using authority-of-the-resource techniques and drawing on Leave No Trace principles, volunteers work in key messages designed to anticipate choices visitors will need to make affecting some of the greatest areas of impact at Dolly Sods. This effort is part of a strategy to make outright restrictions on visitation unnecessary.

Here are examples of some of the visitor impacts observed in Dolly Sods and how the Wilderness Stewards attempt to preemptively address them:

Degradation of trails and surrounding area

Trails in Dolly Sods are frequently severely eroded and muddy. People tend to try to avoid the mud, resulting in ever-expanding

trail width and bypass trails, extending into adjacent wetlands. Sometimes unofficial trails look similar to the real trail, leading unwary hikers astray, sometimes becoming lost.

Message: As a wilderness, Dolly Sods is more primitive than other areas, and invites a more primitive experience. Please stay on trails, even through the mud, to avoid damage to natural areas. We wary of side trails, and if you find yourself on a disappearing trail, turn around and go back the way you came.

Note: This does not eliminate the need for overdue maintenance and remedial repair and relocation of trails in Dolly Sods. It is just something people can do to avoid making things worse.

Proliferation of campsites

The number of campsites in Dolly Sod has expanded greatly; there may be more than 300. Some are in inappropriate locations such as right next to the trail, and some areas have large number of sites in in close proximity, creating “neighborhoods”.

Message: Camping areas have the most impact of any human activity in the wilderness, and one of the reasons people go to wilderness is for the solitude and the experience of nature without distraction. To minimize impact, use an existing campsite rather than making a new one. Enhance your solitude as well as that of others by using sites that are away from other sites.

Note: Concurrently, the Stewards are working with the Forest Service to survey and assess the number of campsites and the level of impact of each. This may help with elimination of excess or inappropriate sites.

Firewood impacts

The number of campsites, their occupancy rate, and concentrations have resulted in severe depletion of dead and down wood for campfires in some areas. Many campsites are scarred with

(More on the next page)

More about Dolly Sods (Continued from previous page)

trees felled for firewood, and some areas host virtual stumptowns. There have been cases of fire spread or near escapes in Dolly Sods.

Message: In a healthy forest all trees, including standing dead ones, and even dead and down wood, play important roles in supporting wildlife and natural processes. Especially in heavily used areas, consider not having a campfire, and if you must, range far from the campsite to avoid concentrated depletion of wood on the ground. Never cut anything standing, not even branches. Burn only in an established fire ring, and keep fires small and controlled, and fully extinguished before leaving.

Note: Some heavily impacted areas have instituted bans or limitations on campfires, especially where there is vulnerability to wildfire. Unless current impact is limited, this is not out of the question for Dolly Sods.

Inappropriate structures

Increasingly, visitors have been leaving monuments to their presence, such as gratuitous rock stacks, carved log “totems”, and outright defacement of trees and rocks. Campsite “furniture” such as benches, chairs and even tables made from rock slabs dislodged from streams are proliferating.

Message: Aquatic and terrestrial wildlife depend on naturally distributed rocks in streambeds, talus fields, and embedded in the ground. Disturbing their habitat leaves them vulnerable to predation or exposure to stressful conditions and may affect their ability to reproduce; they do not necessarily adjust or recover easily. In addition, one of the key values of wilderness is that it is as free as possible of human structures and other evidence of human intervention. Both for the sake of wildlife and for our enjoyment of wilderness, don’t purposely disturb rocks or construct unnecessary structures.

Note: Though they are inconsistent with wilderness, human-made structures can themselves become home to creatures. The Forest Service recommends not peremptorily disassembling them without consulting with their officials first.

Trash and poor hygiene

Lots of trash along trails has not been a big problem at Dolly Sods. But campsites do tend to suffer from leftover trash, abandoned gear, and fields of toilet paper flowers.

Message: Litter is always unsightly no matter where it is left. But trash left in campsites invites critters to identify them as potential sources of food, which can lead to unfavorable conflicts with humans. “Organic” waste such as orange and banana peels does not readily degrade in this environment and is attractive to animals. Human waste and toilet paper near campsites is obviously objectionable and rude to other visitors. Pack out all wrappers, containers, and leftovers. Do your business well away from the campsite, use a cathole to bury waste and toilet paper, and leave your site inviting for the next person.

Drone and low-flying aircraft overflights

The rapid growth in popularity of drones has fed a large increase in their use in the airspace over Dolly Sods and other wilderness. Ultralight aircraft and motorized gliders have been observed flying low over the wilderness.

Message: The Wilderness Act and Forest Service regulations specifically prohibit landing or operation of aircraft within wilderness, so those activities are simply illegal. But beyond mere legality, it is clear that operation of motorized or mechanical transport in a manner that impacts the natural area is not compatible with the meaning and goals of wilderness. In addition to the potential disturbance of wildlife, wilderness is supposed to be free of the motorized cacophony of civilization, and be as free as possible of the evidence of human control and dominance of nature. Motorized aircraft intrude on the wilderness experience of other visitors and mock the very purpose wilderness. Aircraft operators, whether subject to a citation or not, are encouraged to treat wilderness as a “place apart” and refrain from imposing their hobby on a place it just doesn’t belong.

