



# THE BIG SEEP

Longwall mining is draining the water from the springs and streams of northern Appalachia.

**By Kristen Lombardi** *Photographs by Steven Sunshine*

The sound of the longwall machine hits you first, a steady churning, methodical chomping that seems to emanate from everywhere at once. Stand before the six-foot-high layer of coal—the “coal face,” in mining parlance—and you’ll witness the source of this cacophony. It thunders like an industrial

slicer: you can hear the steel shearer’s engine swirling away as cutting blades lop off the jet-black bed and crush it to chunks. The machine passes by, leaving the seam face three feet thinner than before. The sound continues around the clock, from deep inside the earth, wherever coal can be had.



The rail track and longwall panel inside Bailey Mine (top). The coal shaved off the “seam face” ends up at the Bailey Central Preparation Plant (bottom). The largest of its kind, Bailey Central handles 70,000 tons of coal a day.

On this January morning in 2008, it radiates from the heart of Pennsylvania “coal country,” in northern Appalachia, where the mining industry reigns. It originates 600 to 1,000 feet below ground, about three miles into the second largest underground colliery in the United States: the Bailey Mine, which snakes beneath 144 square miles of sparsely populated terrain. Owned by Consol Energy, the largest producer of underground coal nationwide, Bailey operates in the remote village of Wind Ridge, a 90-minute drive southwest of Pittsburgh.

At the Bailey Central Preparation Plant—located nine miles by conveyor belt from this mine’s tunnels—70,000 tons of “clean” coal are loaded every day onto trains bound for some of the coal-fired power plants that produce more than half of the country’s electricity. The 110-car trains chug up and down the East Coast to 42 locations, from New Hampshire to Florida. Of all the coal extracted from Bailey and its “sister mine,” Consol’s Enlow Fork—more than 21 million tons in 2007—90 percent will run the lamps,

TVs, and computers in four million households east of the Mississippi River, making the longwall a critical link in America’s energy infrastructure.

But that energy comes at a steep environmental price. Older mines use a technique known as “room and pillar,” which leaves blocks of coal to support the earth. Bailey Mine, by contrast, employs the brutally efficient extraction method known as “longwall mining,” which chews up the coal seam and leaves the groundcover to cave into the void. Inside Bailey, the longwall machine cuts a swath of coal bed called a “panel,” which in this case runs 1,100 feet wide and 10,560 feet long. The machine works its way down the length of the panel, eating away the entire layer. Longwallers are protected by 192 hydraulic roof supports, each bearing 800 tons of overlying dirt. As the shearer progresses, the supports advance forward, leaving rock and soil to simply collapse. Oftentimes, the ground above sinks three to five feet in an outcome the industry delicately labels “planned subsidence.” Folks living above Consol’s

mines describe the effect more like a “continuous earthquake.” For them, the longwall machine—which keeps gobbling coal as if a famished monster—has jolted houses, roiled farms, and disturbed something far more precious: the aquifers.

Fly over Bailey and the five other longwall mines in southwestern Pennsylvania, within the county lines of Greene and Washington, and you’ll get a hint of the havoc the coal industry has wreaked upon the region. The Bailey Central Preparation Plant, where coal is sized, cleaned, de-watered, and stored for shipment, looms darkly over pastoral fields, its silos towering above the surface, its spotlights flickering in the sun. Smoke spews from mammoth stacks; conveyor belts extend like tentacles across the land. In the sky, you take in lustrous lakes of black sludge known as “slurry,” where waste gets dumped. Railroad tracks jut from the complex between humble houses and roadside barns. At times, you sense the industry’s hold on the countryside, which locals dub “the coalfields.”

Yet it’s on the ground—on the back roads not far from the West Virginia border—that ravages of longwall mining really come into focus. That’s where you’ll discover what “planned subsidence” has meant to folks here: the road bumps big enough to pass for speed bumps; the hillside splits deep enough to swallow a yardstick; the field cracks vast enough to strike fear into one farmer that his tractor would tilt on its side. In Pennsylvania, the law decrees that coal companies may burrow beneath any residence so long as landowners are compensated for damages. In the coalfields, houses look like they were shaken by Mother Nature—sagging porches, tilting floors, twisting walls. It’s not unusual to find insulation shoved in plaster cracks, or cribbing stuffed below foundation beams—the makeshift attempts of property owners to salvage their homes. Undermined properties sit vacant, the ghostly remains of residences ripped apart by subsidence. “Anyone who is affected by longwall mining sees death and destruction,” says Scott Finch, a supervisor from Morris Township who’s fought the encroaching footprints of Bailey and Enlow Fork mines. “It’s like a *path* of destruction.”

But for all the structural damage caused by longwall mining, it’s brought about a more lasting environmental harm: It’s sucked the water into the recesses of earth, leaving behind disrupted aquifers. Throughout the region, water in all forms—springs, streams, wells, ponds—has fallen victim to the practice, draining through fissures by force of gravity. Farmers have lost springs; residents have lost wells. Streams have diminished in flow or disappeared; alternately, they’ve pooled and flooded fields. Stretches of once-lush farmland have collapsed and then collected water, creating instant wetlands.

Longwall mining, says John Hempel, a geologist and president of EEI Geophysical, who has testified in lawsuits challenging the coal companies, in Elkins, West Virginia, “is absolutely draining the aquifers.” He describes the effect on surface and ground water as “quick and catastrophic,” so much so parts of Greene and Washington counties have turned almost arid. Likening the phenomenon

to pulling the plug in a bathtub, he notes, “Every drop of water will leave that tub ... until the tub goes dry. That happens everywhere longwall mining is going on.”

Even Duke Lake, the 62-acre centerpiece of Ryerson Station State Park, in Greene County, apparently vanished because of the longwall machine. The only state park for 38 miles, Ryerson Station boasts more than 1,100 acres of forest and greenery overlying Bailey Mine. But when the mine expanded underneath the parkland in 2005, the Ryerson Dam cracked, prompting the draining of Duke Lake. Now, three years later, what used to be a favorite swimming, boating, and fishing spot remains baked and riddled

with cattails—a vivid reminder of the steel shearer’s plunder. On January 28, 2008, the Pennsylvania Department of Conservation and Natural Resources filed an unprecedented lawsuit against Consol, suing for \$58 million in damages to the dam, lake, and natural resources, claiming the coal company downplayed the risks of longwall mining beneath the park. The case is currently pending in the Fifth Judicial District of the Pennsylvania

Court of Common Pleas.

Consol executives deny their operations had anything to do with the ruin at Ryerson, although they don’t doubt the practice generally has an environmental price. “Consol will not make a case that damage from longwall mining doesn’t occur,” says Thomas Hoffman, the vice president of external affairs at the company. “We say, in fact, that any damage that occurs will occur right away.” Still, the industry downplays the fact that longwall mining drains water from the region. “There are geologists who say all of Greene and Washington counties will become arid,” Hoffman adds, “but we’ve used this technique for decades and there’s still water. The idea that longwall mining is sucking up the aquifers doesn’t hold up.”

He may be right. But no one—not regulators, not policy-makers, not Consol scientists—know much about the long-term consequences on the hydrologic cycle here. And in the meantime, as the longwall machine churns and chomps, the waterways continues to dry up.

## Geologist John Hempel likens longwall mining’s effect on surface and ground water to pulling the plug in a bathtub. “Every drop of water will leave that tub until it goes dry.”

