



A natural gas drill looms over a farm near Dimock, PA. Photo / Dave Harp

Marcellus Shale: Pipe dreams in Pennsylvania?

≈ A region is discovering that the price of the economic boom from natural gas drilling may be irreversible environmental damage and residents' peace of mind.

BY RONA KOBELL

When the natural gas companies descended on Pennsylvania's Marcellus Shale two years ago, it felt like a Gold Rush. And everyone seemed to be hitting pay dirt.

Landowners, many in long-depressed regions, rushed to lease their property, betting the promised royalties would better their lot. Mayors rejoiced that restaurants and hotels were full after decades of barely hanging on. Legislators talked of thousands of new jobs.

Even some environmentalists were pleased—natural gas burns clean, it's plentiful and it's local. Finally, it seemed, an energy source had come along that would wean Americans off their foreign oil addiction, fight climate change and boost the economy.

But now, with nearly 700 Marcellus wells drilled throughout the state, the environmental costs of drilling are becoming clear. The gas in the Marcellus "play" may ameliorate the United States' energy needs, but the technique to extract it has damaged streams, water supplies and Pennsylvania's famous forests. It has transformed some of the state's most beautiful landscapes into industrial zones and brought hardship to some who thought it was their lifeline.

No agency has tallied drilling's toll. But

many environmentalists, legislators and citizens believe that, in its rush to drill, Pennsylvania was unprepared and unable to adequately review applications or inspect in the field. And in the end, it is not only the people in the watershed who will struggle, but the water itself.

"I don't have confidence that the state of Pennsylvania is where it needs to be," said Bernie McGurl, executive director of the Lackawanna River Corridor Association. "They're tripping over themselves to get well heads installed. We're going to have holes all

⋮ See "It's getting harder to see Pennsylvania's once vast forests through their fragments" on page 8.

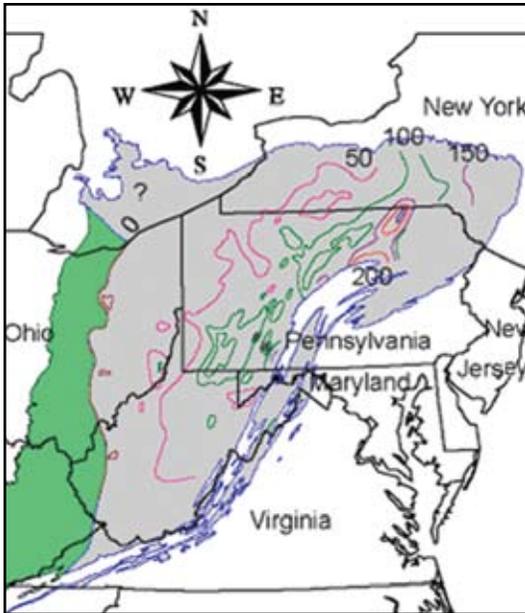
⋮ See "Pennsylvania towns often find themselves powerless against gas company practices" on page 10.

over the northern tier of Pennsylvania. What is the implication of that long-term? They're going too far, too quick, with not enough oversight."

John Hanger, Secretary of the Pennsylvania Department of Environmental Protection, the main agency overseeing drilling, said the state was prepared. He dismisses criticism that the gas companies have too much influence on his agency as "absolutely crazy."

"We have an important responsibility here," he said, "and we're doing it every day."

Hanger acknowledged that natural gas drilling, like all energy production, has



The extent of the Marcellus shale is shown in gray. Other Devonian shales are represented by the green area. The numbers show the variation of the thickness of the stratum in feet. Source: USGS

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environmental costs. But, he noted, compared to coal and oil, natural gas releases fewer greenhouse gases that contribute to climate change and less nitrogen oxide that contributes to air and water pollution.

“If done right, (gas production) will produce much more good than bad,” he said.

THREE PROBLEMS

To reach the gas in the Marcellus, drillers must bore through dozens of geological formations. Then, workers pump into the well millions of gallons of water mixed with sand, salt and a cocktail of chemicals to fracture the gas-bearing rock. This process, known as hydraulic fracturing, or “fracking,” was pioneered by energy giant Halliburton in the 1940s. The gas flows from the broken rock out of the well to a compressor.

With it comes about one-fifth of the water that was pumped in, bearing the chemicals used in fracking and radioactive elements that occur naturally in the rock. The remainder of the



water stays deep in the formation—well below drinking water aquifers, according to regulators and energy companies.

The drilling and fracking process presents three water-related problems.

The first is withdrawals. Gas companies need about 5 million gallons to frack each well. They pull the water from streams, and because nearly three-quarters of the Marcellus is in the Susquehanna River basin, much of that water has and

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DRILLING FOR RESOURCES

For decades, geologists have known that the Marcellus Shale was rich with gas. And oil and gas companies have long extracted resources from Pennsylvania. A combination of technological, regulatory, economic and political factors have brought the industry to where it is today. Here are some milestones. (Note: Time line is not to scale.)