Parking and traffic

Dolly Sods is bounded on 11 miles of its perimeter by forest roads that see increased levels of traffic and, at certain points, a need

for parking that far exceeds capacity. The roads often have traffic jams and become eroded and potholed from overuse, and visitors resort to parking in ways that impede traffic or head out into adjacent meadows.

Message: While this doesn’t happen “in” the wilderness it nevertheless affects it, both the land and the wilderness experience. Visitors arrive at the doorstep of the wilderness confronted with urban-like traffic that is likely worse than what they deal with at home, and start their experience aggravated and on edge. The situation is akin to having to fight for a parking space at their city park during a festival, rather than an introduction to the natural qualities and calm of wilderness. This inevitably affects their attitude toward wilderness, and diminishes their ability to recognize it as a place of special attributes needing special protection. It erodes the likelihood that they will treat it as wilderness once they enter. This makes the front country traffic snarl also one of the more fundamental threats to the wilderness character of Dolly Sods.

The above issues are just a sampling of the impacts of increased visitor usage at Dolly Sods. The first line of defense, so to speak, is to influence visitor awareness, attitudes and behaviors toward those that are compatible with and supportive of wilderness. The Wilderness Act allows for more direct forms of management to fulfill its mandate to preserve wilderness character, but it also places a high value on the opportunity for a “primitive and unconfined type of recreation”. “Unconfined” in this context means with minimal restriction, control or intrusion on visitor activities. Thus the goal of the Dolly Sods Wilderness Stewards is to make enough of a difference in user practices that its wilderness character can be restored and preserved without the need to resort to more intrusive measures.

If you would like to be part of making a difference at Dolly Sods please consider joining us! We will be forming new teams of volunteers this spring and are targeting mid-May for our next orientation and training. For more information and to join, go to <https://bit.ly/3pBjiyV>.

The Highlands Voice: It's Not Just for Reading Any More

The Highlands Voice is the main way that the West Virginia Highlands Conservancy communicates with its members. But we would like to communicate with more than our members. We have a valuable perspective and information; we would like to communicate with everybody. We still offer electronic delivery. If you would prefer to receive it electronically instead of the paper copy please contact Dave Saville at WVHC50@gmail.com. With electronic delivery, you will receive a link to a pdf of the Voice several days before the paper copy would have arrived.

No matter how you receive it, please pass it along. If electronically, share the link. If paper, hand it off to a friend, leave it around the house, leave it around the workplace. It's not just for reading. It's for reading and passing along.

BUMPER STICKERS

To get free *I ♥ Mountains* bumper sticker(s), send a SASE to P. O. Box 306, Charleston, WV 25321. Slip a dollar donation (or more) in with the SASE and get 2 bumper stickers. Businesses or organizations wishing to provide bumper stickers to their customers/members may have them free. (Of course if they can afford a donation that will be gratefully accepted.)



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Mon National Forest Hiking Guide

Celebrating the 50th anniversary of the West Virginia Highlands Conservancy, the new edition of the treasured guide to every trail in the Monongahela National Forest features brand-new topographic maps and Kent Mason's gorgeous photos, all in color.

The Guide has been updated with the cooperation of National Forest District Rangers and Recreation Specialists to reflect changes in the past ten years:

- * newly designated wilderness areas
- * new trails near campgrounds and sites of special significance
- * a new complex of interconnected trails on Cheat Mountain
- * rerouted and discontinued trails
- * ratings for difficulty, scenery, access to water, and much else

The definitive guide to the Mon adds a wealth of information about history, wildlife, and botany; safety, preparation, and weather; horseback and mountain bike riding and cross-country skiing; as well as sources of further information on the Forest and its environs.

The Monongahela National Forest has long been known as a 'Special Place'. The hiking, backpacking, and cross-country skiing opportunities it provides are among the best in the eastern U.S. New wilderness and backcountry trails have been added to the outstanding areas we have appreciated for decades – Otter Creek Wilderness, Dolly Sods Wilderness, Flatrock Plains, Roaring Plains, Blackwater Canyon, Spruce Knob, North Fork Mountain, Shaver's Mountain, Laurel Fork Wilderness, Cranberry Wilderness -- and there are lesser-known gems to be found in between.

Profits from the sale of these guides support a wide variety of worthy environmental projects for the West Virginia Highlands Conservancy.

