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# The Highlands Voice

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## Court Blocks End Run Around Clean Water Act

By John McFerrin

The United States District Court for the Southern District of West Virginia has blocked an attempt by Fola Coal Company to use the West Virginia Coal Jobs and Safety Act of 2015 to make an end run around the federal Clean Water Act.

The controversy concerns discharges from three surface mines along the southern portion of the Leatherwood Creek watershed in Clay and Nicholas Counties, West Virginia. The Plaintiffs (West Virginia Highlands Conservancy, Sierra Club, and the Ohio Valley Environmental Coalition) contend that the water leaving the mines has high levels of conductivity and that the conductivity is impairing neighboring waterways. Everybody pretty much agrees that this is true. There have been tests and they show high levels of conductivity. There may be some dispute about exactly what, if anything, Fola should have to do because of this but there is no dispute that the high conductivity levels exist.

### The Way the Clean Water Act Works

Both the federal Clean Water Act and a corresponding statute in West Virginia prohibit discharge of any pollutant in any amount unless certain conditions are met. The most prominent of these conditions which allow limited pollution is the discharge permit, known as the National Pollutant Discharge Elimination System (NPDES) permit.

The NPDES permit, issued in this case by the West Virginia Department of Environmental Protection, protects streams by limiting the concentration of pollutants that are allowed in water that leaves the mine. The permit allows no more than certain concentrations of pollution such as iron, manganese, and aluminum. The permit

is supposed to set these discharge limits low enough that the water coming from the mine will contain small amounts of pollution but not enough to impair the waters that it flows into.

The second way in which the Clean Water Act protects streams is through water quality standards. Water quality standards are regulations which set forth how clean streams have to be in order to support designated uses such as fishing, swimming, etc. They say that streams may contain no more than so much of this pollutant, so much of that one, etc. They also prohibit certain conditions which are not allowed in state waters, conditions such as a visible color

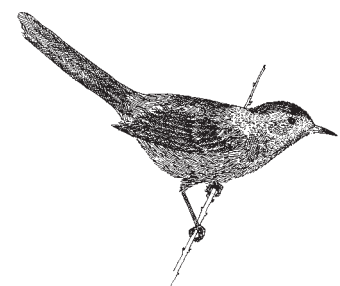
The water quality standards are supposed to be a backup. The discharge limitations are supposed to protect the uses of streams. If, for some reason, compliance with the discharge limitations is not enough to protect the stream, then the person



(More on p. 3)

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## Ramblin' the Ridges

By Cynthia D. Ellis

### Watch That Crawdad, Backin' Back

You get a line,  
I'll get a pole, honey.  
You get a line,  
I'll get a pole, babe.

And we'll go fishing for crawdads. Here in West Virginia, unlike more southern spots, we don't eat 'em, we use 'em for bait.

And...thanks to several new actions, perhaps there will be more crawdads/crayfish/mudbugs around.

That's good news. Crayfish are an extremely important component of aquatic ecosystems, in Appalachia and worldwide. They eat and get eaten. They eat smaller plants and animals, keeping streams and

numbers are a good indication of the health of a waterway.

With their prominent claws, crawdads look like miniature lobsters. Eight legs attach to the midsection; the abdomen can be used in a backward motion...a movement that is sometimes likened to a craven politician..."backin' back." Our several varieties of crayfish in West Virginia live in different habitats...of the 30 kinds, the bigger ones live in bigger rivers. Four species are found, worldwide, only in West Virginia: the Elk River Crayfish, the Tug Valley Crayfish, the Big Sandy Crayfish, and the Guyandotte Crayfish.

But crawdads have suffered recently. Human activities, including mountaintop

locked in a backlog of inaction. The West Virginia Highlands Conservancy was one of the signatories. That petition was then reinforced by a lawsuit to further prod protections and some crawdads are being awarded assistance following settlement of the suit.

Most recently, as an outcome of that settlement, two in-state crayfish are awaiting finalization for inclusion on the Federal List of Endangered and Threatened Wildlife. This will be the first time species are listed as a result of threats due to mountaintop removal coal mining. Our readers have long known and realized the harms due to MTR; a crawdad may lead the way to helping stop those harms. What hurts the crawdads hurts all of us downstream too, and this new listing may be a tool to block the dangers.

One species to be listed is the Big Sandy Crayfish, found in Virginia, Kentucky--and, in West Virginia, in McDowell and Mingo Counties. The other is the Guyandotte Crayfish, found, worldwide, only in Wyoming County, West Virginia.

Yonder comes a man  
With a sack on his back, honey.  
Yonder comes a man  
With a sack on his back, babe.  
Yonder comes a man  
With a sack on his back---  
Watch those crawdads  
Backin' back!  
Honey, baby, mine.

The new listings mean it is backin' back time. Time for mining polluters to back off. Time for regulators to back up rules with enforcement. Time for crawdads, and all the critters connected with them, including us, to back up, regain clean surroundings, and thrive.



wetlands clean and harboring balanced populations. They sustain Hellbenders, raccoons, otters, Great-blue Herons, and, most importantly to fisher folk among us--smallmouth bass. Their creation of "chimneys" and tunnels, terrestrial and aquatic, is critical to survival of a very large number of invertebrates, as well as rodents, snakes, and frogs; so crayfish are a "keystone" species. They're also sensitive to environmental impacts, so their

removal mining, have contributed to major silting and pollution problems in streams, which have reduced mudbug populations. West Liberty University professor Zachary Loughman notes, "Globally crayfish are considered one of the most endangered animal groups on the planet."

This was recognized more than a decade ago. So environmental groups joined in an effort to petition the Fish and Wildlife Center to move to protect crawdads...and a long list of other creatures



## Court Blocks End Run (Continued from p. 1)

discharging the pollution would still have a duty to avoid causing a violation of water quality standards.

### The Legislative End Run

Fola contended that it did not have to worry about violations of conductivity standards because of the West Virginia Coal Jobs and Safety Act of 2015. Part of that Act said that, if a company was meeting its discharge limits, it did not have to worry about causing increased conductivity in nearby streams. For a fuller discussion of the West Virginia Coal Jobs and Safety Act of 2015 see the April, 2015, issue of *The Highlands Voice*.

### What the Court said

The Court held that the West Virginia Coal Jobs and Safety Act of 2015 does not protect Fola for two reasons. First, the

United States Environmental Protection Agency has not approved the change in the law.

Control of water pollution is one of the places where we use what some call “cooperative federalism” The United States Congress passes a law such as, in this case, the federal Clean Water Act. It sets forth minimum standards. States may then enact their own statute and their own regulatory program which must be as effective as the federal statute. This is what West Virginia has done.

Because of this cooperative federalism, the United States Environmental Protection Agency must approve major changes to West Virginia’s program. Until it approves the provision that Fola relies upon, that provision is not in effect.

