ABOVE THE SHALE

AN EXCERPT FROM:

HALF FULL?
Water Futures in the Western Catskills
Prepared by the Columbia University
Urban Design Research Seminar | Spring 2011
Project Team

Urban Design Research Seminar, Graduate School of Architecture Planning and Preservation, Columbia University
Adriana Amendolara, Nicholas Chelko, Heinz von Eckartsberg, Hassan Karimi, Daniel Kimicata, Kathy Kurtak, Sangeeta Ramakrishnan, Austin Sakong, Ruya Saner, Jeremy Welsh, Richard Plunz (Director)

Urban Design Lab, Earth Institute, Columbia University
Richard Gonzalez, Maria-Paola Sutto, Richard Plunz (Director)

Project Advisor
Jennifer Grossman

Publication Editor
Austin Sakong

All photographs were taken by the Project Team, unless otherwise noted.
Copyright © Columbia University 2011 All Rights Reserved.
Editor’s Note

The following article is an advance excerpt from “Half Full? Water Futures in the Western Catskills”, a forthcoming publication about water in the Upper Delaware and Catskills watersheds.

Comprising a number of brief case studies, “Half Full?” will aim to illustrate the innumerable ways in which the region’s water has, throughout its history and continuing into present day, played a central role in the ecology, economy, culture, industry, and politics of its many communities. This excerpt, entitled “Above the Shale”, is one such case study.

In recent years, growing public concerns over the environmental impacts of natural gas extraction have been well-documented. From Colorado to Texas to Pennsylvania, these concerns have sparked debates in universities, newspapers, documentaries, and countless town halls across the country.

In New York and Pennsylvania, these debates have placed a sharp spotlight on the potential conflict between extracting the gas locked within the Marcellus Shale, and preserving the water that flows above it.

Meanwhile, in western and central Pennsylvania, gas extraction is already well underway. In a recent article describing shale drilling in the state’s game lands, the New York Times reported on the preparations being made in Potter County, PA: “An old dirt road that meanders up a ridge here has been widened and fortified. Acres of aspen, maple and cherry trees have been cut. In their place is an industrial encampment of rigs, pipes and water-storage ponds, all to support the extraction of natural gas through hydraulic fracturing, a process known as fracking.”

What is becoming increasingly clear is that the issues of gas drilling reach far beyond the threat of water contamination alone; the preparations necessary for drilling also carry implications for infrastructure, local economies, recreation, and wildlife.

“Above the Shale” is a look into the preparations being made in one small area along the Upper Delaware River. It begins with the story of one local historic landmark, the Pond Eddy bridge; what then follows serves to illustrate how this one bridge, and the communities around it, can contribute to—and even fuel—the larger debates igniting across the country.
The Millennium and Tennessee Pipelines, the former carrying gas from western New York State and the latter from the Gulf of Mexico, come within 12 miles of each other where Sullivan County meets Pike County across the Delaware River. This proximity presents an opportunity for the natural gas industry to link the two lines, although no such plans have been made official or public. The story of Pond Eddy Bridge maps the two pipelines in relationship to a series of seemingly disconnected infrastructural investments nearby, illuminating a potentially strategic location for the gas industry, and the effects that it may have in the Upper Delaware watershed.
Preparing the River

For years, the fate of the Pond Eddy Bridge, which spans 504 feet across the Delaware River between Lumberland Township on the New York side and Shohola Township on the Pennsylvania side, had been up for debate. Built in 1904, the Bridge had been allowed to deteriorate from its original 18 ton capacity to 7 tons, raising safety concerns. But unlike that bridge, which connects two major state roads and two populous towns on either side of the Delaware, the new Pond Eddy Bridge would serve only 26 properties on the Pennsylvania side, with roughly half as many families living on them.

The cost and capacity of this new Bridge, then, represents a significant infrastructural investment that, arguably, anticipates purposes much more far-sighted than the need to get heavy trucks to a small number of homes.

Illuminating what such purposes might encompass requires an examination of the Bridge project within the context of other, parallel infrastructural investments also underway. These investments — coordinated or not—are occurring on both sides of the Delaware River, and together, they conform to an array of preparations for the impacts that the region’s new natural gas economy promises to bring.

Preparing the Pipes

Running roughly parallel to the Delaware River are two natural gas pipelines that come within 12 miles of each other where the Townships of Lumberland on the New York side, and Shohola on the Pennsylvania side, meet at the Pond Eddy Bridge. But unlike the Bridge, much of the dramatic upgrades planned for these pipes’ capacities have already been implemented.