1859

Edwin Drake’s crew drills the nation’s first oil well in Titusville, PA.

1940s

Pennsylvania passes the Gas Act, which exempts gas companies from local zoning. The Department of Environmental Resources, now reorganized as the Department of Environmental Protection, will regulate drilling.

1984

Halliburton pioneers hydraulic fracturing, or “fracking.” Workers pump millions of gallons of water and other chemicals under very high pressure into shale, creating cracks where the natural gas can come out.

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will come from those feeding the Bay's largest tributary. The companies have occasionally pulled water from small headwater creeks that are slow to refill, which can change temperatures and oxygen levels and endanger fish.

The second is the fracking wastewater, called flowback, which is usually stored in a plastic-lined impoundment before it can be trucked to a treatment plant. Critics worry that the wastes could spill during transit or operations and run into waterways or seep into groundwater.

Earlier this year, Texas-based Cabot Oil Co. spilled 8,000 gallons of fracking waste into Stevens Creek, a tributary of the Susquehanna River in the northeast Pennsylvania hamlet of Dimock.

Because fracking waste can have five times as much salt in it as ocean water, groups such as Trout Unlimited worry that accidents like that will forever change the ecology of fresh, coldwater streams.

The third problem is groundwater contamination from methane accidentally released through the drilling. Today, at least 13 families in Dimock, home to more than 63 of Cabot's gas wells, can't drink their well water because it contains methane. Methane contamination has been reported in other states where drilling has occurred, and critics worry it could become a bigger problem in Pennsylvania.

The DEP has fined Cabot nearly \$200,000 in connection with both the spills and the well water contamination.

"HOW BIG IS THIS THING?"

Gas company executives had long been aware of the Marcellus, which sprawls across parts of New York, Pennsylvania, Ohio and West Virginia and small sections of Maryland, Virginia, Kentucky and Tennessee, but weren't excited about it. At close to 8,000 feet deep, extraction was difficult and costly.

But in the 1990s, workers in Texas'



The Cabot Oil and Gas Co. has posted many signs like this around Dimock's farms and woods. The company has already put in 63 wells and has plans for several more in the next year. Photo / Dave Harp

Barnett Shale began using a technique called horizontal drilling coupled with hydraulic fracturing. In this process, workers drill down until just above the target layer. Then they turn the drill to the horizontal so the well runs parallel through the gas-bearing layer, yielding significantly more gas than a vertical well.

Range Resources drilled the first horizontal Marcellus well in western Pennsylvania in 2003. By 2007, when Range released results from three horizontal wells, the industry stirred. The next year, two geologists—Penn State University's Terry Engelder and State University of New York-Fredonia's Gary Lash—published a paper showing that the Marcellus had enough natural gas to supply the whole country for two years.

"That's when the whole world said, 'Whoa, how big is this thing?'" recalled Range spokesman Matt Pitzarella. "And that's when the land grab occurred."

Since the original estimates were

made, new estimates, based on the success rate of the wells so far, put the amount of gas available much higher.

A RUSH FOR LEASES

Landmen, gas company representatives intent on negotiating leases, fanned out across states in the Marcellus Shale offering signing bonuses and royalties. Typically, companies assemble a large area and then decide where to put wells, well pads and other infrastructure.

In Maryland, some landowners in Garrett and Allegany counties signed leases, and while a drilling company has requested permits for four wells, none have been drilled.

Drilling did begin in New York. But last year, as concerns grew about treating the waste and protecting New York City's water supply, Gov. David Patterson announced an overhaul of the state's

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1993

Gas companies employ a technique called horizontal drilling in Texas' Barnett Shale, which is as deep as—and in some places deeper—than the Marcellus.

Eight years after Alabama residents complained that gas drilling contaminated their water wells, the U.S. Court of Appeals for the 11th Circuit in Atlanta orders the EPA to regulate hydraulic fracturing under the Safe Drinking Water Act.

1997

The EPA begins a study of the threats to water supplies from fracking. Later that year, former Halliburton CEO Dick Cheney is declared the next vice president of the United States.

2000

2003

Range Resources drills the first horizontal Marcellus well in Washington County, PA.

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environmental laws. He declined to issue any more Marcellus permits, leading to a de facto moratorium.

Pennsylvania, in contrast, ramped up. Last year, 451 companies applied to drill—almost five times more than all of the applications between 2003 and 2007.

In April, the agency took the soil and erosion control permitting away from the county soil conservation districts to make the process more efficient and, Hanger said, more effective.

