That Sinking Feeling

In coal country, longwall mining is causing the ground to cave in as much as five feet—leaving fish, wildlife, and people as waste products.

By Ted Williams

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Roy and Diane Brendel in front of the undermined pool outside their Spanish Revival mansion in southwestern Pennsylvania.

In the 1970s, shortly before mountaintop removal came into vogue in Appalachia, the coal industry started using an extraction method nearly as destructive to the habitat of fish, wildlife, and humans. But longwall mining, as it's called, is subtler than mountaintop removal. Like conventional mining, it happens underground and out of sight. It doesn't bury streams, springs, ponds, and marshes under tons of rubble; it quietly sucks them into the bowels of the earth. And even when it leaves some surface water, it destroys aquatic habitat in ways that people can't see unless they understand the ecology of fish, amphibians, and macroinvertebrates. Longwall mining doesn't crush houses with flyrock or sweep them away in torrents of sludge. It just shakes them apart at their foundations when the ground drops four or five feet, in what the industry chastely calls "planned subsidence."

Conventional miners leave "pillars" of coal to support the earth above. Longwallers operate a track-mounted cutting head—consisting of two whirling, bit-studded drums—that moves back and forth, shearing off three-foot swaths from the coal seam as if it were slicing a giant kielbasa. A longwall cut, or "panel," may be 1,000 feet wide, 10,000 feet long, and 8 feet high, and when one panel is finished, another is begun. Sometimes longwallers revisit abandoned mines to slice away the pillars. Miners and equipment are protected by hydraulic roof supports, which are removed as the shearer progresses, allowing earth and rock to fall into the empty space. The results on the surface approximate those of a major earthquake.

Longwalling happens anywhere there is coal, but the grossest environmental damage is in the impoverished regions overlying the world's richest mineral deposit—the Pittsburgh Coal Seam, which runs like layer-cake filling for 2,000 miles, 300 to 800 feet under Pennsylvania, West Virginia, Virginia, Ohio, Indiana, Illinois, and Kentucky. These days the seam's bituminous coal is much in demand because it burns more cleanly than western coal and allows industry to meet clean-air standards without making major pollution-control investments. Thomas Hoffman, a spokes- person for Consol Energy Inc., which produces more underground coal than any other U.S. company and primarily by longwalling, estimates that a quarter of the nation's total coal production issues from longwall operations.

I visited southwestern Pennsylvania, not because longwalling is worse there, not because that state's regulatory bureaucracy is more timid and inept, but only because the best biological data has been collected there. No one fishes for or even speaks for the pinky-size darters—the greensides, rainbows, fantails, and johnnies—that depended on the shallow flow that used to hurry over the clean sand and gravel of Hoovers Run in the town of Brave. But darters are as much a part of America's native biota as scarlet tanagers, redstarts, and painted buntings, and they're just as brightly colored. When Consol undermined Hoovers Run, the ground sank, creating "gates" that act like dams. In the undermined reaches, most of the darters are gone now, their sand and gravel buried under mud and silt, their riffles replaced by five feet of green, stagnant water. U.S. Fish and Wildlife Service biologist Jennifer Kagel showed me plenty of fish at her flooded sample sites, but they were ubiquitous habitat generalists like bluegills and green sunfish. These species are popular with anglers, a fact seized upon by the coal industry and (in the past) state bureaucrats as evidence that longwalling can "enhance" aquatic habitat.

A condition of mining permits issued by the Pennsylvania Department of Environmental Protection (DEP) is that longwallers "restore" streams they destroy. One prescribed method is "gate cutting"—that is, removing dams created by the sagging watershed. At Roberts Run near Spraggs I inspected old and new gate cuts. "We have done mitigation on that stream," Jonathan Pachter, Consol's manager for environment permitting, had assured me. "We excavated the stream channel, cut gates, did some bank stabilization. It was very prone to flooding pre-mining."

In some places the meandering stream had been straightened for hundreds of feet; and where once Roberts Run renewed a rich floodplain, there are now five-foot-high banks of raw dirt over a layer of sheared shale. Now there is no place for floodwater to go except downstream, where it becomes someone else's problem. Springs that fed and cooled the flow have dried up, so the "restored" Roberts Run alternates between a raging torrent and a largely dry streambed. Basically, a healthy, biologically diverse stream has been converted to a storm-water ditch.

