

# What's in the water?

Find out how hydraulic fracturing works – and how it can affect the water you drink.

## 1 Benzene

Benzene is a part of the diesel fuel that is often used as a fracking fluid. It can cause leukemia – even in quantities as low as 0.005 parts per million. [F-1a and b]

## 2 Arsenic [F-2]

A Pennsylvania farmer – the largest supplier of heirloom tomatoes on the East Coast – found levels of arsenic at 2,600 times the EPA's standard in the water on his land.

## 3 2-Butoxyethanol

A mother developed a rare tumor of the adrenal gland after drinking water contaminated with the common fracking chemical 2-butoxyethanol near a fracking operation in Colorado.

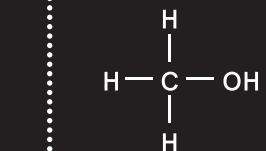
[F-3a and b]

## 4 Methanol [F-4a and b]

Hydraulic fracturing uses more methanol than any other chemical. Even a few ounces of it can cause blindness.

## 5 Naphthalene [F-5a and b]

The EPA found naphthalene, the cancer-causing chemical that moth balls are made from, in water testing wells drilled near fracking sites in Wyoming.



And that's just the beginning...

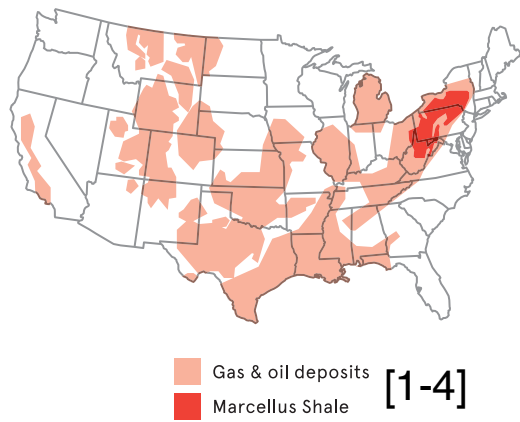
MAKING  
POLICY  
PUBLIC

# What the Frack?

Hydraulic fracturing — sometimes called fracking\* — is a way to extract natural gas from shale rock deep underground. [1-1]

Fracking chemicals, water, and sand are forced under massive pressure into underground cracks. [1-2]

The cracks expand and release the gas, which is then collected back at the surface and used as a source of energy. [1-3]



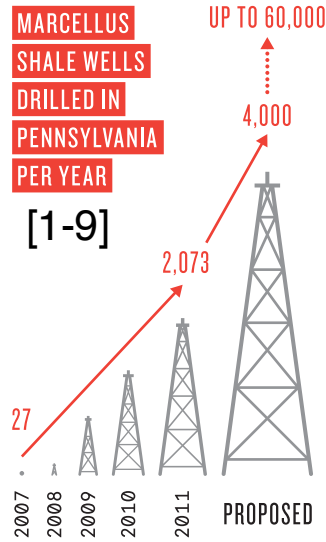
Fracking is now taking place in 34 states. In those states, fracking chemicals, gas, and other substances have already contaminated drinking water supplies and harmed human, animal, and environmental health. [1-5]

And now, fracking is coming to the Marcellus Shale, a rock layer that stretches 600 miles under six states, and is the home to the water supply of 15.6 million people — from New York City to Delaware. [1-6]



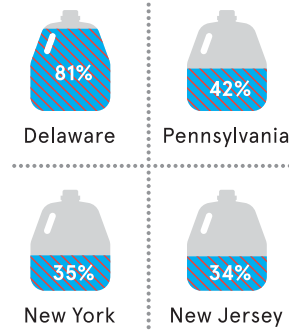
## WHY NOW?

Recently, an economic bubble caused gas prices to increase to the point where fracking (a relatively expensive technology) became a more affordable method of gas extraction. But that bubble is about to burst. [1-8]



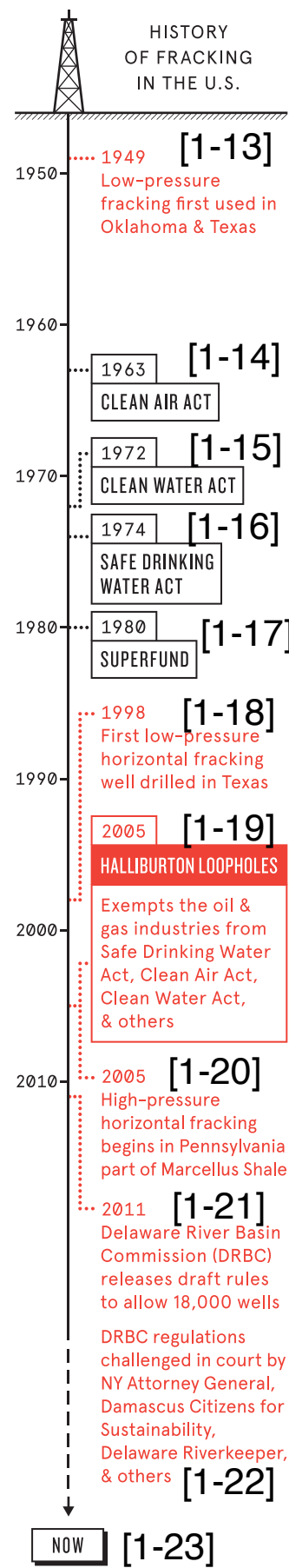
Expansion of drilling is actively being pursued in the Marcellus Shale, which overlaps the Delaware River Basin, a watershed that supplies water to 15.6 million people in New York, New Jersey, Pennsylvania, and Delaware. [1-10]