On the Pennsylvania side, the new 30 inch Millennium Pipeline, its construction costs subsidized by tax breaks from almost every county it passed through, went into service. Both lines are responses to the expected increases in the region’s supply of natural gas extracted from the Marcellus Shale; and both lines will rely on gas drilling companies to transport and sell that gas to the pipeline companies. Ensuring efficient transport of gas to either pipeline on either side of the Delaware, then, would prove beneficial for both the pipeline and gas drilling companies.

Preparing the Ground

On its Pennsylvania side, the Pond Eddy Bridge connects to a broad swath of game lands owned by the Pennsylvania Game Commission (PGC), a state-owned agency...
established in the late 1800’s to manage natural resources. Though its revenues have historically come from issuing hunting licenses, the agency has found that additional revenues could be generated by issuing leases to gas drilling companies on its game lands. For example, in April 2011, the PGC received more than $18 million by leasing potential drilling sites in Bradford, Tioga, and Lycoming Counties.13

Pennsylvania has long practiced leasing its public lands for natural resource extraction. According to the Pennsylvania Department of Conservation and Natural Resources website, “many hundreds of gas wells have been drilled on state forestry lands, and between 450 and 500 wells are producing today. Over the last 55 years, the total income from gas storage royalties and rentals has reached $129 million.”14 Now, the natural gas industry has found new encouragement from Pennsylvania’s governor Tom Corbett, who has openly advocated for new drilling on state-owned land. In February 2011, Corbett repealed a policy that had effectively banned Marcellus Shale gas drilling in Pennsylvania’s state forests;15 and throughout his first term, the governor has repeatedly rejected proposals for a tax on drilling companies.16

The State of Pennsylvania, through the PGC, owns more than 1.4 million acres of game lands. In Pike County, to which Pond Eddy Bridge connects, there are 24,243 acres of game lands; in addition, there are 75,474 acres of state forest and 2,971 acres of state parks—in total, 28% of all land in the County is
of drilling. Nonetheless, like the deterioration of roads and other physical infrastructure, strains on housing and social infrastructure are examples of the secondary impacts of drilling, even if it occurs only across the river.

If gas drilling does arrive, in either Sullivan or Pike Counties, Highland and Lumberland seem now to be prepared, at least via their zoning, for any transient population surge that may accompany the gas industry's arrival.

Preparing the Water

In addition to the infrastructural consequences, both expected and unintentional, that the natural gas boom will bring about in the region, the process of gas extraction may also alter the value of the region's water resources. Hydraulic fracturing, or 'hydrofracking', threatens to contaminate groundwater, and deplete surface water.

The threat of groundwater contamination is illustrated by an examination of a typical well's casing construction. According to a report prepared for the Delaware River Basin Commission (DRBC), "the long-term integrity of a plugged and abandoned well has a high probability of failure within less than 100 years—far less time than the life of the aquifer (>1,000,000 years)." Each failed well casing will provide vertical pathways for shale gas to contaminate groundwater aquifers.

Preparing the Towns

On its New York side, the Pond Eddy Bridge connects to the Town of Lumberland, and the newly constructed Barryville-Shohola Bridge connects to the Town of Highland. In October 2008, both towns collaborated in passing changes to their zoning laws to allow for an increased number of residential 'auxiliary apartments'; which could be "attached to a dwelling as part of its structure, or may be in a separate structure, such as a portion of a garage which is accessory to a dwelling." Conversions or attachments of a second dwelling had always been permitted in each Town's existing zoning laws through an application process. What the new zoning change permitted, and what was previously prohibited, was the construction of a second dwelling within the same parcel of land, effectively allowing these two towns to drastically increase their residential densities without the benefit of a grandfathering process.

Whether the Towns of Highland and Lumberland are capable of handling the potential increase in density, may be the most immediate question. Sewage volume, parking, and other issues of municipal capacity remain unaddressed. A less explicit, but equally pressing, question is why these towns foresaw the need for an increased number of auxiliary apartments (defined as a dwelling between 720 and 840 sq. ft.), and who will need them.

If the upgrades to the Millennium and Tennessee Pipelines indicate the emergence of the natural gas industry in the region, one group of people who may stand to benefit from the Highland and Lumberland zoning changes will be those employed by the industry. According to a report prepared by Pennsylvania State University, the "natural gas drilling process requires substantial populations of transient workforces as well as resident workforces that put strains on housing and government services." Housing transient workers have provided challenges in other areas of the country where drilling has commenced. In Bradford County, Pennsylvania, an influx of workers from Oklahoma, Arkansas, West Virginia, Colorado, and Texas have given rise to plans for a 15-acre 'man camp'. In Sublette County, Wyoming, gas drilling has had a “direct influence on population, including housing construction, public services, cultural changes with new residents and transient workforce issues.”