WATER WITHDRAWAL

As drilling began, the water grab followed the land grab. Trucks backed up to small streams, sucking out thousands of gallons at a time.

In much of Pennsylvania, such withdrawals are regulated by the Susquehanna River Basin Commission, while the DEP regulates water quality. The commission is an independent agency, with representatives from New York, Maryland, Pennsylvania and the federal government, created to guide the conservation, development and administration of the vast basin’s water resources.

The withdrawals “took us by surprise,” said Paul Swartz, the commission’s executive director. “Frankly,” he added, “It has taken some time to get on top of it.”

Under the commission’s nearly 40-year-old rules, companies could take less than 100,000 gallons of water per day without a permit. Some were taking close to that amount daily. And even if they took less, the commission would have a hard time checking. So, it changed the rules. If a company took as much as one gallon, it needed permission.

Next, the commission sent letters to the nearly two dozen gas companies operating in the basin, warning them to get withdrawal permits or face steep fines. They meant it. Cabot had to pay \$75,000. Another company, Chief Oil and Gas, paid \$250,000. Range was fined a whopping \$475,000 for its violations, which Pitzarella attributed to “a lack of knowledge.”

“We fixed it,” said Pitzarella, whose company now has 900,000 acres under lease in the Marcellus Shale. “We want to make sure that never happens again to us.”

The commission has been inundated with withdrawal applications, processing as many as four times the number it did a year ago even as the commission’s budget has been slashed. To cope, it raised the application fees and added staff.

While they’ve approved nearly every permit, officials say they do a lot of negotiating, steering drillers away from headwater streams that do not easily replenish.

“There are a number of concerns about where we are today,” Swartz said. “And where we are is not where we need to be, from an environmental perspective.”

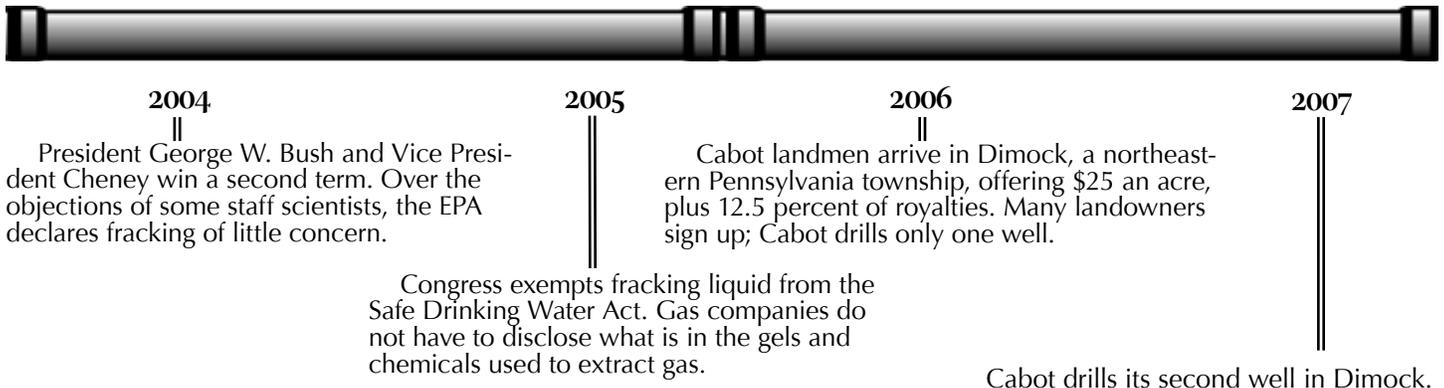


Dimock is still a rural farming community. But increasingly, drilling rigs rise into the sky, high above the silos.

Photo / Dave Harp

The commission has been monitoring sites along the Susquehanna for nitrogen and phosphorus since the 1980s, providing their analyses to the DEP so the agency can enforce environmental laws. It now wants to expand that network into smaller streams in the drilling area and to test for fracking chemicals. To do that, it’s seeking \$750,000 in government or other grant funding.

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WATER AS WASTE

The chemical mixes that make up the fracking fluids break up the rock, keep the fractures open and protect the well from corrosion and bacteria buildup. They include carbonates, methanol, hydrochloric acid and anhydrides, as well as high concentrations of salts. The mixes vary from well to well, depending on the nature of the shale beneath. The gas companies say their specific nature is proprietary.

A 2-decades-long effort to require the companies to reveal more about the fracking compounds and impose broader controls on their use continues. It began in 1989, when some Alabama residents filed a lawsuit alleging that gas drilling contaminated their well water.

On New Year's Day, Norma Fiorentino's well blew into pieces, the result of a methane buildup from natural gas drilling. Photo / Dave Harp



In 1997, the U.S. Court of Appeals ordered the EPA to regulate fracking fluids under the Safe Drinking Water Act. But the industry, led by Halliburton and its then CEO, Dick Cheney, pushed back. By the time the EPA began studying the issue, Cheney had become vice president of the United States and taken a lead role in crafting energy policy.