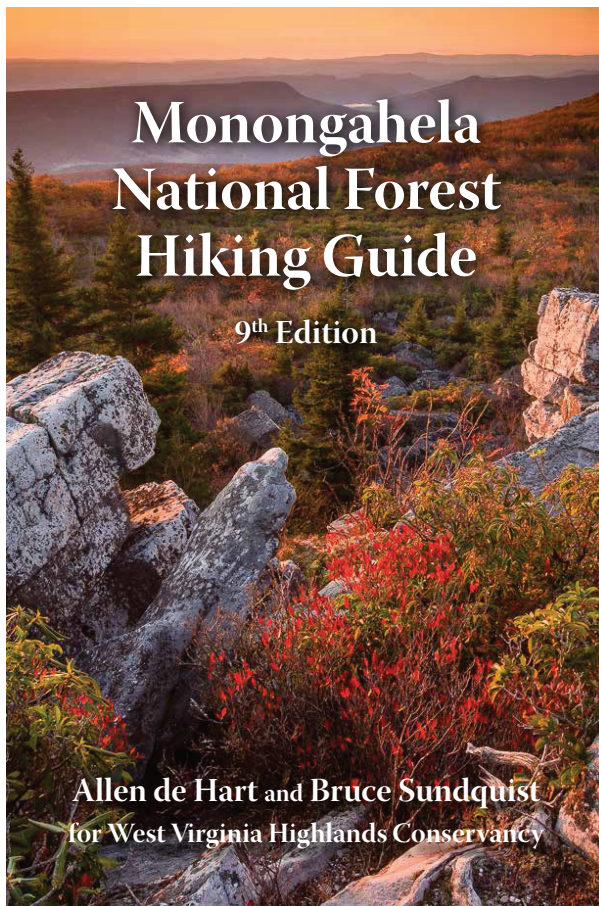
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HATS FOR SALE

We have West Virginia Highlands Conservancy baseball style caps for sale as well as I ❤️ Mountains caps.

The WVHC cap is beige with green woven into the twill with a pre-curved visor. The front of the cap has West Virginia Highlands Conservancy logo and the words West Virginia Highlands Conservancy on the front and I (heart) Mountains on the back. It is soft twill, unstructured, low profile, sewn eyelets, cloth strap with tri-glide buckle closure.

The I ❤️ Mountains The colors are stone and red.. The front of the cap has I ❤️ MOUNTAINS. The heart is red. The red hats are soft twill, unstructured, low profile, sewn eyelets, cloth strap with tri-glide buckle closure. The stone has a stiff front crown with a velcro strap on the back. All hats have West Virginia Highlands Conservancy printed on the back. Cost is \$20 by mail. West Virginia residents add 6% tax. Make check payable to West Virginia Highlands Conservancy and send to West Virginia Highlands Conservancy, Atten: Online Store, P.O. Box 306, Charleston, WV 25321-0306

John McFerrin; Twenty Years Our Editor

By Cindy Ellis

In March, 2002, Frank Young was the president of the West Virginia Highlands Conservancy. In our newsletter, “The Highlands Voice,” he welcomed someone familiar to WVHC but newly tackling the job of editing The Voice. Frank noted that John McFerrin would be assembling the paper with the help of a computer program rather than the tried-and-true manual cut and paste method. John has now been hard at work for twenty years...and are we glad!

Editor McFerrin brought a unique background and sublime skills to the task of keeping our members informed. He is cited 24 times in our history book [“Fighting to Protect the Highlands; the First Forty Years of the West Virginia Highlands Conservancy” by David P. Elkinton] and we continue to profit from his prominence in our history and his editorial work today.

John grew up near the coal mining areas of eastern Kentucky; he graduated from the University of Kentucky and Duke Law School. This was followed by work with AppalReD [Appalachian Research and Defense Fund] in Kentucky and West Virginia. After he became acquainted with the WVHC he served as chair of the mining committee, Senior Vice President and as a two-term President.

He often did and does write guest columns for the Charleston newspaper. In 1998, Governor Cecil Underwood appointed McFerrin to his Mountaintop Mining Task Force. In that capacity John published his Minority Report in 1999. He was blunt. “The historical record is overwhelming that the presence of coal mining does not contribute to the long-term economic health of West Virginia.”

Obviously, the fine editing skills shown in *The Voice* are buttressed by the continuing years of eloquent writing on the part of John himself. This can be accompanied by dry wit, as in remarks about the national DEP: “DEP has been a mess for at least ten years. In another ten we may have the problem figured out and be ready to

start thinking about a possible solution. We’ll get back to you.”

On behalf of nine environmental groups, McFerrin wrote a biting and detailed response to an invitation to appoint a representative to a Special Reclamation Fund Advisory Council. He ended with, “Having been excluded from the creation of the program, the groups could not now participate as part of an Advisory Council trying in vain to make a flawed system function.”

And yet, John is an optimist...and he often displays his wit, humor, and appreciation for nature in his handling of headlines, asides, and through the “What’s Inside” lists that showcase our Voice contents.