**K**im Jones never imagined her farm without natural water. Standing on the porch of her home overlooking her 62 acres, she lays out all the things she’d envisioned—vegetables here, sheep and cattle there, alfalfa fields down there. Yet such ventures depend upon water, and sources come in short supply at KD Farm. “I had water here before the mining,” says Jones, a Wind Ridge resident who lives 641 feet above Bailey Mine’s 1-I panel, “and I just want it back.”

The daughter of a coal miner, Jones, 43, has round, obsidian eyes that burn with frustration when she contemplates how her dream of owning a cattle farm has turned into fantasy, post-longwall. She





Kim Jones has watched in sadness as the natural beauty that cut across her land has been transformed from a de-watered stream (pictured right) to a manmade stream (above).

and her husband, Kenny, a hulking 46-year-old with a humble demeanor, moved to the village in 1993 to settle into an agrarian life. Soon, they were planting a half-acre garden, cultivating a hay field, helping their daughter raise lambs for auction. But by 2003, the couple was duking it out with Consol over the plugging of gas wells, a fight that persists in court today. Mining cost them not only free gas, but also \$15,000 in felled hardwood trees, Jones says. They believe it defiled their wood-framed house—hence the ceiling cracks and plaster drops in the front addition.

Like so many in the coalfields, though, water woes vex them most. Since the longwall machine went beneath their property in 2004, the family has seen the moisture dissipate from the soil and on the surface. Gone are two wells and two springs, along with a stream that cut across their acreage. It had flowed fast enough year-round to sustain three waterfalls—until the mining busted its rock and de-watered its bed. Jones bought her property for a purpose, she says: This was where she was going to raise her kids and live happily ever after. But how can she without water?

It's a common sentiment in the coalfields, where it seems like everyone has a story about the longwall machine draining a source, or diminishing its flow, or dirtying it with toxins. Leigh Shields, who keeps an herb-and-flower farm on 47 acres above Consol's Blacksville #2 Mine, in Spraggs, was undermined in March 2001—an event that plunged his house, shop, and greenhouses four feet and left dry the four springs and four wells he'd developed with \$700, half from agricultural grants. Or take Laurine Williams, who lives just outside the county capital of Waynesburg, nine miles north, above a mine owned by the nation's fourth largest coal supplier, Foundation Coal Holdings. When the Emerald mine wrested the coal beneath her land in March 2001, she was dispossessed of two springs and a pond, which tilted and turned into a silt pool. Thirty miles to the north, across the county line, Ken Carter (not his real name) lives on 160 acres above three longwall panels and four conventional corridors for Mine No. 84. The Consol colliery chewed the coal below his plot seven times—from 1998 to 2000—and took eight sources.

First, the well curdled yellow from hydrogen sulfide and methane gases, making his family sick. Then, he lost three springs and four ponds. Consol grouted the ponds' fractured bottoms—claiming to spend \$100,000 in cement—but none of the ponds can replenish without the springs.

“Water is a big issue,” concedes Patrick Wildeman, Consol's general manager for land coal operations, which negotiates damage settlements with property owners. “People realize coal companies can restore houses,” not necessarily water supplies.

Under Pennsylvania law, coal companies must provide affected landowners with a temporary source of water within 24 hours, if they do not have access to an alternate supply. A common solution is installing a giant tank, or “water buffalo,” which often holds up to 2,500 gallons. The companies have three years to restore or replace an affected supply with a permanent one. Such provisions are mandated by 1994 amendments to the state mining law, known as Act 54. Since residents had no prior safeguards against water losses, state officials paint the provisions as a broad expansion of rights. “Act 54 provides necessary protections to surface owners. It requires water replacement,” says State Senator Barry Stout, a Democrat representing the region and a supporter of the amendments. “This requirement is the best thing to come out of Act 54.”

Coal executives insist the affected supplies rebound. Springs may re-appear yards away, they say, but few disappear. Wells may get interrupted, but few are de-watered. And while they acknowledge that their companies often provide public water to property owners, they claim to re-establish springs at a 99-percent success rate.

Things on the ground seem less fruitful, however. More often than not, the 20 landowners whom I interviewed have had to rely on “city water” pumped from afar, and nearly all have gotten minimal compensation for what they lost. To wit: Carter lived off a water buffalo for 30 months while Consol conducted pump tests on his domestic well. Yet it'd fail to produce enough flow to meet state standards. For taking his free supply, he says Consol paid him \$12,000 for a “lifetime” of public water. In three years, he's spent nearly 20 percent



of that sum on his \$58 monthly bill.

Local politicians like to point out that coal companies have benefited this impoverished region by developing public-water mains. “Companies pay for these lines,” notes State Representative Tim Solobay, a Washington County Democrat, “so they’ve brought infrastructure to communities that wouldn’t be here otherwise.” Indeed, from 2000 to 2006, coal companies subsidized 23.4 miles of new mains costing \$1.5 million in Washington County alone—mostly because mining disrupted sources. Benefits aside, the industry’s installation of water lines reflects its bleeding of area aquifers.

This siphoning has had dramatic consequences in West Finley, on the premises of Charles Whitlatch and his wife, Patricia. Tall and mustachioed, with a tight helmet of hair, Whitlatch, 61, has lived on 40 acres above Bailey Mine’s 17-C panel since childhood, when Patricia knew him as the boy next door. By the late ‘80s, the couple was clashing with Consol over plans to undermine a cemetery where relatives are buried, thus violating state law. A veteran Consol miner, Whitlatch was fired. He and 29 other plaintiffs sued for damages to sacred grounds, and, in 1996, won a \$4.8 million verdict that would be erased on appeal. Seven years later, Consol undermined the couple again—this time, their property. Two pending suits involve ruin to the house, two trailers, a barn, and a garage that teeters near collapse.

But what have devastated the Whitlatches are water woes. They

Chuck Whitlatch walks the stream that used to run through his property.



LONGWALL MINING

delighted in the clear, cold, and gushing liquid from their 80-foot well, which the longwall machine would taint milky white in 2003. Consol refused to haul temporary water—citing a settlement agreement from another undermined property the couple owns—and thus forced them to spend \$5,000 on a tank. For the next three years, they’d fork out another \$6,000 on water deliveries until the state ordered the company to cover costs. In November 2006, regulators still detected unsafe bacteria levels in the well. By then, two additional wells, three springs, and two streams had also vanished.

## Scientists say every stream reacts differently to longwall mining: some get de-watered; others lessen in force; still others pool up.

Even before the longwall machine reached the couple’s property in August 2003, it had totaled the creek crossing the front of their acreage, depleting it in a burst of bedrock. Patricia remembers hearing a thunderous boom and feeling the earth rumble, as though a bomb detonated. A few days later, Charles walked down to the valley and discovered the source of this explosion: his stream. All along a thousand-foot stretch of streambed, huge portions of sandstone had heaved into the air, forming a tee pee, emptying the bed of every water droplet. Consol’s geologists had conducted pre-mining surveys on this tributary, known as #32511, and identified habitats in its flow: “riffle/run at 813 feet; step pool habitat at 281 feet; waterfalls at 129 feet.” But after the steel shearer chewed up the panel, the reports stated, simply, “no flow.”

“I don’t think I’ll see this stream again,” says Whitlatch, shaking his head, staring at a bed barren save for dead leaves.

His creek isn’t confined to his yard, of course. Tributary #32511 cuts across a neighboring farm and feeds into the North Fork of Dunkard Fork, one of five streams cascading into Ryerson Station. Along the way, residents have used it like any run in southwestern Pennsylvania: Children slide down waterfalls; parents stroll along banks; naturists flip rocks for frogs. Farmers let cattle wade in local streams, while fishermen hunt for bluegills, bass, trout. In this way, the loss of tributary #32511 can be felt by not just the Whitlatches, but the public at-large. Maybe this explains why streams damaged by longwall mining have become a rallying cry in the coalfields.