By 2004, the EPA had decided that fracking fluids were not of sufficient concern to regulate. The following year, Congress exempted fracking from the Safe Drinking Water Act.

Since then, environmental groups have been lobbying Congress to close what they call the “Halliburton loophole,” pointing to cases of rare cancers popping up in areas of intense drilling and other serious health concerns. In October, Congress passed, and the president signed in November, legislation ordering the EPA to re-examine the impacts of fracking on drinking water.

U.S. Sens. Bob Casey, D-PA, and Charles Schumer, D-NY, have introduced the Fracturing Responsibility and Awareness of Chemicals Act, known as the “FRAC Act,” which would regulate the practice under the Safe Drinking Water Act and require disclosure.

So far, no action has been taken, although a handful of CEOs—Range’s included—have suggested that the industry voluntarily disclose that information.

Stephen W. Rhoads, the longtime president of the Pennsylvania Oil and Gas Association, said the fracas over fracking is overblown, and some regulators agree.

“We asked the companies what was in it on day one, and they told us on day two,” said Michael Brownell, chief of the Susquehanna River Basin Commission’s water resources management division.

The DEP’s website provides a three-page list of chemicals found in fracking fluids. Asked to identify which were worrisome, DEP spokeswoman Teresa Candori said, “All chemicals are of concern.”

Knowing what chemicals are in the fluid is one issue; treating them is another.

Currently, no wastewater plant in Pennsylvania can adequately treat the mix of chemicals and minerals that come from the drilling operations.

Earlier this year, after high levels of chemicals associated with fracking turned up in the heavily industrial Monongahela River, the DEP ordered that, by 2011, any plant that takes fracking waste must be able to clean it well, and that it would not issue new permits until the plants could. But it let the plants that had been taking the waste continue to do so while they improved their capabilities—so

long as they didn’t increase their amounts. Two of those plants—Williamsport and Sunbury—are in the Susquehanna watershed.

Asked for a measurement of the volume of water treated, Candori said, “At this time the department does not have an accurate accounting as to what wastewater is being received by existing facilities for treatment.”

A few companies want to build new facilities to treat the chemicals. One would discharge directly into the Susquehanna at Tunkhannock, and another just north of it in Messhopen Creek. But some scientists say the treatment technology is untested. And residents and the Pennsylvania Fish and Boat Commission say the river can’t take more stress.

“I am totally against the discharge of pollutants into

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JANUARY 2008

Geologists Terry Engelder, of Penn State, and Gary Lash, of SUNY-Fredonia, publish a paper estimating that 50 trillion cubic feet of natural gas could be extracted from the Marcellus Shale—enough to supply the nation for two years. This is much higher than all previous estimates.

JULY 2008

The governor of New York orders the state’s Department of Environmental Conservation to update its laws to better regulate drilling. The decision puts a de facto moratorium on drilling in New York’s Marcellus Shale as a battle heats up over the drilling’s possible affects on New York City’s water supply.

DECEMBER 2008

The DEP receives 451 drilling applications, about five times more than it received from 2003 to 2007 combined. By now, Cabot has drilled 30 wells in Dimock.

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the Susquehanna River or any of its tributaries,” said Richard Fitzsimmons, a former Wyoming County commissioner. “It does not belong in the streams of Pennsylvania.”

Further complicating the issue is uranium, which has long been known to occur naturally in the Marcellus Shale. According to ProPublica, a public interest news organization, recent tests in New York showed that levels of radioactivity in the fracking fluids that returned to the surface were 267 times higher than the limit for safe discharge into the environment. New York health officials said handling radioactive wastewater “could be a public health concern,” and many plants wouldn’t be able to accept it. One gas company official told ProPublica that, if plants declined to treat their water, they would have to shut down.

The DEP tested shallow gas wells for radioactivity in the 1990s and found only two sites that might be of concern, according to an agency report. The DEP is continuing to study the issue, Candori said.

The industry is looking at options beyond treatment plants, such as recycling the water or storing it in deep-injection wells.

“The concern now is with the volume,” Rhoads said. “It’s true there will be a need to manage those water flows.”

A WELL IN PIECES

On New Year’s Day, Dimock resident Norma Fiorentino left her trailer to visit her ailing daughter. When she returned, her water well was in pieces, blown apart by methane that had seeped into her well. From her faucets, orange water bubbled.

Down the road, Victoria Switzer’s water looked like orange Alka-Seltzer. Well by well, Fiorentino says, neighbors lost what had long been pristine drinking water.