Organic farmer Leigh Shields, who has lived beside Roberts Run since 1968, remembers the old stream. "Consol actually tried to claim it wasn't perennial," he told me as he pointed out mature sycamores falling into the eroding channel. "Even during droughts you couldn't wade across with boots. Now you can jump across

with sneakers anytime. It was full of big bullheads and smallmouth bass. Now you're lucky to find fish two inches long. The mussels and crayfish are mostly gone." The falling earth fractured Shields's gas line, so now he has to heat his greenhouses with propane—"a very poor heating source," he says. Four of his five acres of agricultural land are now too wet to grow anything. His four wells have been plugged because they were venting methane, so now he gets municipal water piped in. Twenty of his neighbors who lost their wells get municipal water delivered to 1,000-gallon plastic bladders called "water buffaloes."

As we cruised the sunken landscape, Kagel pointed out the remains of houses and the foundations of houses that had been torn apart by subsidence, or had exploded when they filled with methane released from coal mining, or had been purchased, then demolished, by longwallers seeking to lower property taxes. Most of the former residents were living in new double-wides and other modest dwellings provided by the companies. For most it had been a step up.

At Laurel Run near Waynesburg we encountered another method of restoration—"grouting," whereby two chemical agents that bind together to form an epoxylike glue are injected into subterranean fractures, supposedly sealing them. A contractor for Foundation Coal, running a drilling rig beside the stream, said things weren't "looking good" for grout injection at this site. But where it had looked good—where the earth is full of glue—the stream and the springs that fed it keep disappearing. I saw grass and red maples growing in the streambed. At the farm of Murray and Laurine Williams, we inspected stagnant, dewatered ponds and hillside springs that had dried up. Now the Williamses and many of their neighbors are on municipal water. To qualify for the DEP permit, all the company (then called RAG Emerald Resources) had to do was promise to grout. Both Pennsylvania's Clean Streams Law and the federal Clean Water Act make it illegal to dewater streams. "Show me how you can mitigate for the loss of flow," declares Mark Hersh, former director of the Raymond Proffitt Foundation, a Philadelphia-based group specializing in environmental protection. "You simply can't. Longwalling is much like mountaintop removal in that government approves a method of mining that is inherently illegal. And now that the companies have invested in this method, DEP doesn't know what to do. The pot is too hot to grab."

After RAG had dewatered parts of Laurel Run, the DEP made it post a $351,900 bond to ensure that it fixed the damage; but this work was scarcely under way when RAG applied for a permit to longwall the rest of the watershed. The DEP granted it without waiting to see if restoration would succeed. It didn't. Now the stream called Laurel Run is basically gone. As I stood on a cement bridge contemplating its remains, I thought of Frost's elegy for his own buried brook: "Deep in a sewer dungeon under stone / In fetid darkness still to live and run— / And all for nothing it had ever done / Except forget to go in fear perhaps. / No one would know except for ancient maps / That such a brook ran water. . . . "

Traditionally the Pennsylvania DEP has operated under the popular superstition that intermittent streams can be written off, though there is nothing in the Clean Streams Law that encourages this interpretation. If a company showed the agency photos of dry pools (which may be seen in most any small perennial stream during low water), the DEP declared the stream intermittent, and longwalling proceeded.

Also with me in Pennsylvania was one of the nation's foremost authorities on headwater ecology: Ben Stout of Wheeling Jesuit University in Wheeling, West Virginia. "First," he explained, "intermittent streams are critically important to the whole river system and watershed; cutting them off is like cutting off your fingers. Second, these streams—at least before they are undermined—are *not* intermittent; they're perennial." Every time Stout looks at a stream the DEP has declared intermittent on the strength of industry allegations, he finds

macroinvertebrates with multiyear aquatic-residence requirements such as five-year-old dragonfly larvae, three-year-old Dobson-fly larvae, and mature aquatic salamanders.

"Macroinvertebrate abundance was 44 percent lower, diversity was 47 percent lower, and long-lived taxa were 51 percent fewer in longwall mined versus reference [control] streams," writes Stout in his most recent study. "No water was present at 18 percent of samples from longwall mined streams. An additional 17 percent of samples failed to support a minimum viable community of at least two individuals, from each of two kinds of macroinvertebrates. . . . In general, longwall mining resulted in streams harboring about one- half the abundance and diversity of reference streams. . . . Twelve years after longwall mining, biological communities failed to achieve the abundance, diversity, or longevity of unmined or [conventionally] mined reference streams."