“There’s a close relationship between residents and their land,” says EEI Geophysical’s Hempel, who’s worked for citizens on water complaints dating back to the ‘90s. When swimming holes and fishing tides go dry, he adds, “People wonder what’s new and start associating water loss with longwall mining.”

Scientists say every flow reacts differently to the method: some get de-watered; others lessen in force; still others pool up. In the most striking cases, subsidence bursts the bedrock so water seeps underground, or slips below the surface and returns downstream. Often, water swells in spots where the bottom has dropped, filling with sediment. To date, the Pennsylvania Department of Environmental Protection (DEP) has reported 23 instances over 97 miles of





Machinery being used to try to repair the stream bed on the Jones property, which has suffered adverse effects from longwall mining.

mined streams now dammed, diminished, or disappeared in Greene and Washington counties. In 2000, biologists with the U.S. Fish and Wildlife Service conducted field investigations on tributaries overlying eight longwall mines and, in data never made fully public, recorded more widespread destruction. Of 131 tributaries surveyed by FSW biologists, nearly half had either pooled or lost flow.

In and around Ryerson Station, the site of the now-drained Duke Lake, the longwall machine has caused such hydrologic chaos that Consol hydrogeologist Joshua Silvis admits the need for state-required remediation is “quite large.” Here, in the western reaches of Greene County, a dozen brooks are undergoing the latest in “restoration,” complete with cement mixers, pipes as wide as eight inches, and industrial-sized bulldozers. At the Jones property, two miles from the park, Consol has spent months mitigating the depleted tributary, drilling holes in the bedrock, filling them with epoxy grout. On this November 2007 afternoon, the scene looks more like a construction site than a family farm. Truck tracks criss-cross the creek and converge on cement bags stacked near a cranky machine that reads CHEM GROUT. Dozens of tiny holes riddle the bed. Some are stuffed with pipes, others with wet cement. Kim Jones points to a hose that leads to a valve and, beyond that, a pipe where Consol will unleash city water—mitigation approved by DEP. She’d prefer a natural flow to what she considers “this charade.” But, she says, flatly, “It’s either public water pumped in or none at all.”

The unnamed tributary, known as #32596, has also disappeared on a neighboring plot, which Consol owns and which overlies Bailey Mine’s 3-I and 4-I panels. In September 2007, the DEP ordered the company to fix the stretch. Last year, Consol hydrogeologists

estimated using 14,000 bags of grout over 21,000 feet of stream in the area’s remediation above the Bailey Mine. They’ve told Jones the company has spent \$2.5 million on tributary #32596—\$850,000 on her stretch alone.

All this work doesn’t exactly impress the Joneses. Their teenage daughter, Kaitlyn, has spent her life playing in the stream, scouring for salamanders, marveling in the sight of deer and turkey. Since it vanished, she’s noticed the wildlife don’t come around, and the only salamanders she finds are dead. “It’s kind of sad,” she says, motioning to the machinery, “so I don’t bother coming here anymore.”

About the only folks who do are environmental activists like Attilia Shumaker. A retired school teacher, Shumaker has wise eyes and a wizened face that suffers fools poorly. In 1998, while teaching biology, she led a high school “stream team,” which studied the destruction caused by the longwall machine. Now, she does much the same as head of the 100-strong Wheeling Creek Watershed Conservancy. One fall morning, she takes me on a tour of the watershed waterways undergoing mitigation, stopping at an Aleppo cattle farm above Bailey’s 7-I and 8-I panels. A hillside stream cuts a withering path. Its once seemingly indomitable rock strata exploded after the steel shearer had gnawed away the underlying coal two years before. Shumaker remembers driving 18 miles from her Ninevah farmhouse just to see the mess. Since then, she’s monitored its state-approved remediation. This day, Consol has laid a pipe along the banks and tapped into a nearby run to add flow. Spotting a valve, Shumaker turns it and releases a minor tidal wave. Water pours into the bed through pipes hidden by boulders. She encounters another valve further up the hill. This time, water spews in the air as if it were



a miniature geyser. She repeats this scenario again and again, opening six valves over a stretch of two football fields.

“Oh, isn’t that cute?” Shumaker quips, her lips taut as she stares at the fake flow.

Across the road, she takes in a more high-profile mitigation effort: the South Fork of Dunkard Fork. Since its undermining in the summer of 2007, the tributary has become a curious sight for many locals. “Everybody was down here looking at it,” Shumaker says, referring to initial damages. She and fellow activists snapped photos that show parts of the stream pooled up *and* parts dried out. Some reveal a giant pipe running down the bed. More recently, she’s watched Consol contractors blanket South Fork’s banks with an elaborate arrangement of hoses that squirted water like fountains. The hoses are gone now, and the stream trickles at a soothing pace. Still, Shumaker cannot help but notice the mature trees delineating an old shoreline higher than the new one. When a pool of minnows

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TILLE SHUMAKER

Tillie Shumaker heads the Wheeling Creek Watershed Conservancy.



glides by, she clicks her tongue in dismay. To her, South Fork doesn’t look anything like its old self—not in water level, nor aquatic life. Despite the restoration, she sees a stream undone by the longwall machine.

“There’s no way to describe the destruction except to say your heart’s sick,” she confides. “You know there’s no way they’ll get this stream back to the way it was.”

**T**hat pool of minnows swimming in South Fork of Dunkard Fork would be a welcome sight to Joshua Silvis, the man behind the restoration. The Consol hydrogeologist has devised remediation plans for this and 11 other streams impaired by Bailey Mine. Strapping in build, with spectacles and a goatee, Silvis stands on South Fork’s banks yards from all the piping and gravel at the company’s central station, Aleppo Grange. He’s made a point to survey aquatic life in the current—shiners, darters, tiny trout. “I’ve also seen snakes,” he says, smiling, “and I’m not a big fan.”

Silvis is smiling not because of this warm winter day so much as because his crew has finished mitigating South Fork. Not long ago, the stream looked like most remediation sites in the vicinity—a construction eyesore. The longwall machine crossed South Fork in 2006 and in 2007, and will do so two or three more times. Subsidence has slumped the bottom three feet, spawning two 700-foot-long pools, stagnating water. When Silvis saw the swelling, he relays, “I was ecstatic we still had flow.”

Typically, flow loss calls for a complicated mitigation regime whereby coal companies drill holes 3 feet to 20 feet deep in the bedrock, then clog them with grout. The cement is supposed to plug fissures like it plugs, say, dam foundations. Silvis finds it “less intrusive” than such methods as lining the bed with plastic. His crew mixes clay with the cement in hope of ameliorating its content. Companies can supplement the regime with “flow augmentation,” pumping water into a dry bed from wells, springs, municipal lines. The measures amount to stream illusions—“They’re not natural,” Silvis cedes—but they’re meant to help the real ones “heal.”

At South Fork, Silvis had to correct a pooling rather than a de-watering problem, so he turned to a technique called “gate cutting.” Companies excavate the bumps in the bed marking tunnel “gates” to longwall panels, which eases the swelling. Before dredging South Fork, contractors spent six hours catching fish in buckets to drain 800 feet of it. They kept water flowing by tapping a hose into another tributary. Recently, they’ve landscaped the channel to encourage life—placing boulders as “hideouts” for fish, for example. Standing on anti-erosion fiber laid on the banks, Silvis soaks up what he considers a restoration “success.”

