



Destination Chesapeake

North Branch Susquehanna

AS GAS WELLS PROLIFERATE, WATER

ENDLESS MOUNTAINS VISITORS BUREAU

In northern Pennsylvania, at the edge of the Chesapeake watershed, a race to extract natural gas from one of the largest deposits in the country is causing heartburn among anglers, sportsmen, and water-quality advocates.

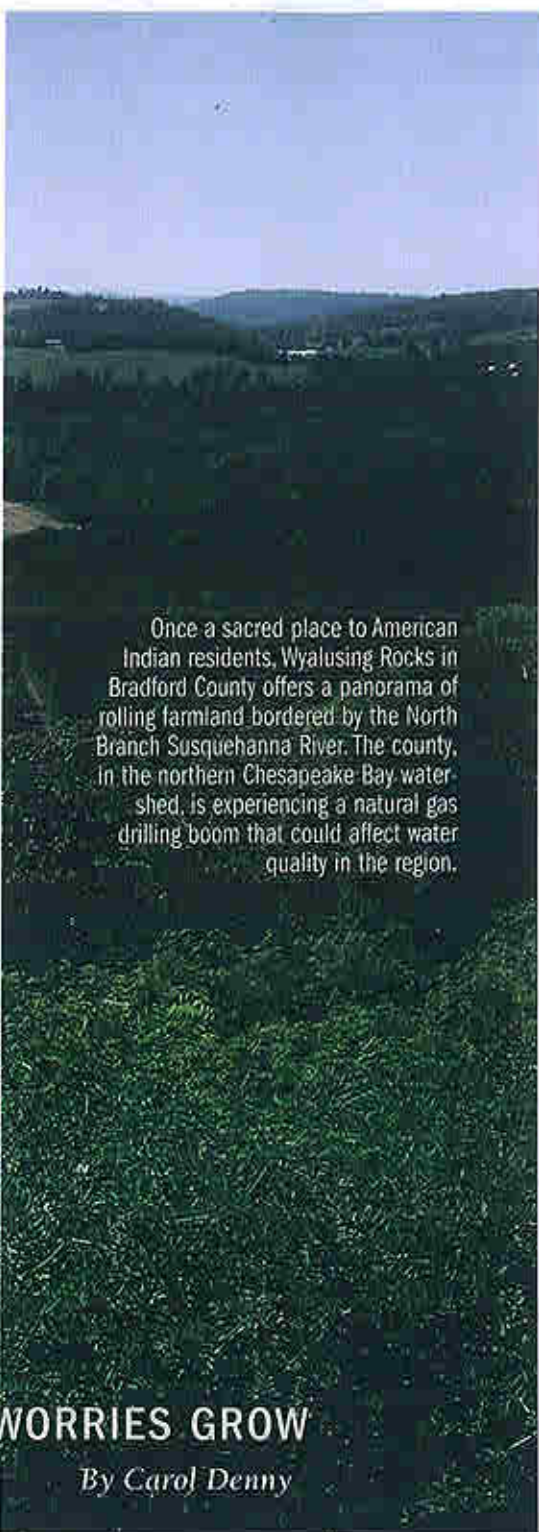
The effects of the drilling could blight what one conservationist calls “some of the last, best places we have in Pennsylvania”—pristine streams and deep forests that once sustained American Indian tribes and still attract

passionate outdoorsmen. The coldwater brooks in the state’s northern tier are prime attractions for visitors, who spend nearly \$2.5 billion in the region each year.

As big drilling companies from across the nation position themselves to tap into a major energy source, some residents are uneasy about the environmental impact of the process. Their concerns focus on the erosion and sediment created as wells are built and the disposal of millions of gallons

of tainted water used to release the gas from the ground.

Questions on the effects of the drilling are surfacing in Bradford, Tioga, and Susquehanna counties in northeastern Pennsylvania, which were among the state’s leaders in the number of drilling permits issued in 2008. Waterways there are particularly vulnerable to the changes, and drain directly into the North Branch of the Susquehanna River, the Bay’s largest tributary.



