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## Coal-Country Trout

*Fish don't have to be just another coal-industry waste product*

**By Ted Williams**

Fly Rod & Reel, July/October 2004

**On the morning of February 16, 2004** I stood beside a misty pool, first of three that feed an icy rill collected by the Cheat River in northern West Virginia. A song sparrow trilled; corn snow crunched beneath my boots; a breeze rolled off a frozen peak; and the mist enveloped me, burning my eyes and sinuses and causing me to leap backwards. I had just inhaled anhydrous ammonia.

The chemical is being injected by the state Department of Environmental Protection into the acidified orange outflow from the old T&T mine. Color and acidity come not from coal but the pyrite associated with it. When pyrite is exposed to water and air it forms sulfuric acid and iron hydroxide. The pH of water entering this treatment facility is 2.5; leaving it's 8.5. As alkalinity increases, the iron hydroxide and other toxic metals in acid mine drainage, many of which magnify in food chains, settle out as sludge or "yellow boy." Here the yellow boy is collected from the settling ponds and pumped 2.5 miles back up the mountain where it's dropped into an old mine shaft.

The system can handle 600 gallons of acid drainage a minute; but the outfall from the mine portal can exceed 2000 gallons a minute. So it frequently runs directly into Muddy Creek, and thence into the Cheat where, as it's diluted and partially neutralized, it dumps its yellow boy, smothering benthic life. Only three miles upcurrent from the mine Muddy Creek sustains wild brook trout. In the Cheat, watershed mine drainage has impaired 100 miles of habitat on 53 streams; 73 of these miles once supported wild brook trout and, with the proper investment, could do so again. All told, acid mine drainage has destroyed or severely damaged about 12,000 miles of fish habitat in West Virginia, Pennsylvania, Ohio, Kentucky, Maryland, Indiana, Illinois, Oklahoma, Iowa, Missouri, Kansas, Tennessee, Virginia, Alabama and Georgia.

The former owner of the T&T mine, Paul Thomas, had been required by the 1977 Surface Mining Control and Reclamation Act to post a bond that supposedly would allow the state to clean up any pollution or repair any wound he might create. But, like all coal bonds, this one had been ridiculously low, and now the state is stuck with the enormous expense of perpetual ammonia treatment. Until very recently, it was standard practice for an operator to go out of business and walk away from one mess, then start a new company and make a new mess. On the Cheat watershed alone there are 74 other forfeited sites, all belching acid. "The bonding system made a lot of bad people out of good people," said Trout Unlimited activist Bill Thorne, with me on that morning.

Not that Thomas was all that "good." In an effort to avoid treatment costs, he sealed up his mine, secretly cut a hole into an adjoining one, and began pumping in his effluent. But he'd miscalculated; the hole was too small, and pressure built up. On April 8, 1994 the wastewater blew a hole in the mountain and poured into the Cheat, staining it orange for miles, killing fish and other aquatic life, poisoning riparian habitat, burning the eyes and skin of rafters and boaters and devastating the local economy, which hasn't fully recovered to this day.

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Randy Robinson, a filmmaker who happened by just after the spill had started, recorded the disaster. His footage, aired by local and national TV stations, galvanized the public and helped convict Thomas for violating the Clean Water Act. Robinson, Thorne and others then helped build a support group called Friends of the Cheat.

In addition to fish, wildlife, rivers, mountains and forests, waste products of the coal industry include people. Also accompanying me was Friends' director, Keith Pitzer. "We looked at the lowest income census block groups in Preston County," he said. "And the first thing I noticed was that a lot were heavily mined. I contacted the public service district to see where their water lines were or were planned, and there was a distinct overlap because mined areas need public water. If you drill a well, you get orange, metal-contaminated acid. These are very low-value homes, not likely to be upgraded or sold."

Three weeks earlier Dr. Ben Stout of Wheeling Jesuit University in Wheeling, West Virginia, one of the nation's leading researchers of acid mine drainage and its costs, had told me this: "I really think in 20 years eastern Kentucky and southern West Virginia are going to be humanly uninhabitable. That's even without considering the ecosystem component. Humans are not going to be able to live in this region where there's no potable water. Kids come into this school thinking you can treat any kind of water and make it drinkable. 'Who taught you that?' I ask them. You can't get manganese out of water without just torturing it. You've got to take it way up in pH, treat the hell out of it, take it way back down in pH, settle it out, and by the time you've done all that you've introduced so many other things that you can't drink it."