## HOW BIG IS THE IMPACT?



% of each state's population whose drinking water comes from the Delaware River Basin [1-11]

Hydraulic fracturing has never taken place so close to so many people! [1-12]



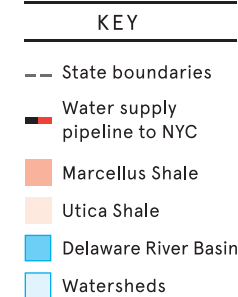
UP TO 60,000 WELLS COULD BE DRILLED IN THE MARCELLUS SHALE. [1-24]

## DRINKING WATER IN DANGER!

Number of people in New York, New Jersey, Pennsylvania, and Delaware who rely on drinking water from the Delaware River Basin [2-1]

PENNSYLVANIA [2-3]

MARYLAND



4.1 MILLION PEOPLE PENNSYLVANIA Excluding Philadelphia

7.4 MILLION PEOPLE NEW YORK CITY

1.4 MILLION PEOPLE PHILADELPHIA

2 MILLION PEOPLE NEW JERSEY

643,000 PEOPLE DELAWARE



\* "Fracking" is a general term used to refer to all of the industrial activities involved in gas production — including the specific technique of hydraulically fracturing rocks.



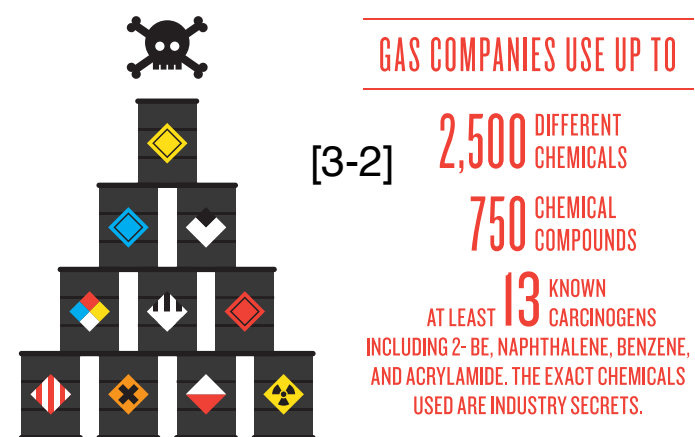
# NOT SAFE NOT CLEAN NOT CHEAP

For more information and documentation on these fracking facts, visit: [DamascusCitizens.org/references](http://DamascusCitizens.org/references)

## NOT SAFE

### Health Impacts [3-1]

Independent scientists have identified 353 chemicals used in fracking fluids that are harmful to people. These chemicals have effects like burning the skin, eyes, lungs, or gastrointestinal system; disrupting the nervous system, immune system, cardiovascular system, endocrine system, and kidneys; or even causing cancer and mutations.



### Food Chain [3-3]

The wastes produced by fracking contain radioactivity; endocrine disruptors; and heavy metals like strontium, arsenic, barium, chromium, lead, and mercury. When these toxins leak into the environment, plants absorb them and they enter the food chain. Animals that eat the plants become contaminated, along with the meat and dairy products made from them. Many animals die, creating real economic losses for farmers.

### Explosions, Fires, & Blowouts

In 2010, at a drilling operation in Clearfield County, PA, a geyser of gas and fracking fluid erupted out of control for 16 hours, shooting 75 feet into the air.

That same year, in Moundsville, WV, a methane gas explosion at a drilling rig severely burned seven workers.

Recently, vapors from holding tanks at a fracking site in Washington County, PA, exploded and caught fire. Three workers with severe burns had to be airlifted out.

In Douglas, WY, Chesapeake Energy lost control of a well, resulting in a blowout of toxic drilling muds and a gas leak that forced 67 residents to evacuate their homes.

### Worker Deaths & Injuries

Oil and gas workers are eight times more likely to die in a work accident than workers in other industries. As fracking increased, there were more than twice as many worker deaths in the Eagle Ford Shale in Texas in 2011 than in 2010.