Our history book notes, “...The Highlands Voice has been deeply blessed with wonderful writers and editors.” Indeed, we have! One can see proof of that through the archives, available on our website, of our newsletter, from its inception, to John’s association with it in 2002, and as it continues today.

Ken Hechler wrote a preface for our book. He lauded, “Thank God for the Cindy Ranks, the John McFerrins, and the Julian Martins of the Highlands Conservancy, who have helped bring these abuses to national attention, and enabled local victims in these communities to have the courage to speak out, even at considerable personal risk.”

We are proud of the fine efforts of John McFerrin and look forward to a long continuation of seeing his handwork in *The Voice* each month.

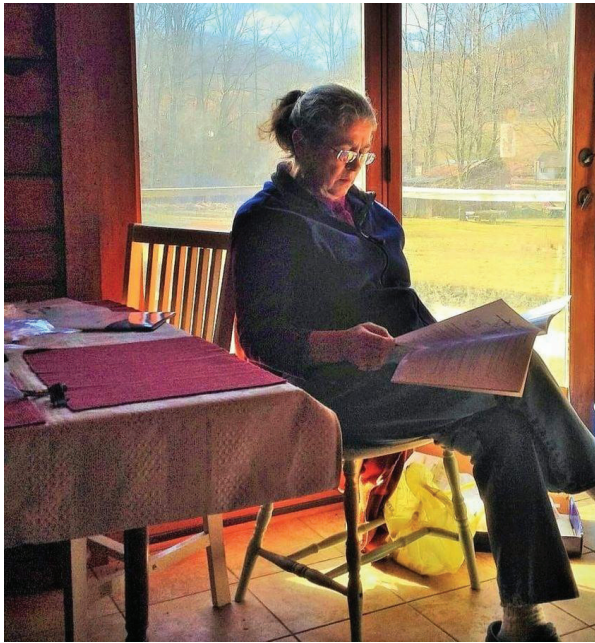
Editor’s note: Ordinarily it might be unseemly to choose to publish so many kind words about oneself. In this case, Ms. Ellis used the magic words, please and thank you (Captain Kangaroo, five days a week, 1957). I had no choice.

Send Us a Post Card, Drop Us a Line, Stating Point Of View

Please email any poems, letters, commentaries, etc. to the VOICE editor at johnmcferrin@aol.com or by real, honest to goodness, mentioned in the United States Constitution mail to WV Highlands Conservancy, PO Box 306, Charleston, WV 25321.

Leave a Legacy of Hope for the Future

Remember the Highlands Conservancy in your will. Plan now to provide a wild and wonderful future for your children and future generations. Bequests keep our organization strong and will allow your voice to continue to be heard. Your thoughtful planning now will allow us to continue our work to protect wilderness, wildlife, clean air and water and our way of life.



Loss of a Friend

We are saddened to note the passing of our member Mirijana Beram of Doddridge County. Mirijana was born in Croatia; living here in West Virginia she developed a deep love for Doddridge County. She retired from Dominion Energy as a mapping specialist and was an environmental activist. We especially remember that she co-hosted a tour in her county, sponsored by WVHC, of the impacts of Marcellus Shale drilling there, and that she joined others in opposition to the Antero frack wastewater plant. Mirijana was both tough and sweet and we are very fortunate to have known her.



New Board Members

We welcome two new members of the Board of Directors. First, we welcome Dave Ruediger as an organizational Director, representing the West Virginia Rivers Coalition. Dave grew up in the woods, rivers and lakes of Michigan. This led him to degrees in horticulture and science education. He spent 36 years teaching students biology, environmental and earth science in Michigan, Illinois and, for the past 29 years, West Virginia. The mountain streams and whitewater of The Mountain State called to him and he spent a large portion of his mid-life in the rocks and rapids of the Elk, Gauley and New Rivers. In 2001, his soul-mate, Pam, and he were married next to a waterfall on the BlackFork of the Elk River in Webster County. They now reside near the BlackFork of the Cheat River in Tucker County. They are both active with the Friends of the Cheat and the Cheat River Water Trail.

Next we welcome Campbell (Cam) Moore. He lives in Canaan Valley with his wife and young son and has loved the West Virginia Highlands ever since first visiting on backpacking trips in college. Cam has a long background working on conservation and climate change in Africa, Asia and Latin America as well as several years focused on West Virginia. He is passionate about sustainable land management, expanding protected areas, and fighting climate change to make sure West Virginia's mountains continue to be graced with snow every winter. Cam currently works for The Nature Conservancy on their global carbon team.

The National Forest and the Candy Darter

By Rick Webb

As described in my presentation for the 2021 Highlands Conservancy Fall Review, current Forest Service management practice does not bode well for preservation and restoration of the endangered candy darter. Although the occupied range of the candy darter is now mostly limited to streams draining the Monongahela National Forest (MNF) and the Jefferson National Forest (JNF), the Forest Service has plans for multiple projects that risk loss of this remaining habitat.