Stout pays special attention to aquatic insects because they're indicators of ecosystem health; and in coal country he's chronicled a 50-percent reduction in both numbers and species. Many of his check stations are on headwater streams, which lawmakers assume don't count and therefore can legally be buried and/or polluted by the coal industry. But he has found that these streams are the "linkages" by which leaves and twigs are converted by insects to fats and proteins, very rare commodities in forests. These insects take to the air and float downstream, sustaining fish, salamanders, frogs, turtles, birds and mammals, jumpstarting energy flow in the whole forest ecosystem. Now the Bush administration is attempting to do away with the regulation that prevents mining activity within 100 feet of perennial streams. Stout calls the proposed rule "just outrageous . . . pulling the rug out from under the Clean Water Act."

**Upstream from Muddy Creek** Thorne and Pitzer showed me four lifeless streams running orange over slimy carpets of yellow boy-Lick Run, Pringle Run, Heather Run, and Morgan Run. They used to ripple with wild brook trout. Now they're known as the Four Dirty Sisters. In the last decade the big change hasn't come in their water quality but in how that water quality is perceived by the public. These days it's no longer "okay" that they're the Four Dirty Sisters. Here and in other acidified watersheds around the state groups like Friends of the Cheat, Trout Unlimited, West Virginia Rivers Coalition, the West Virginia Highlands Conservancy, the Citizens Coal Council, Friends of Blackwater (who look after one of the Cheat's two biggest tributaries), and at least 25 local watershed groups have a firm grasp on the lapels of elected officials and are shouting into their faces.

This year the Corps of Engineers will install a "passive treatment" facility on Lick Run. Passive treatment (as opposed to active treatment-the sort I'd seen at the old T&T mine) requires no daily maintenance. The hollow is very narrow, with two mine portals on opposite sides and about 100 feet from the stream. The Army will put in a limestone-lined pool at each outfall and, below one, install a limestone channel half a mile long. On the other side it will use the stream itself, lining a half-mile with limestone boulders.

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At Morgan Run we hiked up to another type of passive treatment facility. Perched over the mine outflow was a green "Aquafix" silo inside of which a buffering agent such as crushed limestone or cement-kiln dust is pulled down by a wheel powered by the water itself and at a rate appropriate to and determined by the flow-the more water, the faster the wheel spins; and the faster the wheel spins, the more buffering agent is dispensed. The device seemed sufficiently ingenious to have been invented in Japan. But no. "By two local miners," said Pitzer. "Milford Jenkins and his son Mike." After passing under the Aquafix the mine drainage goes through two settling ponds. All DEP has to do is show up every few months to fill up the silo and haul off the yellow boy. The whole project, including excavation, cost \$251,000-which sounds like a lot until you consider that the West Virginia Division of Natural Resources has determined that a mile of trout stream contributes \$40,000 to the state's economy each year. Morgan Run needs many more treatment facilities before it can support fish again.

No less nasty is Greens Run, which enters the Cheat across the canyon from Muddy Creek. But its North Fork is marginal, and, with three new passive treatment systems, including an Aquafix, it may soon be suitable for a transplant of wild brook trout. I inspected one of these systems, installed last fall by Friends of the Cheat with funds from EPA and the Department of Interior's Office of Surface Mining. Carved into an embankment 30 yards above a dirt road was a foot-deep, limestone-lined pool that catches mine drainage and brings the pH up, but not too far or too fast. The trick is to get it almost but not quite to the point where the metals drop out of suspension; otherwise the pool would fill up with yellow boy. From the pool the drainage tumbled down 800 feet of limestone-lined channel curled through mixed hardwoods as if it had always been there. "We're very happy about the way the contractor minimized his footprint," said Pitzer. "I don't think he took out any tree bigger than ten inches in diameter. He just picked his way through the woods."