Second, even if the Act were in effect it does not apply to permits which had already been issued. Even if the 2015 Act did give Fola the protection it sought, that protection would not be available because the permit had already been issued before the Act was passed. The permit would have to be modified, including public notice and an opportunity for the public to comment.

This ruling was just a preliminary ruling on the applicability of the West Virginia Coal Jobs and Safety Act of 2015. There are still other matters to be decided so (surprise, surprise) the case is not over yet. It is an important step because it clarifies whether the West Virginia Coal Jobs and Safety Act of 2015 is available to help the defendant.

## Fun at the Sustainability Fair



West Virginia Highlands Conservancy hosted a booth at the Sustainability Fair in Huntington. Attendance was pretty good despite the rain. The whole event was very well planned and offered much. The next one will also be in Huntington, in 2017.

Conservancy representative and president Cindy Ellis talked with someone from Nigeria and someone from Bangladesh. She met the daughter of long-time Hurricane member, Phyllis Mingo. She fielded a number of compliments and “Thanks for your hard work” comments. They all quit an hour early, as a second round of heavy rain rumbled up, and found out how quickly they can pack up the gear.

Fun and very, very interesting...as ever.

## VOICE AVAILABLE ELECTRONICALLY

The Highlands Voice is now available for electronic delivery. You may, of course, continue to receive the paper copy. Unless you request otherwise, you will continue to receive it in paper form. If, however, you would prefer to receive it electronically instead of the paper copy please contact Beth Little at [blittle@citynet.net](mailto:blittle@citynet.net). With electronic delivery, you will receive a link to a pdf of the Voice several days before the paper copy would have arrived. The electronic Voice is in color rather than in black and white as the paper version is.

*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. Submissions by internet or on a floppy disk 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](http://www.wvhighlands.org).

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.

# Waters of the U.S. Defined (Again)

By Cindy Rank

## SO WHAT'S THE BIG DEAL?

Reading the Clean Water Act (CWA) could lead one to believe that all streams and wetlands we encounter will be protected as the valuable resources they are --- valuable in their own right and valuable because so much of what we do and need to survive and thrive and grow and work and recreate here on this earth is dependent on clean water.



**Caddisfly**  
(one of the beneficiaries of keeping the waters of the united states clean)

Ah, but we know better than to believe, or we quickly find out, that environmental laws and regulations are anything but clear and straightforward and are often quite complex to understand, apply, enforce, and uphold.

When the CWA was written in the 1970s Congress clearly wanted waters of the United States to be protected and gave the Environmental Protection Agency (EPA) the responsibility "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."

Then came the push to define just what were "waters of the US", what streams and rivers and wetlands, etc were to be considered "jurisdictional waters" that the Army Corps of Engineers and the EPA are to protect. Debates raged on for years. And then two significant US Supreme Court decisions (SWANCC in 2001 and Rapanos in 2006) muddied the waters even further... and permitting activities in and around waters of the US became mired in controversy and delay.

## WHAT WE'VE BEEN WAITING FOR...

Responding to requests by government officials, industry and environmental groups over the past decade, EPA began rulemaking to clarify just what waters qualify as "waters of the United States". A draft rule was published in April 2014 and a public comment period

ran until November 14, 2014.

On May 27, 2015 the final rule was released. It will be effective 60 days after publication in the Federal Register.

According to the EPA *"In developing the rule, the agencies held more than 400 meetings with stakeholders across the country, reviewed over one million public comments, and listened carefully to perspectives from all sides. EPA and the Army also utilized the latest science, including a report summarizing more than 1,200 peer-reviewed, published scientific studies which showed that small streams and wetlands play an integral role in the health of larger downstream water bodies."*

The rulemaking is to be applauded in that it does define in great detail many water resources that are "waters of the US" and sets out a clear directive that small headwater streams and other small water bodies are to be protected (an assumption often challenged by the coal industry when labeling those same streams "dry ditches").

If the intrinsic worth of small – even tiny in some instances – headwater streams and wetlands escapes the likes of the extractive industries that operate in those areas (eg coal, gas, mining in general, etc) surely others recognize the more observable worth of these waters as they are used for pleasure, sport, business, and certainly as they contribute to drinking water sources for hundreds of citizens across the country.

The EPA website provides a Geographic Information Systems Analysis of the Surface Drinking Water Provided by Intermittent, Ephemeral, and Headwater Streams in the U.S. The national map is interesting and informative, as are the individual state maps and narratives. ([http://water.epa.gov/lawsregs/guidance/wetlands/surface\\_drinking\\_water\\_index](http://water.epa.gov/lawsregs/guidance/wetlands/surface_drinking_water_index).

[cfm](#))

The narrative for West Virginia describes our dependence on these small streams for drinking water as follows. *"In West Virginia, 14,825 total miles of streams provide water for surface water intakes supplying public drinking water systems; of this, 8,387 miles, or 57%, are intermittent, ephemeral, or headwater streams. Over 1 million people in West Virginia receive drinking water from public drinking water systems that rely at least in part on intermittent, ephemeral, or headwater streams."*

Add to those numbers the many individuals who depend on surface water for their own private springs and cistern systems and the numbers are greatly



**More of the beneficiaries of keeping the waters of the United States clean**

increased.

So, even if you aren't concerned about mayflies and other tiny critters that contribute to the health and biodiversity of streams, the new rule surely is a step forward in protecting more recognizable values such as safe drinking water.

## ... OR IS IT?

The Supplementary Information provided in the preamble to the proposed rule gives me pause. ([http://www2.epa.gov/sites/production/files/2015-05/documents/rule\\_preamble\\_web\\_version.pdf](http://www2.epa.gov/sites/production/files/2015-05/documents/rule_preamble_web_version.pdf))

*"The scope of jurisdiction in this rule is narrower than that under the existing*

**(more on the next page)**



## More About the Waters of the United States (Continued from previous page)

*regulation. Fewer waters will be defined as “waters of the United States” under the rule than under the existing regulations, in part because the rule puts important qualifiers on some existing categories such as tributaries. In addition, the rule provides greater clarity regarding which waters are subject to CWA jurisdiction, reducing the instances in which permitting authorities, including the states and tribes with authorized section 402 and 404 CWA permitting programs, would need to make jurisdictional determinations on a case-specific basis.”*

Just what is including in this narrowing of jurisdictional responsibility?

Well, for one, the rule explicitly says the following are not “waters of the U.S.”: (i) waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the Clean Water Act

It’s hard for me personally to let go of what West Virginia Highlands Conservancy and other allies believed to be a fundamental Clean Water Act prohibition against in-stream treatment ponds - at coal mines and elsewhere, and fought to uphold as far back as the mid 1980s when Island Creek Coal Company proposed a mile long valley fill and treatment ponds in the Right Fork of Tenmile Creek of the Buckhannon River. Through a series of tacit approvals since then in-stream treatment has become an acceptable practice for which an exemption was added to a previous version of the rule as more or less of a footnote and now incorporated in this rule without comment.