DEP tests confirmed elevated methane levels. It declared Cabot was responsible, faulted the company for poor record-keeping and polluting the groundwater, and required that it install methane detectors in several homes—although Fiorentino never got one. The DEP also said the gas in the water didn’t pose a danger.

Still, Fiorentino wasn’t going to drink it. A widow on a fixed income, she begged Cabot to bring her bottled water. They



Victoria Switzer’s retirement dreams began turning into nightmares two years ago when gas drilling cut off access to her favorite hiking trails. After learning of several fracking-related spills into Burdick Creek, which runs right by the home she and her husband are building, Switzer became a community activist, critical of both Cabot and the DEP. “I gave a voice to the people here that really needed someone to stick up for them.” Photo / Dave Harp

refused.

Cabot lawyer and spokesman Ken Kamoroski said the company declined because “the water supply was determined to be safe by the appropriate regulatory agencies.”

The New Year’s Day explosion galvanized residents and environmentalists, who had long been distrustful of both the state and the gas companies and who worried that the mistakes in Dimock could be repeated as the drilling boom spread.

Their list of grievances was long. Because of budget cuts, they charged that the DEP had become little more than a rubber stamp; it had taken the job of permitting for soil and erosion away from the county soil districts, but it lacked the expertise to do the job itself. Several DEP staffers had left the agency for gas company jobs, a fact the agency acknowledges. And, with a budget crisis and a prolonged recession, environmentalists feared the DEP was under pressure to cave to the gas industry.

DEP officials insisted they were doing their jobs. Candori, the DEP spokesperson, said agency employees make “frequent and unannounced visits” to drilling sites, and conducted 10,365

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JANUARY 2009

Dimock resident Norma Fiorentino’s water well explodes. She and other neighbors notice discolored and bubbling water. They beg Cabot for bottled water. Cabot refuses.

MARCH 2009

The DEP takes the responsibility of issuing grading and sediment permits away from the county Soil Conservation Districts.

APRIL 2009

The gas industry intensifies lobbying efforts to oppose a proposed tax on the gas they extract. Tax advocates point out that every state but California taxes drilling.

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inspections this year. And Hanger said one of his first orders of business was to raise the permit application fees so he could hire more staff.

Matthew Royer, an attorney with the Chesapeake Bay Foundation, decided to check their work. In September, he reviewed a batch of recently approved permits. One proposed building a pipeline across a wild trout stream.

Another proposed a pipeline across high-quality trout streams in the Pine Creek watershed, which also includes Pennsylvania's Grand Canyon. The third asked to drill in the Tioga State Forest.

"They're not doing any on-site checking at all," Royer said. "You can catch some deficiencies by looking at the paperwork, but they weren't even doing that."

Despite the agency's claims of tough oversight, it revoked all three contested permits in late October, citing "technical deficiencies." In all three cases, the gas companies and their consultants had given incomplete or inaccurate information.

Royer wasn't doing a victory dance; the DEP also ordered the drilling companies to "halt earth disturbances"—meaning that some of the pristine areas had already been altered. And the agency wasn't budging on the larger issue of giving the authority for issuing permits back to the county soil conservation districts.

"This is environmental protection after the fact," Royer said. "I have not heard from DEP any indication where they're willing to do the reviews...so we will look at more permits. We will appeal more. This can go on and on."

Hanger calls the foundation's views misguided.

"I would be the first to say that the practices that were brought to our attention, in the field, were not appropriate...and we revoked the permits," he said, adding, "Let's be clear who has the greater ability to enforce. It's us. We want to get this industry to the point where they know they are being watched."

DRILLS IN THE NIGHT

In Dimock, Victoria Switzer was watching something else—the rural hamlet where she and her husband were building their dream house had become an industrial zone. She lay awake at

night as Cabot drilled. Water trucks trundled down dirt roads, while pickups with Texas license plates sped by. The great horned owls left, and her favorite hiking trails were marked with "no trespassing" signs and fluorescent ties.

And accidents continued. State records show a diesel spill in February and three subsequent drilling mud spills, two of which reached Burdick Creek.

Like Fiorentino, Switzer couldn't drink her water nor

convince the gas company to buy her bottles. She said she felt like a tenant, with a very bad landlord. It was, she said, "just one nasty surprise after another."

On Sept. 16, Switzer organized a meeting to press Cabot for water. That same day, Cabot had two spills at its Heitsman well, and a third one there a week later. In all, 8,000 gallons of fracking fluid spilled into Stevens Creek, causing a fish kill.

Though he said the spills were at least 99.5 percent freshwater, Kamoroski acknowledged that "three spills in the same area are completely unacceptable."

In October, the DEP fined Cabot \$56,000 and ordered the company to temporarily halt fracking operations. By month's end, on the day the Scranton Times published an article on Switzer's and Fiorentino's woes, Cabot promised them bottled water.