Figure 1, adapted from the Fall Review presentation, shows the historic and currently occupied habitat of the candy darter in relation to the region's National Forests. **Figure 2** shows the location of current MNF projects and project proposals in watershed areas that drain to designated critical habitat for the candy darter. Two natural gas pipeline corridors that would cross candy darter critical habitat are also shown: the now-cancelled Atlantic Coast Pipeline (ACP) and the persistently challenged Mountain Valley Pipeline (MVP).

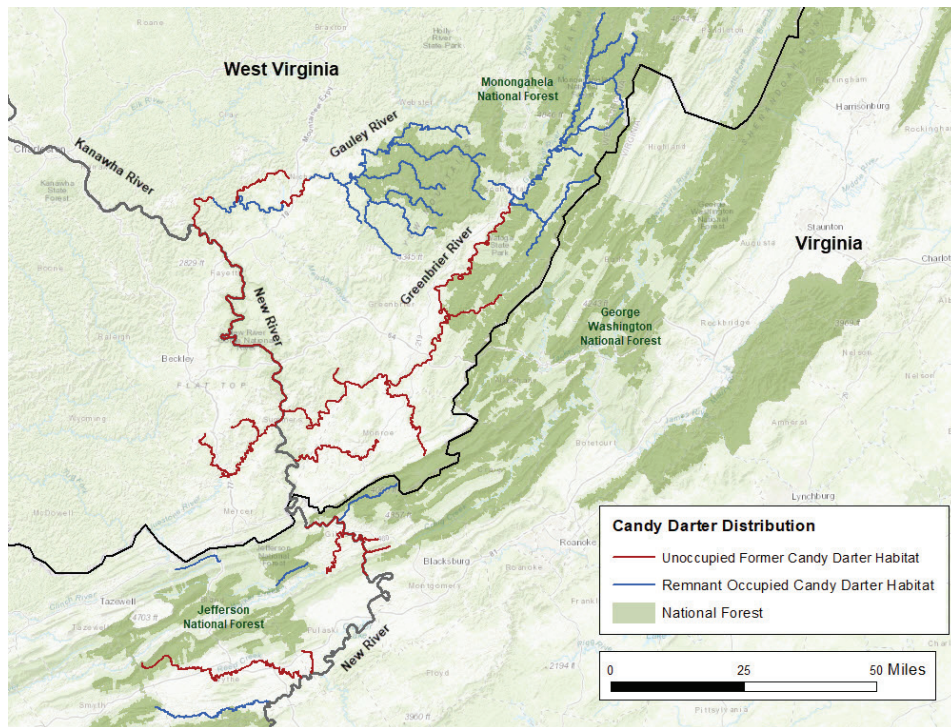


Figure 1 – Historic and current distribution of the candy darter. Approximately half of the historic distribution has been lost due to sedimentation and changes in land use. Hybridization with the introduced variegate darter is a major new threat to the species. The most extensive and connected remaining populations of the candy darter are in the upper Gauley River and upper Greenbrier River watersheds. (Note: designated critical habitat roughly corresponds with occupied habitat. See the ABRA Conservation Hub interactive map for the candy darter.)

Much has happened concerning the candy darter in the few months since the Fall Review.

In December, the Forest Service published a Final Environmental Assessment (EA), together with a Finding of No Significant Impact and a Draft Final Decision, indicating pending approval of the Greenbrier Southeast (GSE) project, a project involving timber harvest and related road construction in the East Fork of the Greenbrier River watershed. The entire GSE project area drains to designated critical habitat for the candy darter.

In January, the Highlands Conservancy responded to the pending GSE project approval by filing an objection based on Forest Service inattention to analysis requirements for endangered species and unsupported conclusions concerning project effects and proposed mitigations. The objection calls for preparation of an Environmental Impact Statement (EIS) to provide for informed analysis of project plans and to achieve compliance with review requirements of the National Environmental Policy Act and the Endangered Species Act.

In February, the Fourth Circuit Court of Appeals vacated a Biological Opinion for the Mountain Valley Pipeline, in which the U.S. Fish and Wildlife Service had concluded that construction of the pipeline would not harm two endangered fish in its path, the candy darter and the Roanoke logperch. In its opinion, the court cautioned that when baseline conditions or cumulative effects are already jeopardizing a species, an agency may not take action that deepens the jeopardy by causing additional harm. The court highlighted the importance of this directive for “the apparently not-long-for-this-world candy darter.”

The decision to vacate the Biological Opinion for the MVP is significant for Forest Service projects affecting designated critical habitat for the candy darter. The Conservancy’s objection to the GSE project focused on the same key issues, in particular the failure to describe and evaluate baseline environmental conditions and the failure to conduct a cumulative effects analysis.