It’s seems to be one of those bitter pills that often accompanies advancements in other areas ... and is most disappointing. As was noted in a release from the Center for Biological Diversity and Waterkeeper Alliance:

*“The EPA also wrote into the new rule an exemption that would allow polluters to dam up mountain streams to form waste lagoons that would not be subject to the protections of the Clean Water Act. More than 30 years ago, when the definition was last revised, the agency inserted the exclusion as a footnote, after the rule had been finalized. Because the provision was added after public comments had been accepted, the public never had an opportunity to provide input on the*

*revision. The agency elevated the waste-treatment system exclusion from a footnote into the main body of the rule updates it proposed in 2014, while declaring that it would not consider comments regarding this repositioning of the provision because the change was merely “ministerial”.”*

But that’s just one of those things that will forever stick in my craw. It will be interesting to see how other aspects of this new rule will be interpreted and applied moving forward. Having listened to perhaps hundreds of hours of courtroom testimony by experts for all sides in our legal efforts to hold coal mining companies accountable for dealing with headwater streams I

personally will be surprised if future court challenges didn’t venture into the proverbial “weeds” of this rule to further complicate any seemingly clarified definition in this new regulation.

And of course there are those in Congress prepared to strike down this rule even before it gets any traction and to restrict how the EPA and Army Corps could write the replacement (S.1140, the Barrasso Bill and recently passed HR 1732).

For more detail about the rule itself see EPA website at: <http://www2.epa.gov/cleanwaterrule/documents-related-clean-water-rule#the%20final%20rule>



Photo courtesy of forrestwander.com

### **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.



## Squirrels: the Next Generation

By Charlie Feldhake

The grand, multi-billion-year scope of evolution has produced many remarkable life forms. We Homo Sapiens have grown to run the show the last mere few thousand years. We are primates and are on the verge of causing the extinction of all other primates. We are soiling our own nest as the result of greed by some so our days are numbered too. We seem to have evolved genes in our makeup that are too successful for our ecosystem's resilience.

I read an article a while ago that speculated what species will replace us as the most intelligent and rule the next planet earth epoch. This author, after observing the ingenuity of squirrels at raiding sophisticated bird feeders, voted for them. Crows and parrots are very intelligent but have feathers on their arms. Porpoise are likewise intelligent but have flippers for hands. Squirrels however, have paws that can hold and manipulate objects so have the potential to learn how to use tools.

I like squirrels. In Southern WV where I live we have grey squirrels and the smaller red squirrels (called Fairy Diddles by locals) and I enjoy their scampering around my back yard. There are also some large European Fox squirrels in the area but I haven't seen any in my yard. Squirrels are pretty clever and have potential.

In the early 70's I spent a winter working construction in Douglas Wyoming. Someone had tamed a Fox Squirrel in the neighborhood and the squirrel and I became buddies. At lunch time I would walk outside and cluck my tongue a few times. He would run down the block, run up my leg and sit on my shoulder. I gave him a few peanuts every day which he took and scampered off. One day I called him and didn't have any peanuts and got thoroughly scolded so I didn't do that again!

Later, when I moved to FT. Collins Colorado I tried over several weeks to tame a wild squirrel by putting peanuts on the ground and moving increasingly closer each day. I was very close to success when a stray cat charged the squirrel just as it was about to take peanuts from my hand for the first time. The squirrel never trusted me again and scolded me from high in the trees every time I went into the yard. Squirrels carry a grudge, just like humans.

So, why do we think the planet is at our disposal? Much of it is cultural from past millennia when times were tougher. A woman I worked with at a science research lab once quipped in response to a discussion about extinguishing other species from selected habitats, "We can do whatever we want with them because god gave us dominion over them". That attitude will be our downfall so make room for squirrels.



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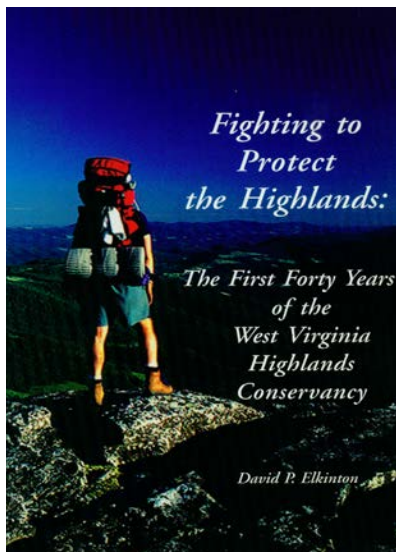
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**West Virginia Highlands Conservancy**  
**Working to Keep West Virginia Wild and Wonderful**

**GREAT HISTORY BOOK NOW AVAILABLE**

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.



Learn about how the Conservancy stopped road building in Otter Creek, how a Corps of Engineers wetland permit denial saved Canaan Valley, and why Judge Haden restricted mountaintop removal mining. Also read Sayre Rodman's account of the first running of the Gauley, how college students helped save the Cranberry Wilderness, and why the highlands are under threat as never before.

With a foreword by former congressman Ken Hechler, the book's chapters follow the battle for wilderness preservation, efforts to stop many proposed dams and protect free-flowing rivers, the 25-year struggle to save the Canaan Valley, how the Corridor H highway was successfully re-routed around key environmental landmarks, and concluding with the current controversy over wind farm development. One-third of the text tells the story of the Conservancy's never-ending fight to control the abuses of coal mining, especially mountaintop removal mining. The final chapter examines what makes this small, volunteer-driven organization so successful.

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 \$14.95, plus \$3.00 shipping, visit the Conservancy's website, [wvhighlands.org](http://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 \$14.95 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.

**ATTENTION!**

**All would-be recipients of the eVoice**

If you have requested receiving the Voice by email (which means you get a link to download it), or maybe you were getting the eVoice, but now you are getting the paper version again, here is the probable explanation: Every month when I send the link to the Voice, I get several error messages back that the email address is invalid in one way or another. It could be that I couldn't read your email address correctly, or didn't type it correctly, or it changed, or something... Anyway, the best way to make sure you receive the e-version again is to email me at [blittle@citynet.net](mailto:blittle@citynet.net) that you want the eVoice. That way I get a good email address for you. Please put something in the subject about receiving the Voice electronically.

If there is no problem with your eVoice and you are getting it by email as you requested you don't need to do anything.



# On the Trail of the Vanishing Spruce

*Below is reprinted an article, in part, that appeared in a 1925 issue of The Scientific Monthly.*

The romantic story of the "lost tribe" has invariably caught our fancy, in whatever form it has appeared. There is a wistful appeal in the picture of an isolated community, preserving in some forgotten corner of the world the manners and customs of a far distant homeland. The original lost tribes of Israel or the fabled lost "Atlantis," the realm of Prester John, the imagined but never discovered remnant of the Aztecs in Peru, all these and many others have beguiled us, down to the survival of seventeenth-century England that is found today in the mountains of Kentucky and Arkansas.