The North Fork's new trout population, however, will be cut off from the rest of the Greens Run drainage. Isolation is a problem with much of Appalachia's brook-trout water and an enormous challenge for Friends, TU and their allies. Still, they're making headway. Pitzer rolled out a county map on which grossly acidified streams were colored red. The Big Sandy watershed showed as scarlet spaghetti, but the map was ten years old. "That wouldn't be colored red today," he said. "There's been a lot of passive treatment. We put in two sites on Beaver Creek, and we have one more to go; but above that-in four of the seven miles-we've introduced brook trout, and they're spawning. Once we put in the third site, we'll have a connection [for the trout] to Little Sandy." In 1989 the state Division of Natural Resources found no fish in a survey of Little Sandy. In 2001, at the same sampling site it found 14 species, including brook trout.

Like stream-bred brookies most everywhere, Appalachia's aren't giants; but, using dry flies only, Thorne exercises many ten-inchers and a few 12-inchers. "Few people realize how good our wild trout fishing is," he said. "Lots of woodland streams have gotten no mine runoff." What's more, the fishing is getting better fast. Thorne showed me a photo of a 13-inch male in spawning colors taken in the Red Run of Dry Fork, dead five years ago from acid rain. Here, and in other streams acidified by precipitation or mine drainage, a new and especially effective passive treatment is in use-dumping limestone sand directly into the stream each year. There's a formula that factors in pH and watershed acreage, but you can't get in trouble by using too much. At first biologists thought the lime would cement the bottom, but it doesn't. Frequently, trout hover over it.

In Charleston I stopped at the office of Friends of Blackwater, where director Judy Rodd and North Fork project leader Emily Samargo loaded me with documents, including an account in Harper's New Monthly Magazine by David Hunter Strother who, on a brook-trout quest in 1851, led the first Caucasians into the Blackwater country. Armed to the teeth with the fanciest tackle, much of which

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they smashed or dropped in the river, they killed fish like a reclamation crew. For example: "Conway . . . who had gone over to Blackwater, returned with about a hundred and fifty fine trout. This lucky forage afforded the company a couple of hearty meals."

The fishery didn't last long after that, but overharvest wasn't an important factor. Clearcutting weakened it, and coal mining killed it. Below Beaver Creek (not the one restored by Friends of the Cheat), the Blackwater was essentially dead until 1994. But then the state installed four perforated, hopper-fed drums which the current turns, grinding the limestone within and pulling out the particles in quantity proportional to the flow. This has restored excellent fishing on about 4.5 miles until the Blackwater collects its grossly acidified North Fork. Five years after the liming station went in, fish biomass in the spectacular Blackwater Canyon above the North Fork had increased from 15 pounds per acre to 42.3; and there has been steady improvement since.

The state now has a catch-and-release area in the canyon's first 3.5 miles. "It has turned out extremely well," says Mike Shingleton, in charge of the DNR's trout program. "In spring we stock catchable rainbows. In fall we put in fingerling browns. There's even limited brown trout reproduction." Fishing schools and guiding services are springing up. Darrell Hensley offers this description of canyon fishing in Fly Fish America: "Awesome waterfalls from countless feeder streams plunge into the river and the late afternoon sun causes the sandstone cliffs at the canyon's rim to glow a vibrant orange. During June and July the aroma and pinkish white blossoms of mountain laurel and rhododendron are throughout the canyon. . . . fishing these runs is fast and furious--lightning quick strikes will surprise you."

This restoration and the kind of work I'd seen on smaller tributaries, has dramatically improved the Cheat River for 18 miles. In 1973 survey crews turned up 24 smallmouth bass per acre at Seven Islands between St. George and Rowlesburg. In 1999 they found 289.

**No major river** in the United States has been made sicker by acid mine drainage than the Susquehanna's West Branch in Pennsylvania. Seventy-two percent of its 6,992 square-mile watershed has been damaged, and at least 150 miles of main stem and 500 miles of coldwater feeder streams have been essentially sterilized of aquatic life. Rehabilitation will cost something like \$500 million, not counting operation and maintenance of treatment facilities; but that hasn't prevented Trout Unlimited, six state agencies, four federal agencies and 10 other partners from making impressive headway.