In 2007, Consol finished mitigating four of the Bailey Mine streams; one still had what Silvis calls “issues”—a diminished flow—while the rest had “restored” flows after grout and piped-in water. After a year’s worth of monitoring in 2008, Consol is now planning further mitigation on two of the four streams because of occasional flow loss, Silvis says. And that’s just the results for one



Hydrogeologist Josh Silvis stands alongside the South Fork of Dunkard Fork stream, in Greene County, PA, which overlies Bailey Mine.

mine. Not long ago, Jonathan Pachter, Silvis’s boss and Consol’s general manager of environmental services, escorted me to remediation sites above Enlow Fork Mine. “We believe we’re doing things in an environmentally sensitive way,” assures Pachter, a boyish mid-50s, as we approach a repaired run named Rock Hollow. It was dewatered after a pass of the longwall machine; DEP ordered Consol to cement its bedrock last summer. Despite recent rainfall, the brook looks barely wet, save for shallow puddles.

Pachter sees progress nonetheless. “There’s water under the rocks,” he notes, whereas they used to be “bone-dry.” Earlier, he told me that it’s virtually “impossible” for coal companies to repair a damaged stream to its pre-mining state. What Consol strives to do is return it to a normal range of conditions. “I know the concept is that every stream should be returned to the way it was,” he said, “but that’s not the way any industry in the United States operates.” Now assessing the shriveled Rock Hollow, Pachter cannot declare success or failure yet. Consol has to collect information for three years before the state decides whether a restoration is successful. But, he says, “Consol has done what it’s supposed to do.”

Back at South Fork, Silvis has just begun to measure the flow to compare with data taken before mining. A perennial stream of considerable size, South Fork draws off a 27-mile watershed, and has gushed as fast as 30,000 gallons a minute. Silvis doesn’t know if the repair will measure up. For now, he says, “It turned out to look pretty good.”

And it does. To the untrained eye, South Fork epitomizes the beauty of Mother Nature, with its lulling ripple and sun-spotted current. Yet longwall mining has managed to harm tributaries in

ways folks cannot detect unless they know something about fish, amphibians, and bugs. Scientists say any alteration in a flow as a result of mining can have devastating consequences for species living in its habitats. To quantify these effects of subsidence, the U.S. Fish and Wildlife Service returned to Greene and Washington counties in 2001. Agency documents show that biologists sampled five waterways—three were undermined; two were not—and found that three quarters of all subsided reaches had morphed into murky pools, thick with silt, which smothered the fish, mussels, and mayflies growing on the bottom. Two of the three habitats in every stream—riffles and runs—had been virtually wiped out, as had the darters, stonerollers, and other fish sensitive to sediment. In a June 2003 report of the FSW findings, which has never been made public, the biologists explain:

*Although longwall mining did not create this sediment (except where steep banks have slumped into the stream), it has created conditions that facilitate sediment deposition ... [which] ... has eliminated fish intolerant of excessive sedimentation, and introduced a long-term instability into the stream.*

Ed Perry, a retired FWS biologist who supervised the 2001 study and who hasn’t spoken publicly about it until now, puts it this way: “The study shows there were statistically significant differences between subsided reaches of streams and un-subsided reaches. The streams were statistically different and that means a lot.”

“Streams don’t come back,” echoes Ben Stout, a biology professor at Wheeling Jesuit University, in Wheeling, West Virginia, who’s



studied “headwater streams,” the small runs that fuel larger ones, for the past two decades. In 2001, citizens asked him to examine those headwaters undermined by the longwall in southwestern Pennsylvania. By then, Perry and FWS biologists had documented the degradation in mid-level streams, where fish and shellfish thrive. Headwaters support the benthic macro-invertebrates on which the aquatic community depends; they’re where the insects lay eggs and mature. Stout evaluated four headwater streams in Greene County, and compared mined to non-mined stretches. In all four, he recorded the same result: “These aquatic insects were disappearing,” he relays.

In his study, Stout found subsided stretches had high conductivity because such metals as calcium and arsenic had dissolved in the flow. He also found the four springs were partly or totally de-watered, which decimated habitats for amphibians and bugs. The message of his work seems bleak: “Longwall mining results in the loss of approximately one-half of southwestern Pennsylvania’s headwater streams,” states the July 2002 report on his findings. Back then, he considered issuing a warning to locals: *You’re being undermined. Get ready to lose your streams.*

Tall and lanky, with a shock of white hair and an all-consuming grin, Stout’s now standing beside an undermined spring in Waynesburg, holding a multiparameter “magic wand” to measure its alkalinity level. Dry for 300 meters, its bedrock bears gaping cracks and is overgrown with wildflowers. Water funnels into it from a two-inch pipe that Foundation Coal spiked from a nearby spring. Stout had recorded salamanders, toads, and shrimp here—a total of 12 aquatic species. Now, he spots one frog, “not half eatin’ size,” sitting in a puddle. Sizing up the damage, he says, “This stream is never going

to come back. Not on its own.”

Not if his work serves as an indication. By 2003, Stout had broadened his investigation of headwaters in Greene County to Marshall County, in northern West Virginia. He spent two years studying the area, comparing data from streams that endured the longwall machine to those that didn’t. To test the theory that tributaries “heal,” he re-visited those undermined as many as a dozen years earlier. But he saw more of the same. “Overall,” his August 2004 report concludes, “longwall mined streams fail to support biological communities in approximately one-half of the headwater streams across the region.”

Perry, who served as assistant supervisor of the FWS Pennsylvania field office, found similar results. He cannot forget the valley of bluebells, warbles, and other wildflowers alongside one Washington County stream, Enlow Fork, which tracks the border between Washington and Greene counties. It had been a prime fishing spot, its pristine flow cascading from mountains, its gravel bottom perfect for small-mouth bass. After the longwall machine went beneath it in the late 1990s and early this decade—eating up the coal in multiple panels—its bed collapsed and capped with silt, making it more suitable to what he calls “trash fish,” like carp. Perry and his colleagues evaluated Enlow Fork in October 1999, and determined 22,000 feet had sunk. Perry recalls sampling 1,000-foot-long pools with Consol consultants, who collected 29 fish of 14 species. By comparison, he’d recorded “thousands” in the un-subsided reaches. “That pool was a biological desert for fish,” he says. “It was an incredibly poor habitat.”

Over the years, as he and FWS biologists conducted field work, Perry walked the length of dozens of streams and waded through

Biologist Ben Stout stands next to a Waynesburg, PA, mined spring, now dry for 300 meters.



knee-deep muck from subsidence. He saw firsthand how the longwall machine has destroyed streams. Reflecting on the plummeting diversity in undermined streams, he says, “There might not be streams of any value left in southwestern Pennsylvania. We’re headed in that direction, and I don’t understand why people aren’t up in arms about it.”

Not surprisingly, coal executives dismiss such predictions. One even claimed the restored streams end up “better” than their pre-mined predecessors. “If there was the kind of devastation that folks on the other side would have you believe, it’d be obvious as you drive down the highway,” says Hoffman, Consol’s vice president of external affairs. He points out that his employer has mined beneath hundreds of miles of tributaries in this area, yet has mitigated “relatively few”—DEP records mention 36 over three mines. “It’s erroneous to look at a stream and say, ‘This is one of hundreds of losses.’” Recently, coal companies have worked with the state to turn subsidence pools into wetlands, leading the industry to tout the steel shearer’s “positive” environmental impacts.