All unknown to many, we have in this country another lost tribe, a vanishing race, whose romantic history antedates even that of Israel or the lost Atlantis, and which has remained through the centuries, isolated in an alien land, and yet clinging persistently to



the characteristics of its own kind hundreds of miles and thousands of years away; The "lost tribe" in this instance is not, however, a kind of men, but a species of tree, or rather two related species, red spruce and Fraser fir, direct descendants of the Canadian spruce and balsam.

When northern America broke from its long sleep under the great blanket of ice, animals found new lairs and plants new habitats. Marked changes in climate had been wrought by the southward movement of the glaciers. There had been a slow southward procession of boreal climatic conditions, which irresistibly set to migrating all species which were able to migrate. Not animals alone, but vegetation as well, had spread southward in advance of the great glacier. Even trees had migrated with the rest, the northern species finding new sites as the warmth-loving southern species were frost killed and driven forth.

In this manner the red spruce came from its home in the north and, well in advance of the last reach of the ice sheet, established itself in the region now covered by the Central Atlantic states. The migration was not confined to spruce alone, for birch, beech, maple and other northern species traveled in the same caravan. All doubtless became well established in this part of the country, until the glacial period came to an end. Then came disaster. In the increasing warmth, the forests of the south must have waged a relentless and successful warfare against their hapless northern

rivals. Only those trees and plants could escape that could climb above the altitude limit of the prolific southern vegetation. This the spruce, among others, succeeded in doing, and became accordingly confined in this region to the highest summits and loftiest ridges, where, in the Southern Appalachians, it has persisted all these centuries and is found today.

The range of red spruce is thus decidedly limited, because of the relatively small area that is high enough to reach the bracing coolness and the plenitude of moisture spruce demands. The Southern Appalachians are themselves the remains of a plateau, once higher than the highest of the peaks remaining (6,711 feet). Composed of much soft rock, which weathered away, exposing the harder surfaces to a slower erosion, this plateau gradually lost all identity as such and took the form of the present mountain range, more than forty of whose peaks rise 6,000 feet and over. At this elevation the temperature is comparable to that of southern New England and the sub-alpine climate of the Rocky Mountains. Because of the greater elevation, however, the atmosphere is much more moist and the rainfall heavier. Here the red spruce has kept its hold, with its more wintry range-mate, Fraser fir. The latter, beginning in the uppermost part of the spruce zone, grows in almost pure stands of small extent, and is the counterpart of the balsam fir of eastern Canada.

Other compatriots of the spruce have also found lodgment, and in the lower part of the spruce belt the hardwoods and hemlock of the north mingle with the hardier species. Here all the vegetation is suggestive of Northern New England and Canada, while the true soil under the trees is covered by a spongy layer of plant remains known as upland peat, sometimes more than a foot in thickness, and frequently as acid as the peat of many of the Coastal Plain swamps.

Successful in its warfare with nature, the spruce in recent years has found certain man-made circumstances too powerful for it. War between nations across the ocean has touched these spruce forests and decimated them, for modern warfare calls for aeroplanes and aeroplanes demand spruce and fir of the splendid quality so often found in these Appalachian stands. War and a growing population in the cities call also for more newspapers, and newsprint takes a heavy toll of spruce, wherever it is available.

For these reasons a large portion of these spruce lands has been logged over, involving a great loss in stream flow protection and scenic value, and contributing but an insignificant amount to the nation's wood supply.

What centuries of continuously hostile climatic conditions could not do to dislodge this valuable forest remnant, man has been accomplishing in a short span of years. The Appalachian spruce is vanishing and may well become extinct if man does not repair the destructive work he has started here.

Details of the logging operations that are clearing off these forests will make the situation clearer. A large portion of this region has been logged over, the spruce lands yielding a cut averaging from 18,000 to 30,000 feet to the acre board measure. In these operations the overhead skidder has been used to some extent to get out the material that lay above the logging railroads and at the heads of the

**(More on p. 9)**



## More Red Spruce History (Continued from p. 8)

flumes. On the steeper slopes dry slides are sometimes used and frequently the pulp-wood bolts are rolled down the steep mountain sides, a process locally known as "ball-hooting." Frequently, when the saw-timber has been logged from an area, the latter is "wooded," which means, in 'local parlance, that it is again cut over, this time for pulpwood. This second cutting removes trees down to about six inches in diameter. The slash left after logging is a fire trap, and the scarlet scourge-the ever-present enemy of young spruce-has taken its toll of

have not yet appeared save on the older tracts. Altogether there is enough of this young growth to continue to hold these lands for spruce, if fire does not intervene; but there is not enough to result in fully stocked stands in this tree generation.

Where fire has come, even though only once, the cut-over lands are in a hopeless condition, so far as spruce is concerned. Blackberry and raspberry briars overrun these acres, to be succeeded by fire cherry and yellow birch, which according to count run several thousand an

the length and breadth of the Southern Appalachians. In that event, the cool mountain streams flowing from hidden springs among the spruce-covered rocks, and inviting alike the hydroelectric engineer and the profitable tourist, will cease to flow. Down gullied, barren mountain sides spring torrents will rush, destructive and profitless to any. Throughout the summer no even flow will be preserved; no wheels will be turned; no hiking pleasure-seeker will find here the refreshing invitation that brings him to such regions. With the vanishing spruce, the good that it has done to the mountain communities will vanish with it. Though strayed far from home and though driven to the heights to maintain itself at all, the Appalachian spruce has paid its way these many years, has made itself a good citizen and friend to man. Now, in its direst extremity, turn about is fair play: the perpetuation of the spruce type in the Appalachians is the duty of every human citizen and friend of the forest. As matters stand today, the loss of this tree is far too imminent a possibility.

**Note: The challenge of spruce planting set out in this article some ninety years ago has been taken up by the Central Appalachian Spruce Restoration Initiative (CASRI). It is a partnership by the West Virginia Highlands Conservancy and others of diverse interests with a common goal of restoring historic red spruce-northern hardwood ecosystems across the high elevation landscapes of Central Appalachia.**



Photo courtesy of Central Appalachian Spruce Restoration Initiative

the remaining small trees, leaving them as gray sentinels to mark the passing of the present generation. Where logs have been skidded downhill by horses and dragged uphill by the steam skid-der, rain has within a year started to "gully" the mountain side.

What kind of timber, if any, can be cut from the next generation on such desolated areas? That is the important question which has confronted foresters and, to some extent, timberland owners with reference to the spruce-fir type. The forestry problems of this type are of a very difficult nature, and have called for some of the Appalachian Forest Experiment Station, which the federal government has established in this region.

On the cut-over spruce lands where fire has not burned, the young trees are coming up satisfactorily. These trees were seedlings before the cutting was made. New seedlings, dating since the cutting,

acre and in this region are of no commercial importance. Only occasionally on these burned areas are live young spruce found, and then around springs and seeps, or along streams, where the small advance growth of seedlings and saplings escaped, evidently because the fire was halted or because it was unable to burn the upper layer of soil where seeds were stored.