Five years ago TU launched an initiative to restore the lower section of Kettle Creek—a major West Branch tributary which, in its upper reaches, is one of the most productive trout streams in the East and, along with its tributaries, offers about 70 miles of Class A wild-trout water. The last 6.5 miles of the mainstem, however, is severely acidified, and two miles before it merges with the Susquehanna's West Branch, and after it picks up Twomile Run, it's lifeless.

TU wrote a science-based restoration plan for the lower watershed. And, with the Kettle Creek Watershed Association, it helped the state DEP plan a large passive treatment facility, now complete, on a tributary of Twomile Run. On that same tributary TU is in the process of reclaiming a 57-acre strip mine, regrading, planting vegetation (of the sort favored by the local elk population), and thereby preventing a good deal of precipitation from reaching acid-forming pyrite. On another Twomile-Run tributary it will have started work on four passive-treatment sites by the time you read this. Total cost for restoring the lower section of Kettle Creek: \$10 million.

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**In the long run**, eliminating instead of treating acid mine drainage is probably cheaper and definitely more effective. You do it by reclaiming (as defined by biologists not industry) strip mines and mountaintop-removal sites. And you do it by filling up or sealing off deep mines so that water and air can't mix with pyrite. This takes a major financial commitment of the sort America hasn't yet been willing to make. Currently there's a political battle between Western and Eastern coal producers over the Abandoned Mine Land (AML) Trust Fund, into which coal companies must pay 35 cents per ton for surface-mined coal and 15 cents per ton for deep-mined coal. Some of the money is supposed to go to the states for restoration of water and land damaged by mines before the August 3, 1977 enactment of the Surface Mining Control and Reclamation Act; but \$1.5 billion sits unused, except to help offset the federal deficit. AML funds are crucial to rivers like the Cheat, which gets 80 percent of its acid from mines that went in before 1977.

It used to be that Appalachia was the biggest coal producer; now it's just the biggest acid producer. These days the largest coal producer by far is Wyoming; but Western coal deposits contain little pyrite and there's not much water to form sulfuric acid anyway. Western companies argue that they shouldn't have to help fix messes in Appalachia. Eastern companies, on the other hand, argue-and logically-that their dirty coal helped the country win World War II, got it industrialized in the 1950's and 1960's, and that Western coal producers are getting fat off that public service and therefore owe them big time.

Meanwhile, the politicians are posturing like tom turkeys on the strutting ground. Without renewal by Congress the AML fund will expire on September 30, 2004 and the \$1.5 billion will get gobbled up for general expenses. For a while, the renewal was tacked onto Bush's energy bill, which was so dreadful that no legislator with an environmental conscience could vote for it, even to save the AML fund. Different bills are being hatched to save the fund, but it's not clear how much, if any, of a renewed fund would go to acid remediation.

Controlling what politicians do with AML money is infinitely easier than controlling how they aid and abet the coal industry in ducking cleanup responsibilities. The problem is that where coal is king most legislators are courtiers. Consider the current effort to do away with West Virginia's "Tier 2.5" designation for water quality. Tier 2.5 means streams in which brook trout are self-sustaining; and, while it offers modest protections, it exempts non-point pollution sources such as agriculture and logging. But, whipped up by the coal industry and the politicians who front for it, property-rights advocates and Farm-Bureau and chamber-of-commerce pooh-bahs imagine that it contravenes the Fifth Amendment. Recently the legislature passed a law that lets a property owner petition the DEP to delist a Tier 2.5 stream. So now wild-trout habitat can be defined by public opinion.

Last year state senator Sarah Minear (R-Tucker County) got an amendment accepted by the legislature's joint Interim Rulemaking Committee to remove the current trout stream list from the water-quality rule. Had it been enacted, West Virginia would now-at least officially-contain no trout habitat. Such is the opposition faced by those who love things wild and beautiful, and not just in West Virginia.

"What kind of person owns land with a brook-trout stream running through it and doesn't want it protected?" said Pitzer.

"A coal mogul or property-rights zealot?" I asked.

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But, as Pitzer and Thorne had reminded me, there are other voices; and, even in coal country, they're starting to be heard. With the public's new ability to petition for delisting, Tier 2.5 water comes the ability to nominate it. Available for saving are all the trout streams never surveyed and all the trout streams that keep surging back to life.