Maybe more surprising is the way lawmakers echo the industry. Solobay, the Washington County state representative, says he’s heard the complaints and seen the studies on environmental impacts of longwall mining. “The horror stories that opponents try to put out there don’t bear themselves out,” he says. Solobay is an avid sportsman who hunts and fishes in game lands above the mines. “I’ve seen none of the quote-unquote devastation,” he goes on. Though he recognizes “isolated” cases of drained streams and water sources, nothing has convinced him of a wide-scale problem. DEP reports on the matter have concluded as much. “These mining companies have been good stewards,” he adds. “Sometimes, people hug environmental trees too tight.”

No state official or coal executive gives credence to a long-term water crisis. Though in moments of candor Consol scientists acknowledge some lasting impacts. Joshua Silvis recognizes that longwall mining has disrupted aquifers, lowering the water table, perhaps changing stream “flow regimes,” or maybe even reducing “gaining sections” where ground water channels into tributaries. He doubts that it’s destroyed aquifers, given recharge from precipitation. Still, he admits, “There is some environmental destruction. I’m not going to lie.”

Stout is clearly more alarmed and more emphatic about his findings. “Everything adds up,” he tells me, taking samples with his wand from the depleted Waynesburg spring. He likens headwater streams to human fingers: you can lose some and not be crippled. “But if you lose all your fingers, one by one, you’ll be f\*\*ked,” he says. “That’s what happens when longwall mining takes away these streams.”

**I**n May 2005, eight months after he’d published his last report on headwater streams, Stout attended a conference on the topic hosted by mining regulators. To his surprise, he’d been invited to present his data on those impaired by the longwall machine. He showed some slides and declared the results “obvious.” He remembers a supervisor at DEP—the agency charged with protecting Pennsylvania’s citizenry and environ-

ment—rose to speak. The supervisor alluded to studies that DEP had commissioned to assess longwall mining on a Washington County stream, which found similar results yet didn’t attribute them “with absolute certainty” to subsidence. The supervisor insisted damaged tributaries recover, sparking a rebuke from Stout, who motioned to the 150-strong audience and announced, as he recalls: “Everybody in this room knows these streams have subsided but you!”

Stout recounts the anecdote with a mischievous grin, as if delighting in the tussle. “Are you familiar with environmental regulation?” he asks. “The agency falls into bed with the corporate entities it’s supposed to be overseeing.”

**“These mining companies are good environmental stewards. Sometimes, people hug the environmental trees too tight.”**

STATE REPRESENTATIVE TIM SOLOBAY

Stout’s echoing a common perception in the coalfields. Environmental activists pin the blame for regional water woes squarely on the DEP, which oversees the mines. In implementing Act 54, the DEP has authority to deny permits in key instances: First, if the longwall method will cause “irreparable damage” to certain buildings; and second, if it is likely to cause “material damage” to certain water bodies. Environmental regulations preventing “pollution” in streams—including loss of flow—also apply. But the division has rarely rescinded approval for longwalling because of a de-watered stream (one known case in 10 years), let alone because of structural havoc. Activists say the coal industry plays the system so well it’s got the mining bureau working on behalf of the mines rather than the public. Why else would regulators allow companies to take headwater springs in exchange for nominal compensation? Or destroy perennial streams and patch them up with artificial materials?

“It’s just stupid,” grouses Bill Lindley, the president of Ten Mile Protection Network, a grass-roots group named after a local watershed. He’s referring to DEP sanctioning questionable stream mitigation rather than prohibiting any destruction—an approach that can lead to illogical positions. For example, DEP requires companies to pump water into depleted streams—within 24 hours in some cases. But it lets them use city water, replete with chlorine and other chemicals that can kill that life. And officials have hailed high-profile grouted streams as “fixed and running,” even though the beds amount to tiled troughs conveying rainfall.

Activists relay anecdote after anecdote about fruitless efforts to stop the degradation. They’ve sent e-mails and written letters decrying the “irreversible” stream damage. They’ve shown up at hearings loaded down with pictures of streams before remediation and afterward. They’ve given tours of the water waste to students, reporters, and anyone else who’ll listen. In October 2007, Attilia Shumaker, of Wheeling Creek Conservancy, convinced the manager of DEP’s



mining bureau to walk tributaries around Ryerson Station. The official could showcase mitigation successes; she'd do failures. She says the pair wound up selecting the same.

"He didn't show me one stream that had come back" without artificial materials, Shumaker says. She figures officials know as much as coal representatives do that damaged streams cannot be restored to pre-mining states. "It appalls me that the state allows this," she adds, "when they know the mining will destroy streams."

William Plassio, the manager of DEP's district mining office, declined repeated requests to be interviewed, and the agency did not respond to requests to interview his superiors. In answer to written questions, DEP's press office provided a seven-page statement outlining provisions of Act 54 and other environmental rules governing the agency's oversight of longwall mining. The statement notes that, "The actions of the DEP are based on law and regulation"—law that permits "short-term impacts" and "use of mitigation" in streams and water sources. It goes on to insist that the agency is living up to its mission. "The department fully and forcefully requires compliance with Pennsylvania's strict environmental rules and regulations," the press office writes. "DEP has successfully and faithfully protected Pennsylvania's natural resources."

This stretch of land in Kirby, Greene County, used to boast cornfields until a longwall machine caused it to sink four to five feet.



If activists are wary of such assurances, they have good reason. In July 2000, Stephen Kunz, an ecologist in Media, Pennsylvania, issued a scathing report on the mining bureau's failure to implement regulations in permitting the mines. Kunz had examined the effects of longwall mining on wetlands in Greene and Washington counties, where the diverse habitat makes up less than one percent of the terrain. His report suggests the steel shearer had dried up some wetlands, turned other wetlands into ponds, and drained their feeder springs. But what it exposed was the way coal companies had ignored many environmental requirements while the DEP rubber-stamped their activities.

To remedy the failures, the agency's since tightened its requirements for identifying wetlands above longwall mines. But Kunz doubts much has changed. "The state isn't putting its foot down saying, 'You have to give us this inventory or we're not giving you a

permit,'" he says.

His observation is born out elsewhere. Under Act 54, the DEP must evaluate the longwall method's harm to citizens and the environment every five years. So far, it's done two reports, both widely criticized as lacking. The latest, dated February 2005, was farmed out to a local university whose authors devoted an entire chapter of their assessment to "limitations"—*i.e.*, incomplete data in DEP permit files.

**I**n southwestern Pennsylvania, the typical landowner I interviewed doesn't own the mineral rights below his or her property; the coal industry does. Act 54 lets companies extract the coal they own from beneath houses in exchange for damage payments (thus treating people's homes as though they're replaceable), and environmental lawyers argue that the law treats aquifers the same. Though Act 54 prohibits "material damage" to streams, it only covers those streams serving public water supplies or feeding certain dams—in effect, a tiny number of tributaries overlying longwall mines. The real regulatory shield is the state's Clean Streams Law, whose provisions require DEP to deny a permit to any mining method that can harm—or, as the act states, "pollute"—streams and water sources. Many environmental lawyers interpret the term "pollution" to mean drained or diminished flow, although DEP defines it this way: "flow sufficient in quantity to maintain existing and foreseeable uses." Either way, the law has heft—in theory.

It's hard to calculate the cumulative draining of aquifers in southwestern Pennsylvania because DEP does not archive water waste in a systematic way. The agency does report the number of landowners who've filed water-loss complaints against the mines (287 as of September 2008), as well as its responses ("replacement plan under review," for example). But it doesn't track whether a lost spring has re-emerged yards away, or whether a lost well is among a cluster. With streams, the agency is gathering data to judge the state-approved remediation work, not necessarily to document the mile upon mile of ruin.