All told, it is evident that the amount of new growth is entirely inadequate for a future stand of softwoods on by far the greater number of these spruce burns. If new stands of spruce and fir are to be available within a reasonable time, the slow and expensive method of planting must be adopted.

Most obvious and most important of all is the fact that adequate fire protection must be put in force on this cut-over land; otherwise what is true of these spruce burns will soon be duplicated throughout

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## Some Rumblings from the Colonies

By Beth Little

Here's my challenge to folks who live in nice urban or suburban neighborhoods: If you had to arrange for dealing with your trash, the generation of your energy, and the disposal of any waste from generating that energy, within your own community, how would you do it?

You see, there are people devising solutions for reusing and recycling waste, besides just reducing it - solutions that confine the objectionable odors and appearance, so it could happen virtually next door. There are sources of energy available now that do not emit pollutants and can be disbursed within a neighborhood - solar panels on rooftops, new versions of windmills that can be on rooftops too, and ways to reduce consumption through energy efficiency. These localized solutions would be particularly effective for industrial facilities such as factories, shopping centers and sky scrapers.

As it is now, waste dumps are sited in poor neighborhoods or rural areas. Energy production, from fossil fuels through mining and fracking, to power plants, pipelines and other transportation, and finally to disposal of waste, is foisted on rural areas where relatively few people live, or on uninhabited areas. But though few and spread out,

rural residents are still people who don't want to breathe, drink, hear or see waste dumps, coal mines, gas wells, compressor stations, pipelines, power plants, sludge ponds or other toxic installations any more than residents of Chevy Chase or Beverly Hills. And the uninhabited areas contain our public lands and wild areas that are gradually being contaminated and sacrificed. Are we going to fill them up completely? How much is enough?

All this happens out of sight of the majority of the population; and it appears that 'out of sight' means 'out of mind.' But it still affects the planet, so it will eventually affect everyone. And it has a good start. The fossil fuel energy production is contributing to global warming. It is also polluting the soil and water where our food comes from; i.e. rural farming areas, grazing lands, and the ocean. Cancer rates are increasing while sperm counts are decreasing. Autism, asthma and other respiratory ailments, allergies - all conditions that are linked to environmental toxins--are increasing. All kinds of funding is going into finding cures for these chronic diseases - more drugs and medical procedures, but virtually nothing is going into prevention - into eliminating the cause.

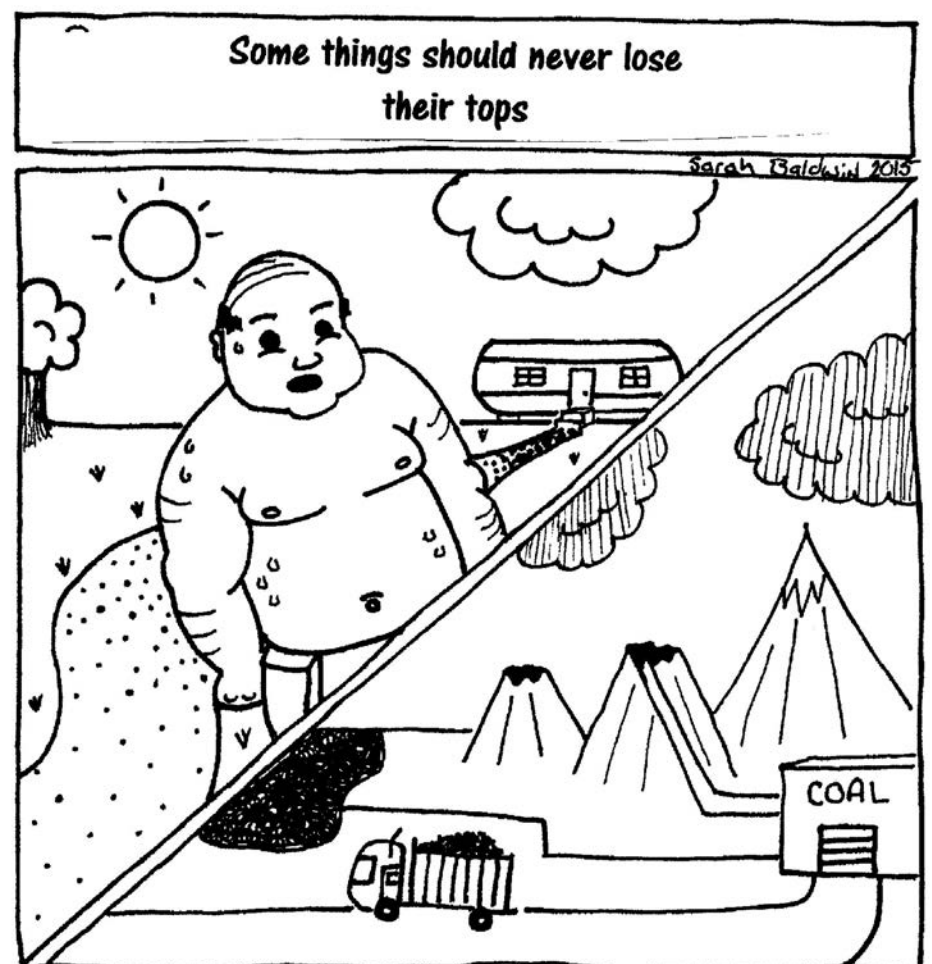
Anybody who is paying attention can see this. You can google it if you want proof. So why isn't anything being done? Why are our elected officials and government agencies allowing this? Even promoting it?

When you investigate any environmental degradation situation, you find that money is involved. Huge profits are being made, and it is cheaper to pollute than to clean up after yourself. Cheaper for the polluter that is; and profitable for the politician receiving large donations. For humanity as a whole, and the people whose health is affected in particular, it is lots more expensive. For future generations - the ultimate price our children and grandchildren will pay is going to be catastrophic if we continue as we are.

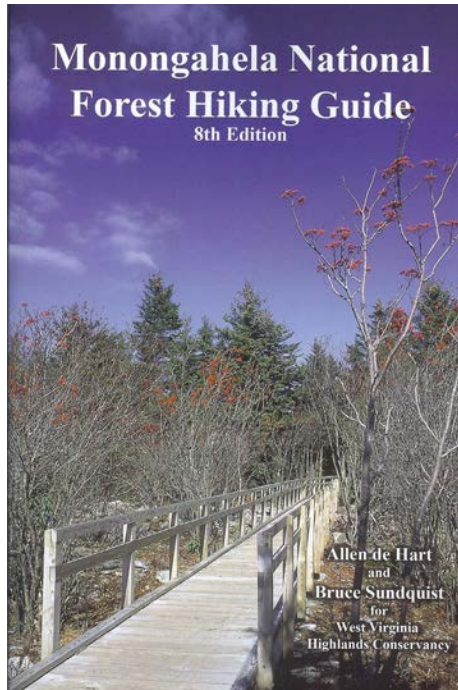
But the polluters are concerned with short term profits, and they know that people who live in poor and rural areas do not have the clout to turn the tide. We fight and fight and fight each new threat to our homes and our health, and we win some battles; but until the people who are sending us their waste or getting their energy from our backyards realize that we are all in this together and join us in demanding change, the relentless poisoning of the planet will continue.