Since the passage of the Highland and Lumberland zoning changes in 2008, both Town Boards have since begun deliberations on excluding industrial uses like gas extraction in their zoning, illustrating an increased awareness of the primary impacts of drilling. Nonetheless, like the deterioration of roads and other physical infrastructure, strains on housing and social infrastructure are examples of the secondary impacts of drilling, even if it occurs only across the river.

If gas drilling does arrive, in either Sullivan or Pike Counties, Highland and Lumberland seem now to be prepared, at least via their zoning, for any transient population surge that may accompany the gas industry's arrival.
required for hydrofracking a single well to the volume of water contained in a typical fishing pond in Sullivan County. Approximately 2 to 9 million gallons of water are required to hydrofrack one horizontal well. In comparison, Mongaup Pond, a popular fishing pond in the Town of Rockland, contains approximately 177 million gallons of water. Therefore, if each horizontal well is only hydraulically fractured once using 9 million gallons each, only 20 wells would be needed to use up the equivalent of a water body like Mongaup Pond.

As of 2007, 941 individual parcels have been leased for gas drilling in Delaware County alone; in Sullivan County, 112 parcels have been leased. In Highland, over 30 parcels have been leased; in Lumberland, no leases have been signed to date.

Moving Ahead

When it comes to the future of natural gas extraction in the Upper Delaware watershed, few things can seem certain. Moratoriums are imposed and lifted, conflicting scientific studies are published and debunked, and one state’s DEP contradicts another’s. Still, stories like that of the Pond Eddy Bridge suggest that there are those who have already begun betting on the gas industry’s success, and are laying the groundwork for it.

Perhaps the only thing that stands in their way—the only thing, in fact, that literally separates the two pipelines sweeping through Sullivan and Pike Counties—is the water of the Upper Delaware River.

A Question of Risk

Scientists at Duke University conducted a study linking the contamination of ground water wells to the proximity of gas wells.

To learn more, visit: “Methane contamination of drinking water accompanying gas-well drilling and hydraulic fracturing” http://www.pnas.org/content/early/2011/05/02/1100682108
Citations

Above the Shale
2 “Pond Eddy Bridge capacity downgraded” The River Reporter, 11/16/2006
3 “Pond Eddy Bridge debacle nears solution” The River Reporter, 09/06/2007
5 “Decision near on fate of Pond Eddy Bridge” The Times Herald-Record, 05/08/07
6 “Traffic begins moving over new Shohola-Barryville bridge” The Pike County Courier, 10/26/2006
9 Ibid.
10 “Pipeline crossing underway on Lackawaxen River” The River Reporter, 08/04/2011
12 “Temporary signs for temporary roads” The River Reporter, 05/29/2008
13 “Agency OKs more gas drilling on state game lands” The Associated Press, 04/22/2011
14 Pennsylvania Department of Conservation and Natural Resources, “DCNR Natural Gas Leasing Proposal” http://www.dcnr.state.pa.us/gasleasing/
15 “Corbett repeals policy on gas drilling in parks” The Pittsburgh Post-Gazette, 02/24/2011
16 “Gov. Tom Corbett doesn’t waver in anti-drilling tax stance” The Associated Press, 04/18/2011
17 Pike County Officials Directory 2011
18 Lumberland Changes to Zoning Law, 10/10/2008
19 “Energy Boomtowns & Natural Gas: Implications for Marcellus Shale Local Governments & Rural Communities” NERCRD Rural Development Paper No. 43, Pennsylvania State University
20 “Community impacts of natural gas” The River Reporter, 08/20/2009
21 Ibid.
22 “Report for the Delaware River Basin Commission on Natural Gas Development Regulations” Prepared for the DRBC by HydroQuest, 12/09/2010
25 “Gas Leases in Sullivan and Delaware Counties” Prepared by the Open Space Institute, 2007
26 The Oil & Gas Asset Clearinghouse “Cabot Oil & Gas, Marcellus Shale Acreage” 07/01/2010
27 “1913 USGS Map” Courtesy of the archives of the Minisink Valley Historical Society
29 Courtesy of the archives of Richard Plunz
30 Ibid.