Agency inspectors cannot be all places at all times, so they've had to rely on the coal industry for information. On occasion, data has fallen through the cracks. Although companies must report to DEP water losses on property they own, they don't always do so. And if they do comply with the regulations, their reports—unlike those of citizen landowners—are not made public. As a result, countless water sources on hundreds of parcels are unaccounted—indeed, Consol owns almost 500 plots in Washington County alone. Consider, too, that companies don't always report stream losses. A case in point: Jim and Linda Winegar's 60 acres in Graysville overlie two longwall panels and a conventional corridor for Bailey Mine. The longwall machine gobbled the coal under their property in 2003 and 2004 and took two water sources. When their spring went dry, Consol re-established it. Not so their stream.

Kent Run meandered through the Winegars' acreage in all four seasons—until the mining would bust its bedrock. When the flow lessened, Consol merely monitored it. It's now vanished for a half



All that remains of Kent Run, a once-flowing perennial stream that cut across the Winegar property and into a nearby state park.

mile. In response to Jim's complaints, the company said it's not responsible because the couple hadn't developed the stream for "use." Never mind that they considered Kent Run, in Linda's words, "just a beautiful feature of our property," or that it's among the five runs funneling into Ryerson Station. Because of Consol's position, DEP had no record of the de-watering for four years. That changed last fall when the Winegars bumped into Attilia Shumaker, who'd escort DEP's William Plassio to the stream. Within weeks, an agency inspector assessed the spoilage, yet advised the Winegars that the division would do nothing without a formal claim.

Interestingly, Kent Run is classified as "perennial," the only category DEP protected until October 2005. Before then, the agency wrote off tributaries defined as "intermittent," which fade in dry seasons, so that coal companies could mine with near impunity. Its guidelines for issuing permits beneath such surface waters as streams, long viewed as a blank check for the industry, were revised in the face of mounting pressure. Under new rules, companies must predict potential pollution to all stream types; regulators allow longwall mining so long as there's no evidence of permanent harm. Companies have up to three years to return degraded streams to "normal" flows, based on pre-mining data. If not, DEP can ask that they "compensate" by enhancing another stream.

Coal representatives find the new guidelines tough, in part because companies now have to provide specific hydrologic and biological data to DEP to secure a longwall permit. Because they must collect a couple of years' worth of baseline information for every stream, Consol employs a dozen consultants who measure daily

flow characteristics, gather samples to determine water quantity and quality, and track aquatic species. Firms must also submit remediation plans for the streams expected to pool up or lose flow, on which DEP reviewers must sign off.

It's an obvious improvement, environmental advocates say, save for a glaring loophole: By allowing for some ruin to surface waters, DEP has done an end-run around the legal standard of "pollution." Its guidelines distinguish between "temporary" and "permanent" harm, but, says Heather Sage, of the Harrisburg-based environmental group Citizens for Pennsylvania's Future, "the language is so arbitrary as to be suspect." How can officials say that a drained flow lasting 180 days is better than, say, 365 days? Or that a stream de-watered in the fall versus the spring has limited injury? "You're really messing with things scientists cannot fully predict at that point," she explains.

In its seven-page reply to questions, DEP maintains that it only approves longwall mining when there's "no presumptive evidence of potential pollution of streams." While the agency admits "a permanent loss of flow in a stream is categorized as pollution," it suggests that not all de-watering fits the bill. "Effects of limited duration include flow losses that are expected to dissipate within one or two years or can be restored by the company within that time." Asked how anyone can predict whether such ruin will last a month or a year or 10 years, it's replied: "Stream response to mining is a function of specific technical factors, which may include mining method, mining extent, topography, depth to coal, ground water levels, watershed size, [and] stream mitigation techniques."



But even Consol scientists admit it's difficult to predict harm, temporary or otherwise. Coal companies try to forecast adverse effects by determining how much fracturing of bedrock will take place. Historically, scientists have seen more fissures in stream beds lying in shallow overburden and consisting of brittle rock, such as sandstone. Still, Silvis, the Consol hydrogeologist, acknowledges, "You don't really know what is going to happen until you mine."

DEP's detractors can't help but see the new rules as a lot of smoke and mirrors. Lindley, of Ten Mile Network, remembers when his organization argued as much at an informal permit hearing for Mine 84 in 2004, around the time the agency was drafting its guidelines. Members arranged to set up a microphone and registered concerns over water woes, prompting DEP officials to promise that streams and springs would not disappear. Post-longwall, officials discovered a local tributary named Brush Run dry for about 1,000 feet, with 25 or so dead fish. In December 2007, they handed down a compliance order to Consol for causing Brush Run, as it states, "to go dry unexpectedly over the 7-B panel and for causing a fish kill." "You'd think DEP officials would wake up by now," Lindley says, "but they won't."

Michael Nixon, an environmental lawyer who heads the mining committee for the Pennsylvania chapter of the Sierra Club, puts it more diplomatically: "No one imagined the systematic de-watering of aquifers would be allowed, much less accepted by DEP."

Nixon sees parallels between the loophole in the surface-water guidelines and other regulatory twists. Take the raft of safeguards for historic properties. State regulations feature a clause governing these properties that specifies a mining method "will not adversely affect" them. But DEP has interpreted this to mean the method won't cause "irreparable damage," allowing coal companies to mine beneath historic houses so long as the wreckage is fixed. That's how the agency enabled Consol to undermine a 1939 Spanish revival mansion in Spraggs, which wound up in such disrepair it had to be gutted. To Nixon, it seems DEP is doing the same with streams.

"It's like telling coal companies, 'If you can fix it, okay,'" he says. "DEP is supposed to *protect* the environment, but that's like an escape clause."

**K**im Jones and her daughter, Kaitlyn, stand near the picnic pavilion at Ryerson Station, marveling at the ripple and flow of Panther Lick Hollow as it trickles into the depleted Duke Lake, some 400 feet away. When Jones was a girl, her miner father would pack the family into the car on August days just like this and head to the state park. She remembers frolicking in not only the lake, but also the five runs. Now, save for a burlap-like fabric on its banks—a telltale sign of remediation—Panther Lick looks almost as lovely as her memories.

The pair soon follows its trail. In November 2006, Jones, the treasurer of Wheeling Creek Conservancy, heard that Panther Lick was not what it seemed: a fellow activist discovered that it springs from a pipe. She'd driven here with Kaitlyn and her 6-year-old son, D.J., then just four years old, and trekked along the tributary for almost a mile until reaching the park border. Remediation was underway, but nothing unusual.

This day, it takes Jones and Kaitlyn 40 minutes to follow the run, trekking up a wooded hill to the apex. Sunlight shines through hardwood trees, as headwaters narrow to a sliver. They reach a barbed-wire fence delineating private property. Beyond "No Trespassing" signs, they spot a two-inch pipe spewing water. The activist who'd made this trip trailed the pipeline, too, and discovered it connected to two tanks. But the Joneses take a seat and listen as the water hisses through a spigot. I ask about the apparent illusion.

"Truthfully," Kim says, resting against a rock, "it's hard for me to comprehend." She doesn't get how the industry can turn a profit given all this remediation. "I know there's money to mine coal," she explains, "but is there really money in it when forking out millions to fix streams?"