Last month, DEP ordered Cabot to provide a permanent water solution to Fiorentino, Switzer and 11 other families. It fined the company another \$120,000 and set up a tighter inspection schedule for well casings, pipelines and other infrastructure.

Kamoroski still questions whether Cabot caused the water problems. Nonetheless, the company signed the agreement accepting responsibility.

"We're aware the Dimock situation has not been helpful to our overall effort," he said. "We want to earn everyone's confidence and belief that drilling is safe, and we can build a track record that demonstrates that."

Norma Fiorentino and Victoria Switzer are not likely to become believers. "The regular folk out here will never see the compensation they deserve, and their original water supply is forever gone," Switzer said. "I'm never going to make any money on this. All I've lost is my soul."



Hiking trails have been marked with "no trespassing" signs or fluorescent ties.

Photo / Dave Harp

APRIL 2009

U.S. Sens. Bob Casey, D-PA, and Charles Schumer, D-NY, introduce the Fracturing Responsibility and Awareness of Chemicals Act, known as the "Frack Act," which would require companies to disclose what is in fracking fluids.

AUGUST 2009

The Chesapeake Bay Foundation appeals three permits that the DEP approved.

SEPT. 8, 2009

A Penn State study estimates that, in 2009, drilling in the state will create more than 48,000 jobs, generate \$3.8 billion in value-added dollars, and bring in \$400 million in state and local tax revenues. It called the environmental effects "minimal." The gas lobby paid for the study.



A gas company, left, works a well site in Beech Creek Township near Bald Eagle State Park, PA. Photo courtesy of Dick Martin / the Pennsylvania Forest Project

It's getting harder to see PA's once vast forests through their fragments

When an early Pennsylvania settler clawed his way through the woods to the top of a hill, he found disappointment. The view, he said, "is nothing but an undulating surface of impenetrable forest."

Penn's Woods was aptly named. When colonists arrived in the 1600s, it was 98 percent forest, causing another settler to declare that it "was not a land of prospects. There is too much wood."

Few complained over the next 200 years as the state's trees "came down like tall grass before a giant scythe," as a contemporary observer put it. By the time botanist Joseph Rothrock traveled through the northern tier in the late 1800s, he called it the "Pennsylvania desert."

Rothrock led a campaign to restore the

state's forests. In 1895, he was named Pennsylvania's first commissioner of forestry. His program flourished. Over the next century, Pennsylvania's state forests grew to cover more than 2.1 million acres—one of the largest expanses of public forestland in the East, and one of the nation's most respected forestry programs.

For the last 11 years the independent Forest Stewardship Council certified that Pennsylvania's forests met or exceeded standards to maintain the sustainability of the woodlands. But they have added a caveat—they asked the state to study the long-term effects of the rapidly increasing gas drilling within the big woods.

Today, more than a million acres of the state's prized forestland sit on top of the

Marcellus Shale—the gas-rich rock that's prompted a rush to drill in the Keystone State. Already, the state has leased more than 600,000 acres of its forestland for drilling and recently decided to open 200,000 more acres with the hope of raising \$60 million to support its recession-strapped budget.

Gas company officials maintain they've been drilling in the forests for decades, with few problems. But legislators and biologists worry about the scale of the current boom.

"God isn't making any more land. He quit that a long time ago," said Rep. David K. Levdansky, a Democrat and chairman of the Pennsylvania House of Representatives' Finance Committee as well as an avid

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SEPT. 15, 2009

Chesapeake Energy offers Wyoming County landowners \$5,750 per acre, plus 20 percent royalties. The company pays for the courthouse to be open extended hours so that all of the deeds can be recorded.

SEPT. 16, 2009

Dimock residents meet with Cabot and again beg for water. That same day, Cabot has two spills at its Heitsman well.

SEPT. 22, 2009

Cabot has a third spill at the Heitsman site, for a total of 8,000 gallons of fracking waste released into a Dimock creek.

SEPT. 22, 2009

The DEP orders Cabot to stop fracking until it submits an updated plan.

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outdoorsman. “We ought to be very cautious about doing this.”

What happens in the vast state forests between Interstate 80 and the New York border—places such as Tioga, Loyalsock and Tiadaghton, as well as the private forests nearby—is also of concern to the Chesapeake Bay, 200 miles downstream. According to a recent report by the U.S. Department of Agriculture’s Forest Service and the Conservation Fund, the Bay watershed loses 100 acres of forests a day, and is likely to lose nearly 10 million acres by 2030.

That’s of great concern, because forests have long been considered the best land use to protect the Bay. They absorb nitrogen, slow erosion, provide crucial fish and bird habitat and promote biodiversity.

The rush for gas has the potential to accelerate those losses and break up increasingly rare, large, unbroken blocks of forest. Each drill site requires at least five acres for a well pad, and miles of roads and pipelines that fragment the big woods.