Once a sacred place to American Indian residents, Wyalusing Rocks in Bradford County offers a panorama of rolling farmland bordered by the North Branch Susquehanna River. The county, in the northern Chesapeake Bay watershed, is experiencing a natural gas drilling boom that could affect water quality in the region.

coupled with advances in drilling techniques, have made the state's natural gas reserves in Marcellus Shale a hot commodity.

Marcellus Shale is a massive rock formation extending from Ohio across Pennsylvania and into New York. In recent years, it's become one of the leading sites for domestic gas production in the United States, in part because of new technologies that extract natural gas through a process called hydraulic fracturing. Drillers inject huge quantities of water into the ground at high pressure to "fracture" the shale, which then releases natural gas. Sand and chemicals are added to the water to aid the process.

Once the gas has been freed, about half of the more than two million gallons of water injected—now contaminated with salt and minerals, in addition to sand and chemicals—comes back to the surface. First, the "frac" water is pumped into a large, lined impoundment pond or storage tanks; later, it's vacuumed up by fleets of tanker trucks and shipped to a wastewater plant that can treat it.

The problem, as CBF Water Quality Scientist Harry Campbell sees it, is that very few treatment plants are equipped to

remove the salt and chemicals in the mix. "One of the main concerns is the high salinity of the water. If frac water gets discharged into streams in this concentrated form, it will affect aquatic life," he said. "Also, we don't have water-quality criteria for the many chemicals used in frac water, so there's no way to know if the water's being adequately treated."

To its credit, the Pennsylvania Department of Environmental Protection (DEP) has devised a strategy to deal with pollutants in the frac water and proposed regulations that would set limits on the discharge of these pollutants. Industry has voiced opposition, and a vigorous debate will likely play out in Harrisburg in the coming months.

Several municipal wastewater treatment plants have already been permitted to receive frac water for treatment. But in June, DEP issued citations to the Jersey Shore wastewater treatment plant, which discharges into the West Branch of the Susquehanna near Williamsport, for numerous violations. The state agency ordered the plant to stop accepting frac water deliveries immediately, forcing the borough to store the excess in a holding tank and underscoring how limited the facilities for frac water treatment are.

An alternative to treating the frac water is to dispose of it by injecting it back into the earth. This too, raises concerns, Campbell said, because the practice could potentially affect sources of drinking water. Federal controls on the process are currently lacking. CBF is fighting for passage of two bills now pending in the U.S. House and Senate (the latter co-sponsored by Senator Robert Casey), which stand to correct the exemption for frac water treatment granted in 2005.

Adding to concerns about drinking water are reports of methane leaks, some leading to explosions, which have been associated with gas drilling across the state. The methane, which can escape when cement casings around the bores fail, has been reported in private wells in northern and western Pennsylvania.

Drilling sites are common across the Marcellus Shale formation, home to some of the country's largest natural gas reserves. Hundreds of wells are already active in Pennsylvania's northern tier.



WORRIES GROW

By Carol Denny

"We're really concerned about getting protections in place here," said CBF Pennsylvania Attorney Matt Royer. "There are serious risks to our water from the drilling—from stormwater runoff and erosion that occurs during the construction phase, and from the treatment of wastewater after the drilling phase."

Although the history of drilling in Pennsylvania goes back more than 150 years, 21st century demand for new energy sources,