Consol's Pachter dismisses this work as bad science in that Stout included a pristine Ohio stream as a control while the forest in the longwalled area was second growth. But Stout hadn't used just one control; he'd used 11, almost one for each of 12 longwalled streams he studied, a ratio unheard of in such work. Finding 11 controls had been a monumental challenge. "It's very tough to find a stream around here that hasn't been impacted by these guys," said Stout. "I couldn't figure out why the hell one longwalled stream had such a good biological community; then I found out it hadn't been mined after all."

The Laurel Run debacle energized the environmental community, which, in turn, helped the DEP acquire a modicum of resolve. On November 12, 2004, the agency ordered UMCO (a subsidiary of Murray Energy Corporation) to cease work on panel 6E under a tributary of Maple Creek, 30 miles south of Pittsburgh. The order was hardly draconian. For this one mine UMCO had already received 70 DEP citations and noncompliance orders, and for two years the mine had been destroying other tributaries of Maple Creek. UMCO was free to longwall elsewhere in the watershed, and it was free to continue to remove coal from under the stream if it left conventional pillars. Still, the company responded by shutting down the entire mine, laying off 495 workers, whooping it up in the media about government abuse, and predicting imminent bankruptcy. It had done the same thing the previous July in response to a similar DEP order. After being pilloried in the press, the agency had reissued the permit with a provision for more grouting (that later failed).

Meanwhile, UMCO was facing other challenges. By law the coal industry must give homeowners at least six months' notice before it undermines them. But in a letter to the DEP, PennFuture—a statewide citizens' group committed to environmental protection—cites DEP documents it says indicate UMCO notified homeowners *after* they'd been undermined, then submitted "at least 14 falsified certified mail receipts, misrepresenting by ten months the dates when UMCO notified landowners that the company would be undermining their homes." The DEP has turned the matter over to the attorney general's office, and a criminal investigation is under way.

On November 30, 2004, Justice Bernard A. Labuskes Jr. of the state Environmental Hearing Board denied UMCO's appeal of the DEP's November 12 order, finding that "when UMCO mined in Panels 4E and 5E, every spring and seep, as well as the 5E stream itself, went dry. When the remnants of a hurricane that caused devastating flooding in much of Pennsylvania this past autumn passed through the area, remarkably, the 5E stream stayed dry. . . . UMCO is at least partly responsible for where it finds itself due to its (1) aggressive business plan and (2) questionable course of conduct. . . . There is and should be no reduced level of environmental protection for operations that consciously expose themselves to these heightened risks. In the face of these developments and these warnings, UMCO proceeded to prepare to mine Panel 6E as if authorization were a fait accompli. It developed the panel, installed the longwall equipment in place, and readied the stream mitigation measures." Nine days later—when it was clear that Labuskes wasn't kidding—

UMCO stopped kidding, too, putting everyone back to work, reopening its mine, and cutting longwall panels that don't underlie streams.

Despite UMCO's histrionics, there is no need for longwall mining. Like mountaintop removal, it's just cheaper for the industry. Environmentally acceptable alternatives include conventional underground mining and, in some situations, even surface mining. What's more, "planned subsidence" is strictly an American euphemism, designed to give the impression that manmade earthquakes are okay so long as the industry knows they're going to happen. In Europe, where longwalling has a much longer tradition, companies are required to prevent subsidence by "backstowing"—that is, by filling their empty panels with rocks.

Longwall mining beneath streams is unlawful under federal and state clean-water laws. And under the Fifth Amendment, which proscribes government-facilitated takings of property without due compensation, it's unlawful under houses. No other legislation supersedes these statutes; but, despite its inherent illegality, longwalling continues without major legal challenge. Pennsylvania's Subsidence Act of 1966 outlawed destruction of people's homes. The industry challenged this all the way to the U.S. Supreme Court and lost. Then, in 1996, it got the state legislature to slip through Act 54. The part of the bill that required longwallers to replace the water supplies they destroyed sounded great. But the second part—which allowed longwallers to destroy homes, provided they pay to have them fixed or replaced—attracted scant attention, and the bill sailed through without a single nay. So, propped up by Act 54 and conveniently ignoring countermanding federal statutes, longwallers now destroy private and public property. Bob Ging, the attorney who has litigated most of the longwalling cases in Pennsylvania, says this: "If government agencies want to destroy your home, they have to compensate you first and then only after they go through eminent domain proceedings. So coal companies basically have more power than our government."