Residents aren't the only ones pondering these questions. Every year, the industry extracts more coal from the bowels of southwestern Pennsylvania and, every year, citizens face more water woes on the surface. "The problem is nobody knows how to mine this coal

Burlap-like fabric on Panther Lick Hollow marks it as an undermined stream; today, its headwaters spring forth from a black pipe.







Longwall damage: Miles of streams have dammed, diminished, and disappeared in southwestern Pennsylvania.

yet protect the water,” says Richard Ehmann, a retired state-environmental court judge and an attorney who’s handled longwall-damage complaints. “This is a problem on a huge scale.” Bailey Mine, for instance, has already ripped out coal—and interrupted aquifers—across 64,000 acres, and a Consol representative estimates that it and Enlow Fork still have a combined reserve of 700 million tons, which will take another half-century to extract. That doesn’t include Consol’s two other longwall mines. On its website, meanwhile, Foundation (which declined to comment for this article) reports that its affiliates “control a reserve base of nearly 750 million tons in this region—enough coal to last more than 50 years.”

“Are acres of lost streams and aquifers worth all this longwall mining,” Ehmann poses, or “are we going to look back and say, ‘What a disastrous bargain that was?’”

It’s actually possible to mine this coal yet protect the water—if different methods are employed. Of course, state lawmakers would have to amend Act 54 to require companies to leave pillars to support surface waters. They could also mandate that operators fill in the panels, or “backstow,” as the longwall machine advances, so the groundcover doesn’t cave into the void. Such practices—required in some European countries—don’t take nearly as many water sources.

Yet legislative reform seems unlikely. Senator Stout, for one, says room-and-pillar mining forces companies to lose 50 percent of their coal—half their investment. “I don’t think it’s realistic to say, ‘You can’t use the latest technology to extract coal,’” he adds.

Miners contend that it’s safer to cut a panel from the coal bed without interruption; undertaking a “move-around,” they say—disassembling the longwall machine so as to avoid a stream or source above—poses greater risk of rock collapsing on *them*. Bailey’s longwallers have done this maneuver to protect some water bodies, but because of the potential hazards, company officials want to limit its use. There are also the economics. Consol has spent “millions” on stream restoration so far—Pachter deferred on a figure. Yet mining the old-fashioned way, he admits, “is much more expensive, and companies like us aren’t going to do anything without making a

profit.”

Consol spokesman Joseph Cerenzia takes the claim further. “It may sound noble, but if the state enacted a law like that, it’d put thousands of folks out of work,” he argues, since labor and production costs would rise. “It gets my dander up just to hear some things these folks say.”

Those who live above Bailey Mine are equally riled. Residents are especially angry that Consol plans to mine underneath 14 streams near Ryerson Station. Currently, the company has applied for a permit revision to expand the mine by 3,135 acres. In its application, it reveals that, of the 14, most will endure “temporary” damage, and six sections are predicted to lose flow.

When Kim Jones read the permit revision in the local newspaper, she couldn’t believe its fine print: Consol requested approval to perform “minor forms of stream restoration” on three streams in stretches of up to 11,100 feet—or eight miles in all. The application proposes five remediation locations for one stream alone—Kent Run, which was left dry by the longwall on the Winegar property.

Under the Bailey expansion, Jones would have to endure more mining beneath her farm. The coalfields activist has waged a fierce fight against Consol and DEP to reclaim what the longwall machine has taken from her family, but the weight of this unyielding battle belies itself when the feisty miner’s daughter confides: “There are days when I have the fight of a lion in me and there are days when I cower in a corner like a mouse because I don’t know what to do.”

Some residents see longwall mining afoot and know exactly what to do: they flee. Farmers, in particular, wonder whether their springs and wells will flow and sustain their cattle and crops. Or will they just fade away? “This land ain’t gonna be worth nothing if coal companies take all the water,” says Bill Whipkey, of Holbrooke, who tends a herd of 100 cows on 95 acres above Cumberland mine. He expects his farm will turn arid once the steel shearer visits in a decade. “I don’t want to see what happens,” Whipkey laments. “I’m telling the company, ‘You give me a check.’ I’m outta here.”

He’s heard the horror stories from fellow farmers like Harold Van Druff, of Kirby, whose thriving dairy business went belly up, post-



longwall. Van Druff watched his dairy cows get sick from chlorinated city water after losing his pure sources to Blacksville 2 Mine in 1996. His farm's never returned to its pre-mining prime, despite his attempt to remake it into a cattle ranch. Or Dick Patterson, a cattle farmer in Waynesburg who witnessed seven of the springs he'd developed dry up from Emerald mine in 2002. Foundation has replaced his freshwater with a municipal supply, pumping 16 gallons a day for his 70-strong herd—a rate too costly for him to pay. Or Leigh Shields, the Spraggs herb grower who lost his eight sources and pays for public water. He'd planted such herbs as mint, oregano, and sage in a three-acre field beside his 47-acre farm—until it sunk four feet and became a swamp. Consol packed it with dirt, but he can't plant crops in bulldozed soil.

Farmer Dick Patterson's cattle now must drink "city water."



**“Loss of water tables is permanent and it’ll have a real impact on farmers, so the state is going to have to decide if that’s a priority or not.”**

SANDRA BROWN

“I think Greene County will regret the loss of water and the death of farming,” says Sandra Brown, a farmer in Holbrooke whose 45 acres sit between the Enlow Fork and Emerald mines.

Sitting on the porch of her 1880s farmhouse, surrounded by shovels and buckets, Brown is a former legal secretary whose blue eyes grow wide as she discusses the dwindling agricultural community here. In August 2005, she moved to this hollow from Pittsburgh to live off what she calls “income-producing land,” researching organic foods, studying trends. She’s sunk \$373,000 into the farm and has managed to sustain herself—“The experiment is working,” is how she puts it. Today, she has 19 Scottish Highland cows, 125 French hens, 16 egg-laying hens, and a rooster. But long-term success hinges upon the looming longwall mines, which will close in on her property within 12 years.

In the past two years, coal companies have purchased nearly every surrounding farm. One farmer colleague is giving his herd to his son. Another has bought a smaller plot and is unloading equip-

ment. Still another is staying for a final season and then selling to King Coal. Two adjacent farms are set to become a mine portal. For Brown, a rookie who likes to talk shop with veterans, the desertions have meant less supplies *and* support. “The whole system you have when you have an agricultural community is affected,” she says, standing before seven cows munching on grass near a shimmering pond. Hens and the rooster waddle in its edge as heron fly overhead. A constant ring of crickets fills the air. She finds the scene too “exquisitely beautiful” to give up. But who knows what she’ll think, post-longwall?

“It seems to me the state is condemning the land to live off rainwater,” she observes. “Loss of water tables is permanent and it’ll have a real impact on farmers, so the state is going to have to decide if that’s a priority or not.”

If the Pennsylvania DEP isn’t quite living up to its environmental mandate, the Department of Conservation and Natural Resources seems willing to step into the void. At least, that’s what this state agency has done in the most dramatic instance of water loss: Ronald J. Duke Lake. Created by Ryerson Dam, which plugs the North Fork of Dunkard Fork as it meanders through Ryerson Station, the artificial lake sits in the heart of the only state park in Greene County. Unlike typical water bodies, its 62 acres weren’t sucked into the substrata after the longwall machine had gnawed away the coal. Rather, DCNR drained the lake because of cracks in the dam, which had materialized once Bailey Mine moved into the territory.