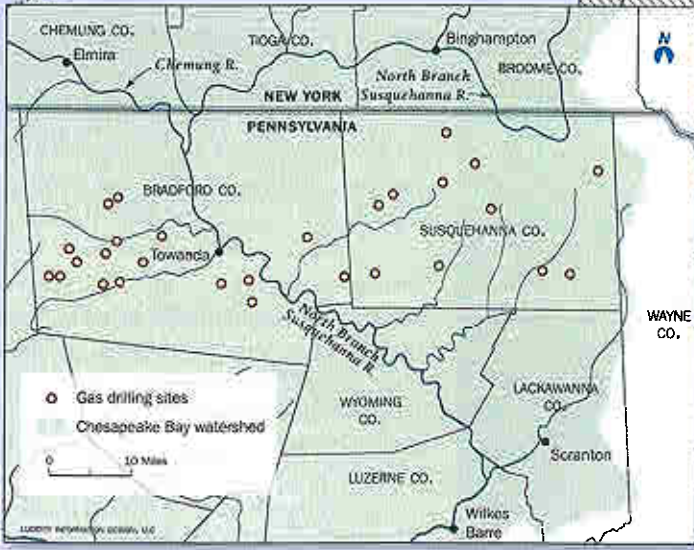
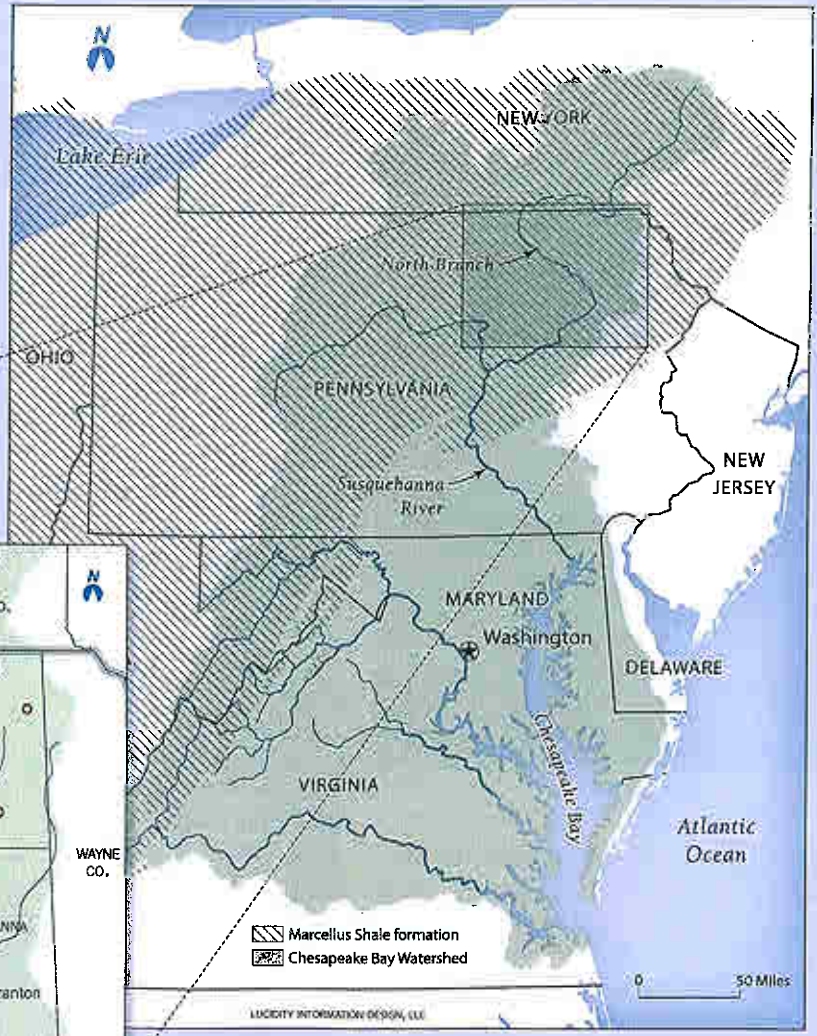


ENDLESS MOUNTAINS VISITORS BUREAU

Pristine lakes and forests attract sportsmen and anglers to the region surrounding the North Branch Susquehanna. Kayakers paddle on the Susquehanna Water Trail near Ulster, Pennsylvania.

North Branch Susquehanna At A Glance

- Length: Approximately 327 miles.
- Watershed Area: Approximately 11,310 square miles, including 15 counties in Pennsylvania and 20 counties in New York.
- Land Use: Forest (deciduous and evergreen) and agriculture (hay and pasture, dairy farming).
- Citizen Groups: Upper Susquehanna Coalition, www.u-s-c.org; PA CleanWays, www.pacleanways.org; North Branch Land Trust, www.nblt.org; Pennsylvania Council of Trout Unlimited, www.patout.org. For a complete list of local conservation organizations, visit cbf.org/wg.