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# OF KARST, CAVES, AND PIPELINES

By Jim Van Gundy

The Atlantic Coast Pipeline is a 550-mile long up to 42-inch diameter high-pressure natural gas pipeline proposed to carry gas produced from the Marcellus shale in Pennsylvania and West Virginia to markets in Virginia and North Carolina. It will be built, owned, and operated by The Atlantic Coast Pipeline LLC., a partnership composed of Dominion, Duke Energy, Piedmont Natural Gas and AGL Resources.

It will run from Harrison County, West Virginia to Robeson County in southern North Carolina and, because a pipeline of this size has never been constructed in mountainous territory, it will likely present a variety of unprecedented environmental and engineering challenges. One such challenge will be that it will cross quite a bit of karst along the West Virginia-Virginia borderlands. Karst landscapes are characterized by sinkholes, large springs, caves, and generally sub-surface drainage systems. These features all present the potential for problems both during and after pipeline construction, including problems of groundwater contamination, and structural support for the pipeline itself.

The surface area of karst that will be traversed in the West Virginia segment of the ACP is relatively small and occurs as three narrow bands of limestone totaling perhaps a mile or somewhat less in terms of the length of karst surface actually crossed by the pipeline. These limestone outcrops all occur on the sides of ridges in the Allegheny Mountain section of the state. One of these is on the east side of Rich Mountain and one is on the west side of Cheat Mountain, both in Randolph County. The third is on the east side of Back Allegheny Mountain in Pocahontas County. Each of these bands of limestone has known caves, springs, sinkholes, and sinking streams associated with it. The known caves in these areas are relatively small both in number and in size.

The pipeline survey process that will soon be underway will certainly pay attention to known caves in the areas that the ACP will cross, but there are certainly also many unknown caves in these areas. Caves are only known if they have an entrance. However, caves with no natural entrance are frequently encountered by limestone quarries and mines, and in construction sites and road cuts. Large voids are also sometimes encountered when drilling wells in or through limestone and related rocks. In actuality, only a small fraction of West Virginia's existing caves are currently known and mapped.

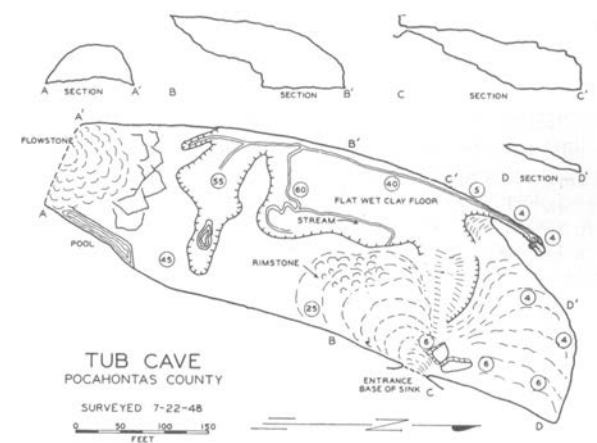
While the actual area of karst that will be crossed by the ACP in West Virginia is small it should be pointed out that water draining from non-limestone areas upslope of karst frequently sinks into the ground almost immediately after crossing onto the limestone. Hence, karst drainage systems are potentially affected by activities occurring in all areas that contribute water to them and not just water from the karst surface itself. Since the three narrow bands of affected West Virginia karst all occur on the flanks of ridges, they will also collect water from everything upslope of them, which is likely to be a considerably larger area than the karst itself.

In Virginia the amount of karst affected by the ACP will be considerably larger than that affected in West Virginia. In Highland County the pipeline will cross nearly 7 miles of karst surface and in Augusta County, roughly 27 miles. In these areas the pipeline is crossing the Ridge and Valley section of the Appalachians and the geology is far more varied and complex than in the West Virginia section. This part of Virginia contains more caves, larger caves, and more extensive sub-surface drainage networks than the affected karst areas in West Virginia.

Karst landscapes present some special problems that are generally not of concern when pipelines are constructed across landscapes underlain by the more usual insoluble rocks. The bedrock surface beneath karst soils is often highly irregular on a scale of a few feet to tens of feet with pronounced ridges and deep fissures. As a consequence of this, structures built upon such surfaces may have a tendency to settle unevenly with more settling over the soil-filled fissures and little or none over the rocky ridges. This uneven settling causes differential stresses within the structure, which may result in cracking or even collapse in extreme cases.

Large air-filled voids (i.e. caves) may exist at shallow depths in karst. Such voids may collapse when subjected to increased loading by structures or by heavy machinery. This results in the formation of a "collapse sinkhole" with potentially serious consequences for any man-made structure that lies above it or crosses it. There are a number of large voids (cave rooms) known in both Virginia and West Virginia caves. Figure 1 shows an outline map of one of West Virginia's largest cave rooms, that of Tub Cave near Marlinton in Pocahontas County. This cave is essentially one immense room that is about 600 feet long and 200 feet wide with a maximum ceiling height of about

60 feet. While this is an unusually large cave room, there are several others known in West Virginia that are even larger.



Tub Cave in Pocahontas County

In karst terrain, water frequently drains directly into the bedrock before it reaches surface stream channels. Such drainage points are often identifiable as closed depressions called sinkholes and these feed water into the underground drainage networks. Such networks may move water relatively quickly for many miles before it ultimately returns to the surface in a large spring. Although groundwater movement rates in most rock types are measured in inches per day, in limestone and related rocks, rates of several feet per second are possible.

Any major activity such as road or pipeline construction may alter local drainage patterns in karst. Water routed to a new location may open up previously clogged sinkholes and allow sediment to reach the groundwater body. Re-routed water may also remove sediment from subsurface voids and cause collapse of the land surface. The trench in which a pipeline is laid will intercept and to some extent conduct shallow groundwater in possibly new directions.

Groundwater drainage divides in karst are frequently different from the divides in the surface drainage basins that overlie them. Sub-surface diversion of water from one drainage basin to another is not at all uncommon. This means that pollutants associated with pipeline construction such as gasoline, diesel fuel, sediment, drilling fluids, and the large volumes of water that are used for pressure testing may be flushed into the underground drainage system and be rapidly transported relatively long distances in unknown directions without

**(Continued on the next page)**



## More Karst, More Caves (Continued from previous page)

being observed.