In April 2005, after Bailey’s longwallers cut a panel some 2,000 feet from the dam, state inspectors noticed new seepage on its left side. Over the next four months, according to DCNR’s lawsuit and DEP dam-safety reports, inspectors monitored the dam, measuring cracks, recording leaks. Some crevices had surfaced and been repaired months earlier; others emerged and grew as the steel shearer started on a new panel and inched closer. On July 13, they’d calculated water seeping at levels “significantly higher than previous observations”—35 gallons per minute. Two weeks later, that figure would rise to 80. By July 28, the shearer was within 1,400 feet of the dam, and DEP’s dam-safety division had ordered DCNR to open floodgates in order to protect houses and a business downstream. It dictated removing a 100-foot section of the 200-foot spillway, and draining 10 feet of the 12-foot lake.

DCNR, which oversees the state parks, began lowering Duke Lake the next day. Within hours, residents descended on the scene in a futile attempt to save fish. One family shot a coarse video of their children stacking flopping bodies of carp, shiners, and bass into picnic coolers. Morris Township Supervisor Scott Finch visited the following day. He’d piled his grandkids into his pick-up truck to go for a swim and instead was greeted by the horrible stench of decaying fish. The job of cleaning up the site had gone to inmates of Waynesburg Prison, who were dumping 5-gallon buckets full of dead carcasses into Dumpsters.

Folks in the coalfields have long suspected longwall mining as the culprit. Many cannot forget the cozy agreement that DCNR en-

tered with Consol in September 2001. Under the pact, the agency would effectively sell its mineral rights underneath Ryerson Station to Consol and, in exchange, Consol would spend \$200,000 on a new park visitor's center. (The company ended up spending \$350,000, which it's touted in press releases and which residents, like Finch, regard as "an upfront inconvenience fee.") Bailey's longwallers soon followed, as did the dam cracks. By August, park personnel and residents had noticed foot-high bumps in the road on the right side of the dam, in line with its face, the kind of bumps that tend to emerge above longwall panels.

Over the years, DCNR has said little about what caused the dam to shift. Not long after the draining of Duke Lake, though, officials were speaking privately with a geology firm, which visited the dam four times in August and which identified longwall mining as a possible source of distress. One July 30, 2005, memorandum from the geologists to state officials explained the reasoning:

*Despite what was reported to us to be a very considerable distance from the dam to mining operations, a concrete gravity dam such as the Ryerson Station Park Dam is extremely sensitive to even small ground deformations that would not necessarily damage other types of structures. Further, given the long-term satisfactory performance of the dam coupled with the time coincidence of active mining, this possibility must be considered.*

In 2006, DCNR hired the firm to further investigate the matter—an investigation that would last a year and reportedly cost \$1.2 million. Today, the findings have yet to be made public. Officials have shielded the records from citizens, activists, and reporters, including this one. Even Consol executives maintain that they've never seen the results.

Presumably, the findings form the basis of DCNR's pending lawsuit against Consol. In January 2007, just weeks after receiving the geologic results, the agency filed a summons for the company in state civil court, which led to a quiet negotiation period. One year later, the agency finally made its suit official. In January 2008, DCNR

filed a 28-page complaint accusing Consol of negligence, misrepresentation and deceit, and breach of contract. In it, the department claims Bailey Mine's "unreasonable interference" with public use of Ryerson Station "has and continues to significantly harm the lands, waters, wildlife, habitat, and natural resources of the park." The complaint estimates costs of rebuilding Ryerson Dam and Duke Lake at \$38 million, and asks for another \$20 million to repair damages to unspecified "natural resources."

Ryerson's destruction, as the suit alleges, "is of a continuing nature, and has produced a permanent and long-lasting effect on the land, water, [and] habitat." Such damages were never mentioned in Consol's proposal to undermine Ryerson Station; instead, according to court records, executives "misrepresented facts to and concealed information from the DCNR regarding the known, increased risk of damage to its property . . . in an effort to induce the Commonwealth to not object to its mining at this location."

Consol declines to discuss the pending suit, except to deny its allegations. In court papers, its attorneys argue DCNR's case amounts to a longwall-damage complaint under Act 54, which belongs under jurisdiction of DEP—an agency that, conveniently, has insisted the mining occurred too far away to have harmed the dam. On October 2, a judge agreed and stayed all case proceedings until the resolution of such a complaint; DCNR has since filed that complaint, which DEP is investigating.

At Bailey Mine, just three weeks before DCNR would file its complaint, Consol Vice President Dave Hudson was discussing Duke Lake. "That dam never did break," says Hudson, a robust man with a matching personality who's toiled in company mines for 35 years. "They cut the middle out of it," he tells me, without irony. He recalls all the rumors circulating about water pouring into the mine—"Not true," he says. Bailey's superintendent then, Hudson paints the longwall operation as "relatively dry," pumping an average 700 gallons of water a minute, as compared to 2,000 gallons in wetter mines. DEP inspection reports show that Bailey's active sections were "damp to wet" during much of 2005; likewise, inspections by

The 62-acre Duke Lake, once the centerpiece of Ryerson Station State Park (left). It has all but disappeared since the park was undermined (right).







Once a favorite swimming spot, Duke Lake now looks like a cattail haven.

the U.S. Mine Safety and Health Administration reveal repeated pooling problems. State inspectors issued two compliance orders in February 2005 for what’s described as “accumulation of water . . . rib to rib approximately 150 feet in length . . . and 16 inches in depth.” In April, when park personnel spotted the dam cracks, MSHA was issuing a citation for “a large pool of dark, murky water” in the 3-I panel-closest to Ryerson Dam. Federal inspectors designated the condition “significant and substantial,” and noted its “recent origin.” By July, when the dam leaked the most, Bailey was using a pump to keep water levels below 12 inches. But MSHA would hand down at least seven more water-related citations over the remaining months. In September, Bailey requested more time to fix one area partly because of “the amount of water needing to be pumped.”

**“Water is one of the only resources we have. What’s going to happen when it’s gone.”**

KAITLYN JONES

Hudson claims his employer has behaved as an admirable steward. He helped negotiate that deal with DCNR, he says, and agreed to leave a two-square-mile pillar under Duke Lake. That works out to be five million tons of coal.

“That was a huge sacrifice for us,” he says. Later, he observes, “We’re not out here trying to destroy the environment, but some people have the perception we are. Once they think that, it’s hard to change their minds.”

**T**hat perception stems from devastating scenes across southwestern Pennsylvania, like the one at Ryerson Station, where Duke Lake remains a baked and brittle bed. Once dubbed the park’s “crown jewel,” it looks like a cattail haven these days. The stream still flows into its bed, but gets lost in the low-lying vegetation without the dam. On one side there’s a sign that reads, ironically, “Ronald J. Duke Lake.” Crickets and dragonflies flutter around, but that’s about the only aquatic life that the Jones family can see as they stand on its mucky banks.

The Joneses still mourn the loss of their favorite recreational haunt. Duke Lake drew them here each summer—Kim would volunteer to park cars for trout-fishing events, she and Kenny would help at community picnics. Both recount the days when paddleboats and canoes peppered the lake, as campsites dotted its beaches. Years ago, when his father worked as a janitor at Ryerson Station, Kenny would sit on the docks, catching carp and catfish all day. Now, the Joneses only come here to see what the coal company has done to the park’s streams.

Earlier, while resting on that rock near Panther Lick Hollow’s artificial headwaters, Kim offered her observations of the park plunder. “It’s the reality of corporate America,” she’s said, her daughter listening. “It has caused a path of destruction here.”

And with the clarity of a child, Kaitlyn interjected: “Water is one of the only resources we have. You can do so much with water—take a bath, grow plants, raise animals. What’s going to happen when it’s all gone?” □

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