The following sections of this article describe some of the main concerns raised in the Conservancy’s objection to the Greenbrier Southeast project. These are among the concerns that apply to the multiple Forest Service projects in watersheds that support the candy darter. Additional information concerning the candy darter and these projects, including regulatory review documents and interactive maps, can be accessed through the Allegheny-Blue Ridge Alliance (ABRA) Conservation Hub.

Failure to conduct a baseline assessment

The Forest Service failed to prepare an environmental baseline

(More on the next page)

More about the Candy Darter (Continued from previous page)

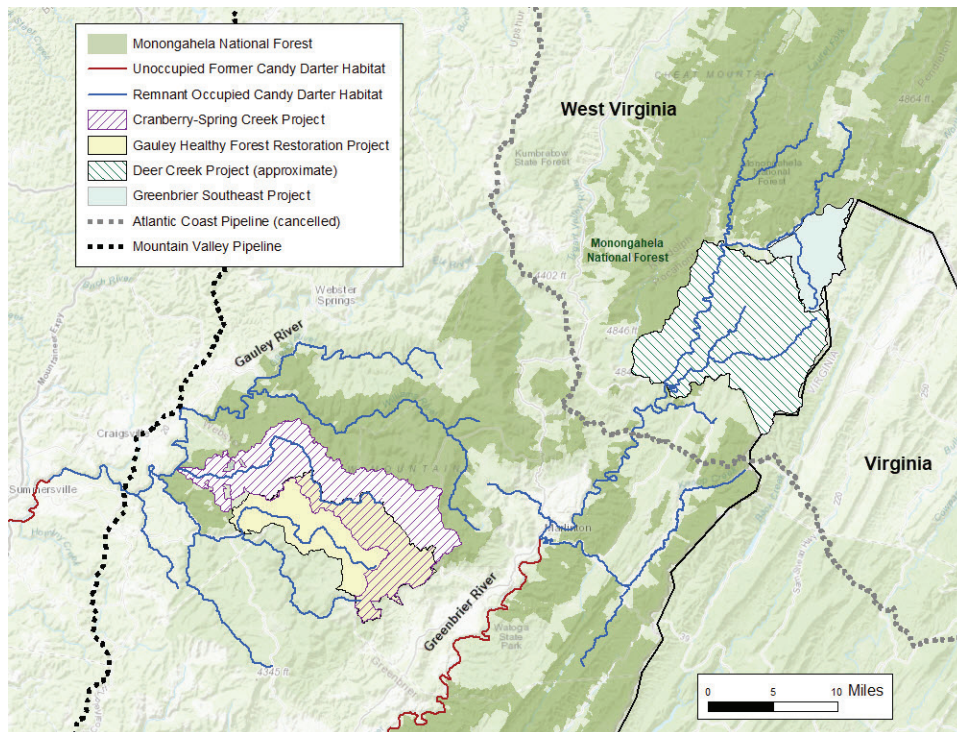


Figure 2 – Proposed projects in the MNF that involve timber harvest and road construction in watersheds that drain to remaining occupied candy darter habitat. Two implementation-phase Forest Service projects affecting candy darter critical habitat are not shown, the Upper Greenbrier North project in the MNF and the Dismal Creek work area of the Eastern Divide Insect and Disease II project in the JNF.

The routes of the MVP and the cancelled ACP pipelines are also indicated. As described in the text, a recent court ruling has blocked proposed MVP crossings of candy darter critical habitat on Gauley River in West Virginia and Stony Creek (not shown) in Virginia.

ABRA's Conservation Hub maintains interactive online GIS maps that provide details for Forest Service projects. (See the National Forest Integrity Program on the Conservation Hub website.)

description and evaluation for streams in the Greenbrier Southeast project area. As a result, the Forest Service failed to consider the best available scientific data and information in concluding that the project will not adversely affect the candy darter and its critical habitat. The Forest Service also failed to provide an informed baseline assessment to the Fish and Wildlife Service when seeking concurrence with this conclusion.

Among the most-relevant scientific information that the Forest Service failed to consider are the monitoring program evaluation

reports periodically prepared by the MNF. The current MNF report, Fiscal Year 2011–2019 Monitoring Evaluation Report, was finalized in March 2021, eight months prior to release of the Final EA and Draft Decision Notice for the GSE project.

Although the 2021 monitoring report has clearly negative implications for the candy darter and its critical habitat, the findings of the report were evidently not considered in the preparation of the Final Environmental Assessment or the Draft Decision Notice. Nor is there evidence that the findings of the report were considered in the Forest Service Biological Assessment for the project or the Fish and Wildlife Service Biological Opinion for the project. (The findings of the 2021 report were not described, discussed, or cited in these documents.)

Analysis included in the 2021 monitoring report indicates that most of the streams in the MNF are degraded and trending negatively with respect to chronic sedimentation. This is bad news for the candy darter and other aquatic life, such as the brook trout, that depend on a clean gravel streambed.