The springs which return sub-surface streams to the surface are frequently used for water supply or to provide water to fish hatcheries. In past years, sediment from road construction over limestone in Pocahontas and Randolph counties has caused damage to the State Fish Hatchery at Edray and to the (then) Federal Fish Hatchery at Bowden. Fish hatcheries are especially sensitive to increased levels of sediment in the water.

A significant pipeline leak over karst might allow explosive gas to move rapidly through air-filled passages over relatively long distances. These might be cave-size openings or even smaller openings that are still capable of transporting gas many hundreds, or even thousands of feet from the site of the leak. Cave passages in the Valley and Ridge section of the Appalachians are overwhelmingly developed along the strike of the limestones and so the transport of either leaked gas or waterborne pollutants would be away from the pipeline either to the northeast or to the southwest. Even small releases of methane that would ordinarily be dissipated in most geologic settings may, over time, accumulate significant quantities of potentially explosive gas in the sub-surface voids of karst terrains.

As it crosses the Valley and Ridge portion of the Virginia highlands, the ACP will cross surface exposures of the Helderberg-Tonoloway Limestones and the Marcellus Shale. The bottom of the Marcellus and the top of the limestones are separated by only a few hundred feet stratigraphically and are separated by the Oriskany Sandstone, a usually minor ridge-forming rock unit in the highlands of the Virginias. As a consequence of this the Marcellus Shale and the cave-forming limestones of the Helderberg series will be close together in outcrop on the steeper slopes, with the Marcellus always above (up-slope of) the limestones. The significance of this is that the Marcellus contains significant quantities of the iron sulfide mineral pyrite (FeS<sub>2</sub>) which when disturbed by excavation reacts with oxygen and water to form sulfuric acid. The sulfuric acid can increase the rate of pipeline corrosion directly, but it also reacts with calcium minerals in the shale to form the mineral gypsum (CaSO<sub>4</sub>·2H<sub>2</sub>O), which causes the rock to expand significantly in volume. The combination of chemical attack by the acid and the physical stress induced by the expansion of rock and fill increases the chance of pipeline corrosion and therefore pipeline leakage. Damage to structures

constructed on fill consisting of Marcellus shale has been documented in West Virginia and pipeline failures due to pyrite corrosion and associated swelling of rock and fill have occurred in Kentucky. Were such leaks to occur on the ACP, they would potentially be within a few hundred feet of outcrops of some of the major cave-forming limestones of eastern West Virginia and western Virginia.

Another issue of concern for any major construction activity on karst is the possible threat to the animals that inhabit the caves and groundwater of the area. These animals usually exist in small and isolated populations and as such are particularly subject to local and even global extinction. There are documented populations of the threatened Madison Cave Isopod in the Waynesboro-Grottoes area of Augusta County, Virginia and there are several endangered or threatened bat species that inhabit caves in the area through which the ACP will pass. Special measures will need to be employed to protect these sensitive and threatened species. Of special concern is the threat of sediment pollution of karst groundwater systems.

Dominion Resources has a simply abysmal track record of sediment control on their recent projects in West Virginia. The WV Department of Environmental Protection, which notably has been very hesitant to issue Notices of Violation (NOV) to any corporation has nonetheless issued multiple NOVs on different Dominion projects in West Virginia's northern panhandle. Many of these involved slope failures and sediment pollution in a topographic setting far less rugged and remote than that with which the ACP will have to deal.

On its ACP website, Dominion states that it has transmission pipelines in the Appalachian Mountains and is well accustomed to building and operating in rugged terrain. Their pipeline map shows a single Dominion pipeline that crosses the Allegheny Mountains and Valley and Ridges section of the Appalachians in southern Pennsylvania. While this pipeline does cross some karst, it is located in a generally less rugged and more accessible areas than will be encountered by the ACP in West Virginia and Virginia.

If the ACP is to be built, it will be a massive and challenging undertaking requiring great care and great expense to insure protection of the natural ecosystems through which (and over which) it will pass. Sediment control on steep slopes and on karst will be a major challenge for the ACP project. Because of its size, its length, and the remote

and rugged territory it will cross, it will demand a herculean effort on the part of both federal and state regulatory agencies to insure the ACP stays in compliance with all applicable environmental law.

In an ideal world it is probably true that a high-pressure natural gas transmission line of this size can be safely built on karst and in mountainous territory without causing significant environmental disruption. In the real world however, large corporations must always look to the bottom line and how they can minimize costs and maximize profits. The real question then is whether the ACP consortium will be willing to spend the money that will be required to build it in an environmentally responsible manner, and whether state and federal regulators will be able to insure that they do so. There is considerable uncertainty as to whether the Virginia Department of Environmental Quality and the West Virginia Department of Environmental Protection have either the legal standing or the resources to provide the level of oversight that will be required to assure that the ACP is constructed in an environmentally responsible manner.

Finally, it should also be mentioned that the ACP is not the only proposed pipeline that would cross the karstlands of the Virginias. The Mountain Valley Pipeline (MVP) is a 300-mile long pipeline that originates in the same general area of West Virginia as the ACP and then heads almost due south to Monroe County, West Virginia before turning southeastward into Virginia. Depending upon its final right of way, this line will cross between two and six miles of karst in Monroe County and an unknown amount of karst in Giles, Montgomery, and Roanoke Counties in Virginia. The Greenbrier limestone is up to 1,400 feet thick in Monroe County where it forms a broad karst plateau that is pockmarked with sinkholes and almost entirely devoid of surface streams. Yet another proposed pipeline that is currently in an earlier stage of planning is the Appalachian Connector Pipeline that will presumably follow a route similar to that of the MVP.

## Field Trip Feedback

By Cynthia D. Ellis

Some years ago, I met the very boyish Glenville State College biology professor Ross Conover as we served on a citizens' advisory committee for a West Virginia wind turbine facility. Not long after, I was pleased to hear from him again and find that he wanted to bring students to view the mountaintop removal scene at Kayford Mountain. Time after time, we met there, to try to help students get a more complete picture of energy in our mountains. Sometimes we were joined by those with deep roots and piercing words on the issue at hand...Julian Martin, Chuck Nelson...and even Kayford's primary spokesman and protector, Larry Gibson.

Dr. Conover made extensive efforts to invite coal industry representatives into our presentations. But he was not able to draw them in. Sometimes only he and I led the kids... each time we scrambled to try to be able to remember more of what Larry and the others had said; trying to add our own findings and new information to what everyone saw as we looked over the scarred vistas.

Ross brought a special atmosphere to these outings. Bounding with energy and optimism, he always made time for discussion of what we saw. He tried to make each person comfortable with voicing opinions or reflecting on the situation in their own home communities. Once, as we were beginning a discussion, a black bear ambled up toward the picnic shelter where we sat, and then just veered off to the side and down over the ridge.

In addition to acquainting scores of students with MTR, Ross brought fellow professors, and a local newswoman. So his outreach was wider. Additionally, Glenville State College has its own contingent of out-of-state students and second career students; they added to the give and take.