But longwallers can't take your home if it's on the National Register of Historic Places; they have to prevent its destruction with pre-mining "mitigation." To get a feel for how well this mitigation works, I returned to Spraggs and, in fading light and driving rain, dropped in on Roy and Diane Brendel, whose house had been built in 1939 by Major Ernst Thralls of the U.S. Cavalry with tiles and stained glass he'd brought back from Mexico and with native timber milled and carved by local craftsmen. It had been one of the best examples of Spanish Revival architecture in the East.

On November 30, 2004—four years and four days after being undermined by Consol—house and property looked like a set from *The Addams Family*. A fence of wood, stone, brick, and concrete lay in ruins in the front yard. Cribs of crisscrossed mining timbers supported porches. Steel posts set at 45-degree angles buttressed sagging walls. The yard was festooned with scraps of blue plastic tarp, Consol's attempt at roof repair. Blue plastic pipes shunted rainwater off the roof—in the opposite direction it used to flow. A white plastic pipe vented methane. Standing in for ruined wells was a black water buffalo. Propane tanks replaced the broken gas line.

The Brendels have lived here since 1971. Choking back tears, Diane showed me pre-mining photos of her daughter in a wedding gown standing on an elegant veranda amid potted flowers and looking out over bright gardens and an immaculate swimming pool. "This was like going to the Mediterranean," she said. "Look at it now." The stone steps were broken and piled by the creek, the railings nowhere in sight, the stone floor cracked and separated from the house, the 17-inch-thick sandstone walls split all the way through and up to the second floor. The stone arch was fractured. Thick mats of vegetation covered the bottom of the crumbling swimming pool.

Inside the house more cribs supported ceilings. Stairs were separated from walls. Chandeliers had been replaced by bare lightbulbs. Consol's mitigation had included bubble-wrapping the chandeliers, stained glass windows, painted glass doors, china, and antique furniture. Eighty boxes were piled in the now unlivable living room, and after four years they're so moldy that Diane is loath to clean for fear of spreading pathogens. The kitchen door, made of steel, keeps getting stuck shut. So far, says Diane, Consol has sawed through it 13 times. Nineteen other doors don't open or don't shut, and some are off plumb by as much as three inches on a side. Every now and then the whole house jumps as rubble settles in the old coal panel. In 2001, a year after longwalling, a motion alarm went off upstairs. The Brendels raced home to find that a rug had slid four feet across the hall and into the separated wall, which then dropped and pinned it. I couldn't budge the rug. There are cracks in the ornate floor tiles, bulges in wooden floors high enough to tempt a young skateboarder. Before we had finished our tour of the cellar, Consol's sump pump went off. According to Roy, it does so about every 10 minutes because the house dropped 4.5 feet into the now unpotable water table. "Waterfowl now land in our hayfield," he continued. "We like waterfowl, but we want our hayfield back."

Unlike their neighbors, the Brendels refuse to settle. "I think this mitigation was a dog and pony show so that Consol could get permission to mine," said Roy. "I don't think they ever planned to restore this house; I think they thought we'd take a settlement." Still, if the Brendels would just come around, they could move to a safe, comfortable house. I asked them why they were standing their ground.

"Why should we go from a 13-room mansion to a double-wide?" said Roy. "That's about what they offered us."

"This is our *home*," said Diane.

Shortly after the Brendels were undermined (and purely by coincidence), their insurance company dropped every noncorporate account. Now, despite two hearings before the insurance commissioner, they can't get homeowners' insurance because there's a "preexisting condition" in the form of planned subsidence—planned by Consol, not the Brendels. To wage the constant and as yet unsuccessful battle to get their house restored, the Brendels say they've had to retire—she from her job at Shields's organic farm, he from guidance counseling for the local school district. "So far," Roy told me, "this has cost us about $100,000—our life savings—for lawyers, architects, historical renovators, engineers, and estimates from contractors to document what a blind man on a galloping horse could see."

I can't tell Consol's side of the story because Jonathan Pachter declined to comment, citing "ongoing litigation."

The litigation had been initiated when Consol sued the Brendels in federal court—in a vain effort to get their house taken off the National Register of Historic Places.

Ted Williams last reported on the coal industry in "Sludge Slinging" (www.scottchurchdirect.com/ted-williams.aspx/sludge-slinging), in the May 2004 issue of Audubon.

What You Can Do

For more information on longwalling and to help with the effort to control it, log on to the websites of the Tri-State Citizens Mining Network (www.tristatecitizens.org) and the Raymond Proffitt Foundation (www.rayproffitt.org).