The 2021 monitoring report compared fine-sediment data obtained for stream reaches throughout the MNF with exceedance criteria for “*particularly detrimental effects*” to native coldwater fish. **Figure 3** shows the application of these criteria to the subset of sampling reaches on streams that drain to candy darter critical habitat. Consistent with observations for streams throughout the MNF, most of the streams that drain to candy darter critical habitat, including streams in the proposed GSE project area, are degraded by chronic sedimentation. Similarly, the problem is getting worse, not better.

These elevated and increasing fine sediment values compromise the survival of the candy darter and the integrity of its critical habitat. The candy darter is intolerant of sedimentation, and sedimentation is among the primary habitat degradation factors responsible for loss of the candy darter from about 50 percent of its historical range.

The continuing degradation of streams throughout the MNF due to sedimentation is a critical baseline condition that should be described and evaluated for all MNF management projects that risk additional sedimentation of aquatic habitat.

In planning the Greenbrier Southeast project, the Forest Service failed to describe and evaluate existing sedimentation impacts to candy darter critical habitat. Rather than reaching conclusions based on analysis of the problem, the Forest Service is simply relying on

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More about the

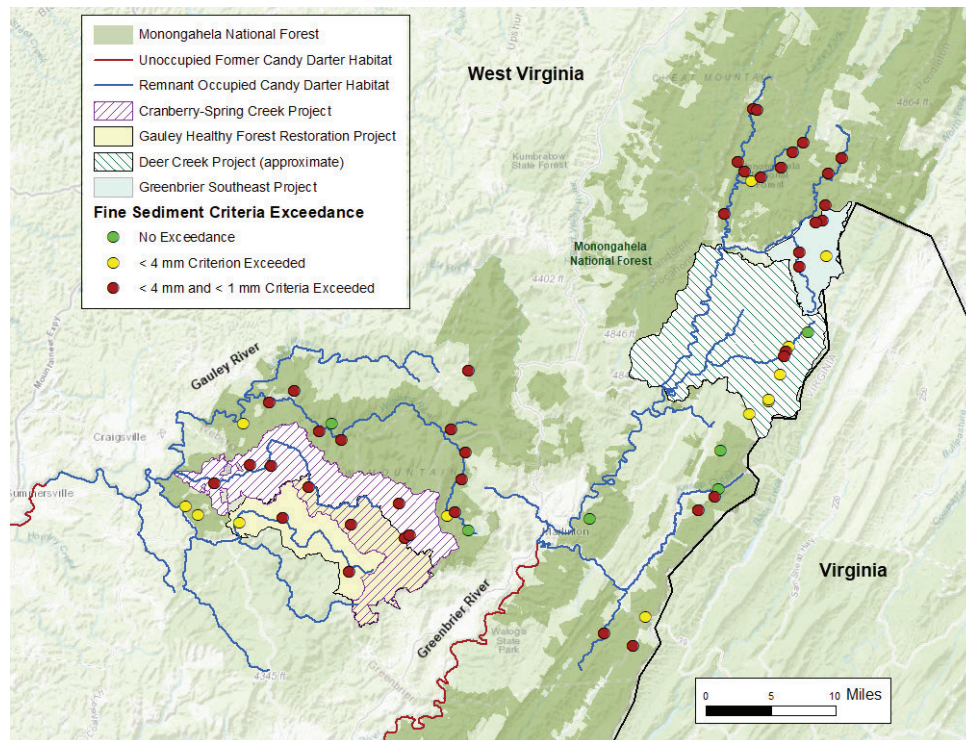
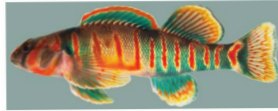


Figure 3 – Percent fine sediment values for MNF Aquatic Ecosystem Unit Inventory (AEUI) program sites on streams that drain to designated candy darter critical habitat – shown in relation to detrimental effects criteria for native coldwater fish.

the questionable efficacy of project design features and mitigations to achieve *reductions* in new sediment production and delivery to candy darter habitat. In other words, the existing sedimentation problem will become worse, though not as bad as it would be if there were simply no mitigation effort.

Informed conclusions concerning potential sedimentation impacts of proposed Forest Service projects on candy darter critical habitat require an understanding of the sources, transport, and fate of existing sedimentation. A properly prepared baseline assessment should provide this understanding.

Over-reliance on project design features and mitigations to prevent stream sedimentation

Although research consistently shows that roads increase erosion and sedimentation more than any other practice associated with forest management, the Forest Service is proceeding with planning for multiple projects that will require extensive construction and use of roads for timber harvest in watersheds that drain to candy darter critical habitat.

As described in the Final EA for the GSE project, the project was designed to limit both production of sediment and delivery of sediment to streams by locating ground-based timber units to avoid

steeper slopes and to maintain distance between the stream network and the timber units and related roads.