“There’s no doubt this is going to have an impact on interior-dwelling species,” said Jerry Hassinger, a retired biologist from the Pennsylvania Game Commission. Fragmentation paves the way for invasive species and Hassinger fears that even if the gas companies do reclamation, the trees and grass they plant will be no match for the wily intruders that could hinder any forest recovery.

The affected area could extend up to 300 meters from the disturbance site, said Kim Van Fleet, a biologist with the Pennsylvania Audubon Society. This phenomenon is called the “edge effect.” Because everything in an ecosystem interconnects, changes in sunlight, wind and vapor pressure brought about by cutting clearings have far-reaching consequences.

Van Fleet is worried about the scarlet tanager—17 percent of that songbird’s breeding population lives in Pennsylvania forests. Cerulean warblers, wood thrush, ovenbirds, and forest raptors also top her list of affected birds.

“If there is fragmentation nearby, it will



Gas drilling requires miles of roads as well as impervious surface around well sites. That paving breaks up large tracts of forests, removing crucial habitat for birds such as the wood thrush, above, and reptile habitats. Photo by Steve Maslowski / U.S. Fish & Wildlife Service

affect these birds,” Van Fleet said, noting that they all require large forest tracts to thrive.

Matt Royer, a lawyer for the Chesapeake Bay Foundation, was concerned enough with the pace of drilling permit approvals in the Tioga Forest that he filed a legal challenge. By the time he won it, the earth had already been disturbed.

“What’s it going to look like, in two or three years, when you do an aerial flyover of northeastern Pennsylvania, and it’s sliced and diced with all these well pads and compressor stations, a contiguous forest area that doesn’t have a contiguous forest anymore?” he asked.

Van Fleet and others point to lessons learned in the Allegheny National Forest in northwest Pennsylvania, where gas companies have been drilling shallow wells for decades, and where, the U.S. Forest Service reports, several species have lost habitat to gas drilling.

Ryan Talbott, executive director of the Allegheny Defense Project, said gas companies once drilled a few dozen shallow wells a year. In 2007, they drilled more than 1,200 wells. Today, more than 2,000 miles of roads support the gas industry. Talbott says he sees fewer cerulean warblers, northern

goshawks, turtles and rattlesnakes, and more invasive plants.

“It was literally like watching a national forest be transformed in a couple of years,” Talbott said.

Last year, Talbott’s group sued the Forest Service for trying to open Pennsylvania’s only national forest to more than 1,000 new wells without following the National Environmental Policy Act, which requires both public input and government reviews. In April, the Forest Service agreed to delay some drilling until it conducted a full environmental review with public comment.

Rep. Edward G. Staback, a Democrat and chairman of the Pennsylvania House of Representatives’ Game and Fisheries Committee, opposed opening more forests to drilling and instead pushed for a gas tax to raise money. He lost.

But, Staback said he’ll be watching the forests closely.

“Our concern is that the gas companies not walk away from their responsibilities the way the coal barons did years ago. They left land filled with slag piles. We’re still paying the price for that today,” he said. “We want to be absolutely, positively, sure that there’s no way that happens again.”

— Rona Kobell

OCT. 7, 2009

Range Resources, which spent nearly half a million dollars lobbying against the proposed gas tax, hires K. Scott Roy, a top aide to Pennsylvania Gov. Ed Rendell, as vice president of government and regulatory affairs for the Marcellus Shale Division. Rendell initially supported a gas tax, but changed his mind.

OCT. 9, 2009

Governor Rendell signs the \$27.8 billion state budget without a gas tax. Instead, the state will raise \$60 million by opening more state forestland to gas drilling.

OCT. 16, 2009

The DEP allows Cabot to resume fracking.

OCT. 22, 2009

The DEP fines Cabot \$56,000 for its three spills, which it says violate the Clean Streams Law, Solid Waste Management Act and Oil and Gas Act.

PA towns often find themselves powerless against gas company practices

There's a reason they call these the Endless Mountains. Undulating hills of yellow and crimson rise gracefully before disappearing into a blanket of gauze-like fog. For miles, no other cars share the two-lane roads that snake through this tranquil pocket of northeast Pennsylvania.

People visit here for the hiking and the bicycling and the skiing and the leaf peeping; they stay for the quiet.

But natural gas drilling is quickly transforming these rural hamlets into industrial zones. Towns and counties that are sitting atop the gas-rich Marcellus Shale know that the gas companies are coming, and they are trying to prepare. But because of industry practices and current regulations, they may be powerless to control their destinies.