I'm lucky to have known Ross. I'll miss our times together on Kayford Mountain, but feel sure that his sponsorship of student tours there has added to the effort to make more mountaintop removal destruction cease. Also, I feel assured that his environmental leadership has made, and will continue to make, an impact that will endure.



Ross Conover and Cynthia Ellis

### Comments from field trip participants:

Dr. Ross Conover posted the following on the West Virginia Highlands Conservancy's Facebook page:

I recently had what I now know to be my final Kayford Mountain (Mountaintop Removal Mining) field trip through Glenville State College (I'm moving to teach at Paul Smith's College in the Adirondacks). It was a good one and concludes 12 semesters of bringing between 36-128 students/semester to witness the environmental destruction this practice causes. I hope another professor will continue this ... tradition, as a culture change on campus has become evident in the increasing amount of "I Love Mountains" bumper stickers roaming the parking lot. Perhaps the best way you could support stopping this destruction is to become a member of the [West Virginia Highlands Conservancy](#), if you aren't already!

In keeping with traditions, I have summarized my favorite quotes from the student's trip reviews. It's lengthy, so read what you like...

"Pro mountaintop removal supporters don't use scientific evidence to back up their cause. All they keep saying over and over is that coal keeps the lights on."

"I was thirsty on this trip but afraid to drink water with all the discussion of tumors and vaginal cysts"

"When we looked at the site that had been reclaimed for over fifteen years, as a forestry major, I was shocked at how little even the fast-growing trees had actually grown. In undisturbed soil, these species would nearly be ready to harvest but here it would be at least another fifteen years to harvest them, if they even survive that long"

"this frustrates me that I'm a sophomore in college and this is the first time I've been taught about this subject...I think our public school systems should be forced to teach kids at a very early age about MTR and how we're killing our own state"

"The mountains which were once covered with beautiful hardwood forests are now barren acres of nonnative grasses...it makes me sad to think the birds come back from their long winter migration to find their home is gone."

"Despite being a Natural Resource Management major, I will never be that person who tries to stop mountain top removal mining because I come from a background where you do what you have to, to support your family...we do things far worse to the environment than blast it for coal, which by the way was put here by God for a reason...to keep the lights on"



The mood felt almost like a memorial service for the mountain and there was something oddly peaceful about it”

“The fact that the coal we mine is supposedly so good for WV’s economy was hard to fathom when I saw the poverty condition of the surrounding communities”

“I’ve always been pro coal but seeing the environment reshaped is a little disturbing. I never realized there were such consequences that came from MTR mining until this trip...Another reflection is about Larry Gibson. Learning about him was moving to me as he stood up for what he thought was right in his eyes even when no one else did. It takes courage to stand up for something like that as it was basically the government against Larry”

“I first heard of MTR in seventh grade...English teacher had I Love Mountains stickers all over her classroom...all of the kids just made fun of her, but none of them realized just how important her message was”

“I have lived in WV all my life and was oblivious to just how detrimental MTR really is...opened my eyes that it is up to us to stop this from continuing and save our mountains for future generations”

“As an avid fisherman it hits home to see a trout stream now have orange tinged water from acid mine drainage and have no fish at all...loblolly pines are 18 years old and are severely stunted in growth and now worth any commercial value. This site will not be suitable for any forestry practices any more, at least in my lifetime”

“Sure, coal does provide electricity and create jobs in a place where there is nowhere else to work because the coal companies block everything else out”

“Overall I found this to be a great field trip and I feel like students were shown MTR without a biased opinion. This subject is very political and everyone’s opinionated but the best approach is to just visit the site and see the destruction for yourself”

“Coming from a family that is pro coal I understand why this is a touchy subject, for I will probably not even tell my family about this field trip for they’ll be mad just that I was learning about this stuff...now have a more well-rounded view and understand that there are negative effects on the environment”

“I’m pro coal but darn these companies do a very poor job at reclaiming incredibly large areas of previously pristine hardwood forest. They should be forced to put it back exactly as it was regardless how much it would cost them”

“I’ve always wondered why the majority of these operations were so secretive, as if they had a reason to conceal their activities”

“the greatest danger in this situation are humans not knowing or choosing to ignore what MTR mining does to the environment...with a few water samples we proved that a couple hundred yards of settlement pond doesn’t do much to improve water quality...the pond was only slightly less conductive than 8 gauge copper wire”

“My favorite part was hearing about hardships endured by Larry (Gibson) and his family...not many people in the world with enough guts to resist millions of dollars for anything”

“there is only about 30 years of coal left that can be removed by MTR mining, and then the communities will be left with no jobs, bad water, and spoiled land not suitable for farming or most any other use...it amazes me these coal companies would lay to waste so much in their quest for...the Garshalmighty dollar”

“before this trip I had never realized there could be any negative environmental impacts from mountaintop removal mining because coal companies are pro hunting and fishing”

“I was stunned that even the older reclaimed sites looked nothing like a WV forest”

“It makes me feel guilty to be human knowing that we would blow up something so beautiful just to make some money”

“My dad always told me MTR made mountains ugly, but now I know it also makes towns and communities ugly as well”

“Before this trip I thought we only removed coal by going underground and hadn’t realized we damage the surface too”

**Note: The original posting was nearly twice this long, too long to be repeated in its entirety here. It has been shortened by removing many of the comments.**

**Note: Tours of Kayford Mountain and an up close view of mountaintop removal mountain are still available. To arrange one, see the box on page 10 of this issue.**

# HIGHLANDS CONSERVANCY BOUTIQUE



- ▶ 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.]---\$17, Infant tee [18 mo.]---\$15, Toddler tee, 2T,3T,4T, 5/6---\$18
  - ▶ Soft pima cotton adult polo shirts are a handsome earthtone light brown and feature the spruce tree logo. Sizes S-XXL [Shirts run large for stated size.] \$18.50
  - ▶ Order now from the website!
- Or, by mail [WV residents add 6 % sales tax] make check payable to West Virginia Highlands Conservancy and send to West Virginia Highlands Conservancy, Online Store, PO Box 306, Charleston, WV 25321-0306

## T- SHIRTS

White, heavy cotton T-shirts with the **I ♥ Mountains** slogan on the front. The lettering is blue and the heart is red. “West Virginia Highlands Conservancy” in smaller blue letters is included below the slogan. Short sleeve in sizes: S, M, L, XL, and XXL. Long sleeve in sizes S, M, L, and XL. **Short sleeve** model is \$15 by mail; **long sleeve** is \$18. West Virginia residents add 6% sales tax. Send sizes wanted and check payable to West Virginia Highlands Conservancy ATTEN: Online Store, WVHC, P.O. Box 306, Charleston, WV 25321-0306.



## 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 and the pre-curved visor is light green. 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, black and red.. The front of the cap has ♥ MOUNTAINS. The heart is red. The red and black 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 \$15 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