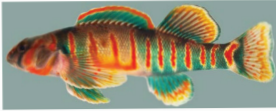
Although distance is a factor, sediment is moved by surface water runoff, and the presence or absence of a hydrologic connection between sediment producing ground disturbance and the surface water drainage network, is the primary determinant of sediment delivery to streams. Drainage networks, moreover, are variable and can be extended both by heavy precipitation and by changes in runoff patterns due to flow concentration and diversion by roads and other disturbed ground. In discounting potential sediment delivery to surface waters and downstream candy darter habitat, the Forest Service failed to account for sediment movement associated with extension of the surface water drainage network due to storm events and hydrologic alteration related to the project.

As also described in the Final Environmental Assessment for the Greenbrier Southeast project, application of Best Management Practices (BMPs) is standard procedure for Forest Service timber operations and related road construction. The Forest Service will rely on application of standard BMPs to reduce sediment production and transport for much of the road use, construction, and restoration associated with the project, including for new skid road decommissioning, for storage of multiple-entry skid roads, and for decommissioning and closure of temporary and reconstructed roads.

Research cited in the Final Environmental Assessment indicates that application of BMPs for timber operations and related roads can reduce sediment production and transport, especially when compared to operations without BMP application. The cited material, however, also indicates that BMP performance can vary widely. For example, one study reported BMP efficiencies ranging from 53 to 94% during timber harvest and for up to a year after harvest for three forested watersheds in West Virginia, Virginia, and Kentucky. Other cited studies indicate that substantial increases in sediment production are unavoidable, even when the most cautious road-building methods are used.

Research cited in the Final Environmental Assessment for the Greenbrier Southeast project further indicates that while sediment production can occur throughout the lifespan of a road, it is greatest during road construction and in the first one to two years after construction, a period that coincides with road use for timber harvest. Active road use for timber harvest precludes use of some of the more-important BMPs for controlling runoff, such as waterbar installation, outsloping, decompaction, mulching, and seeding. Thus, while standard or even enhanced BMPs can reduce sediment production

(The rest of the story on the next page)



and transport following post-harvest road closure or decommissioning, BMPs are less useful during periods of road construction and use. They cannot be relied upon to prevent sediment production and transport during the period when sediment production associated with roads is the greatest.

Failure to conduct a cumulative effects analysis

Cumulative effects refers to environmental impact that results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions. With respect to the candy darter, the appropriate scope for cumulative effects analysis is the geographic extent of designated critical habitat. All parts of the designated critical habitat have been determined to be essential for long-term survival of the species.

At a minimum, reasonably foreseeable future actions include the concurrently planned Forest Service projects that involve timber harvest and related road construction in watersheds that drain to critical habitat for the candy darter. The Forest Service, however, has thus far failed to conduct a cumulative effects analysis for the GSE project or any of the other planned or proposed projects that may affect the candy darter or its critical habitat.

The multiple Monongahela National Forest projects that may affect designated critical habitat for the candy darter share the problem of chronic sedimentation. Thus far, however, project review has failed to include an analysis of existing sedimentation impact, has failed to determine what level of additional sedimentation would be significant, and has failed to provide any estimate of potential additional increments of sedimentation that may result due to the projects. Reliance is instead placed on project design and mitigation measures that, as described above, are unreliable or have limited value for prevention of sediment production and delivery to streams.

Consideration of potential cumulative effects of multiple Forest Service projects, especially with respect to sedimentation control and continuing degradation of critical habitat, raises these questions concerning National Forest management policies and the candy darter:

- Does the Forest Service have a coherent policy for reversing the current chronic sedimentation trend?
- How much additional sedimentation of candy darter habitat will the Forest Service and the Fish and Wildlife Service deem acceptable?

Preservation and restoration of the candy darter and its designated critical habitat will depend on how these and similar questions are answered.

For additional information see:

[Allegheny-Blue Ridge Alliance Conservation Hub](#)

[Final Environmental Assessment for the Greenbrier Southeast Project, 12/9/21](#)

[West Virginia Highlands Conservancy Objection to the Greenbrier Southeast Project, 1/3/22](#)

[Fourth Circuit Court of Appeals Opinion Vacating the 2020 Biological Opinion and Incidental Take Statement for the Mountain Valley Pipeline, 2/3/22](#)

[Monongahela National Forest Fiscal Year 2011-2019 Monitoring Evaluation Report, March 2021](#)

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Filling out the form, etc. is, of course, the old school way of doing things. If you prefer, just email the information to Dave Saville at WVHC50@gmail.com.

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► The baby shirts are certified organic cotton and are offered in one infant and several toddler sizes and an infant onesie. Slogan is “I ♥ Mountains Save One for Me!” Onesie [18 mo.]---\$25, Infant tee [18 mo.]---\$20, Toddler tee, 2T,3T,4T, 5/6---\$20

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