Gas companies play their cards close to their vests. They do not announce they may drill 40 wells; they drill one first and see how it produces. Usually, they approach a private landowner, who does not need permission from his or her municipality to lease. That's how Dimock, a rural hamlet in northeast Pennsylvania, went from one well in 2006 to more than 60 by the end of 2009. That's why visitors who meander down its barely one-lane roads will see the classic tableau of red barn, silver silo and lazing cows – but behind it is often a gas well lit up like a space shuttle.

"There's only so much that they can plan, because when these gas companies decide to come in, it happens rather quickly," said Jerry S. Walls, who was director of the Lycoming County Planning Commission for 37 years.

Many Pennsylvania towns have no zoning ordinances, complicating matters. But even those that do will not necessarily be able to enforce them on drillers. Under the Pennsylvania Gas Act of 1984, state regulations trump local ordinances.

The Pennsylvania Department of Environmental Protection

regulates gas drilling. It approves most permits and relies on the industry to self-report problems, while conducting spot checks for compliance.

"We've got no oversight at the federal level, none at the local level, and the state is in a shambles," said Jim Weaver, the lone planner in Tioga County, a prime location for drilling. "For all intents and purposes, the state legislature has handed the gas



Dimock's narrow roads, left, rise and fall like a roller coaster. They were not built to sustain the heavy traffic associated with gas drilling. Photo by Dave Harp

industry the Marcellus play to do with whatever they please."

Weaver called the situation "short-sighted and less than strategic" and said he hoped some planning would occur at the state level.

This year, two court cases in Western Pennsylvania clarified the powers of local authorities over drilling. In Oakmont, the state Supreme Court ruled that gas companies could not drill a well where zoning laws forbade it. But in Salem, the court ruled the local laws had no say over where gas companies put

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OCT. 26, 2009

Oct. 26, 2009 – The *Scranton Times* runs an article in which Fiorentino describes how she has to spend her fixed-income on bottled water. Within hours, Cabot calls to say they will buy her bottled water. A Cabot spokesman says the events are unrelated.

OCT. 28, 2009

The Chesapeake Energy Co.'s CEO promises that his company will not drill in the New York City watershed.

The DEP revokes the three permits that were the subject of a Chesapeake Bay Foundation's lawsuit, citing "technical deficiencies."

OCT. 29, 2009

Nov. 5, 2009

DEP fines Cabot \$120,000, requires additional oversight over its casings and drilling, and says the company must come up with a permanent water solution for the 13 families affected by the well pollution. Nearly a year after her well exploded, Norma Fiorentino relaxes.

— Rona Kobell

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infrastructure, such as pipelines, which come under the DEP's permitting process.

Bradford County Planning Director Ray Stolinas has been following the cases, trying to figure out how to apply them in his county. Recently, the county decided not to review plans to build a compressor station on the advice of their attorney.

"The message of these court cases is that you can regulate, to some extent, where, but you can't regulate how," Stolinas said. "I do feel unprepared. We're learning every day as we go along."

While Stolinas worries about stormwater and big trucks on the county's gravel roads, town officials are enjoying the boon. In Towanda, Bradford's county seat, restaurants are full and new businesses are opening.

"I think it's going to be a good thing for the town," said Towanda Mayor Richard Snell.

Sixty miles south, many gas companies have set up offices in Williamsport, breathing life into once-vacant downtown buildings.

The renovated Holiday Inn offers world-class food with prices to match: a room, if one is even available, costs at least \$145.

"It's like a convention that really hasn't left yet," said Jason Fink, vice president of economic development for the Williamsport/Lycoming County Chamber of Commerce.

Some residents say money is already changing the character of these towns. Linda Nealon, a Wyoming County preschool

teacher, does not plan to lease her land. But, with landowners in her county commanding nearly \$6,000 an acre and 20 percent royalties, she says, she's in the minority. And because she's aired concerns in public about drilling, she feels hostility from neighbors.

"I always felt very connected to my community. Now I feel very disconnected," she said. "It breaks my heart."

But residents and municipalities in the Marcellus Shale region don't have to throw up their hands, according to Walls, the professional planner. The gas companies will be in the state for a long time, and there is room to negotiate. He suggests local officials meet early with the companies and point out ecologically important areas and other places inappropriate for drilling. He also says local officials should update their land ordinances, talk to officials where drilling is already in full swing for advice, and get zoning if they don't already have it.



This water truck is part of the increased traffic from drilling that goes on 24 hours a day. Photo / Dave Harp

"It's such a travesty to take these pristine areas and ruin them because once you start, you're never going to get them back."

— Lynn Senick, Montrose activist & organizer of an online forum to discuss drilling risks

Lynn Senick, a Montrose activist who has organized an online forum to discuss drilling risks, is hoping the government can somehow slow down the process.

"It's such a travesty to take these pristine areas and ruin them," she said, "because once you start, you're never going to get them back."

— Rona Kobell

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