The Marcellus Shale formation (shaded area on larger map) extends over a large part of the mid-Atlantic region, including parts of the Chesapeake Bay watershed (in green). In recent months, drilling has boomed in Bradford and Susquehanna counties in Pennsylvania, along the North Branch of the Susquehanna River (inset). Well sites are shown in red.



SUSQUEHANNA RIVER BASIN COMMISSION

Left: More than two million gallons of water per well are injected to release natural gas from the shale formation. Disposal of the contaminated frac water poses environmental risks. Right: Wells are capped after drilling.

The pipelines, the truck traffic, the actual disposal of the wastewater—everything has an impact downstream.

—DEB NARDONE, COLD WATER RESOURCE SPECIALIST

A major worry in the largely undeveloped region is the amount of land being disturbed by drilling and its related activities. Extensive forested areas are being cleared for drilling pads, pipelines, and roads to the well sites, which could accelerate erosion and pour tons of sediment into nearby streams. "There are two or three hundred wells in the county already, and a lot of infrastructure going up right now. We'll see frenzied activity this year," predicted Mike Lovegreen, District Manager of the Bradford County Conservation District.

Until March of 2009, the state's county conservation districts—the environmental overseers who provide the "boots on the ground," according to CBF's Royer—were responsible for approving erosion and sediment permits for gas well construction. But a sudden decision by DEP excluded the county conservation districts from the permitting process. Instead, the department instituted a new fast track permitting option that allows drillers to obtain permits without any technical review of plans. The unexpected action raised suspicions that in the rush to drill, local environmental oversight was being brushed aside.

"This is the biggest impact of land in Bradford county since it was clear-cut for timber in the 1800s," said Lovegreen. "The DEP decision is something we'd like to see reversed, because we have the local knowl-

edge and could provide input. That's what the county conservation districts were created for, to make sure things are done right."

CBF Pennsylvania Executive Director Matt Ehrhart concurred, pointing out that the abrupt change in the permitting structure, with no public notice or discussion, sets a dangerous precedent for environmental protection. "Without technical review of plans, DEP is relying solely on the drillers' paid consultants to ensure that streams are not polluted by sediment," explained Ehrhart.

At the current rate of drilling, more than 30 million gallons of water could be drawn for gas wells this year in Bradford and Susquehanna counties alone. The huge withdrawals have led members of conservation groups like Pennsylvania Trout Unlimited to question whether local resources can withstand the pressure. As part of the permitting process, DEP requires drillers to specify the sources and location for the fresh water they use; the Susquehanna River Basin Commission (SRBC) also regulates the process.

"The SRBC and DEP have done a pretty good job of overseeing where the withdrawals are being taken," said Deb Nardone, a Cold Water Resource Specialist who works with the Pennsylvania Council of Trout Unlimited. "But the new roads built to get to the well pads, the stream crossings,

CBF's Concerns on Natural Gas Drilling

- Stormwater and sediment runoff from drilling and related construction
- Tens of millions of gallons of fresh water withdrawn from local streams
- Inadequate facilities and regulations for contaminated "frac water"
- Permits "fast-tracked" without local technical review
- Potential drinking water contamination

the pipelines, the truck traffic, the actual disposal of the wastewater—everything has an impact downstream. We're talking about [protecting] true wilderness areas, pristine streams where our members hunt and fish."

CBF is fighting to protect the region's natural resources against the effects of the drilling. In August, it challenged three permits issued to drilling and pipeline construction companies in Tioga County. "These permits were issued without technical review and an analysis of the damage caused by construction and post-construction runoff. That violates both the federal Clean Water Act and Pennsylvania law," said CBF's Royer. The Pennsylvania Environmental Hearing Board will rule on the case. ✨

✨ To learn more, visit cbf.org/MarcellusShale.



Carol Denny, editor of *Save the Bay* magazine, is a native of Pennsylvania. She last wrote for *Save the Bay* on Maryland's Mattawoman Creek.