### Earthquakes [3-11]

Earthquakes are now happening where they rarely occurred before, in places like Ohio, Arkansas, Texas, and England. Most of these earthquakes happen when fracking wastewater is injected deep into the earth for disposal, causing stable ground to shift. But some have been connected to the hydraulic fracturing process itself.

### Radioactivity

New York State found levels of radium-226 that were up to 260 times the legal release limit when they tested wastewater from six gas wells in Schuylar County.

The Marcellus Shale contains uranium, which produces radioactive radon gas. The radon will be piped to homes in cities along with the natural gas collected from fracking.

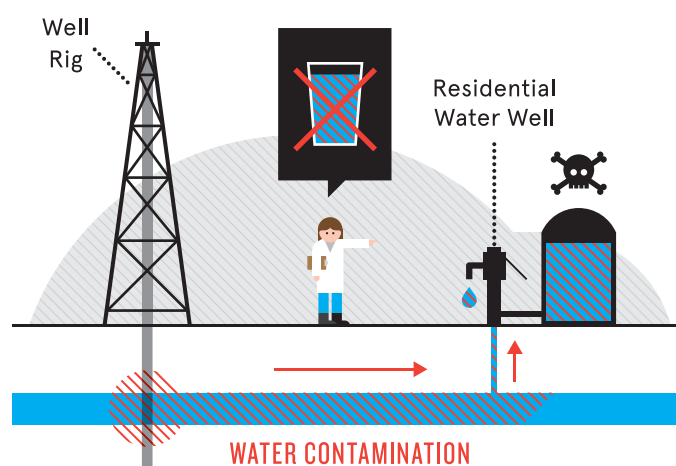
## NOT CLEAN

### Water Contamination [3-16]

Gas wells are drilled through rocks that already contain lots of cracks. When the toxic chemicals are pumped in, they move through the cracks and end up in water supplies. 80% of fracking chemicals never return to the surface — they stay underground, seeping into drinking water over the course of months or years. This contamination is permanent and cannot be cleaned up later.

Fracking drills through layers of cracked rocks, connecting underground drinking water sources to naturally occurring salty deposits that are laced with toxic metals.

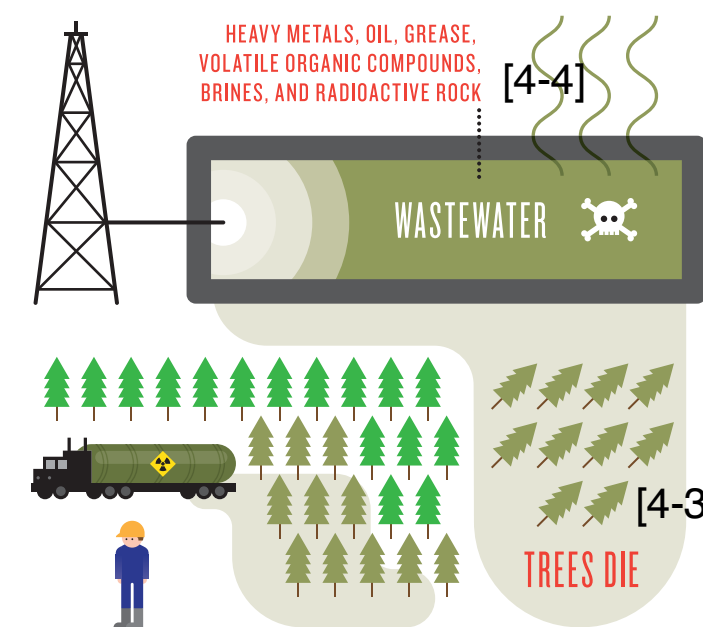
15 families in Dimock, PA, found their water wells contaminated with methane and other materials after nearby drilling.



[3-23]

### Wastewater [4-1]

Across the country, millions of gallons of fracking wastewater are produced daily. The wastewater contains heavy metals, volatile organic compounds, oil, grease, brines, and radioactive rock dug up from deep underground. When this hazardous waste was released on a forest in West Virginia, all of the plants and half of the trees died.

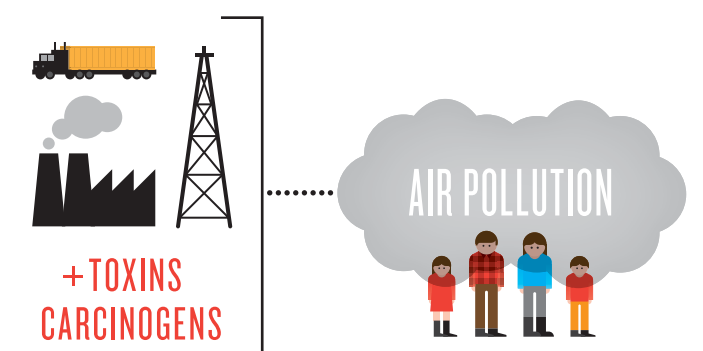


Some waste goes to sewage treatment plants. In Pennsylvania, most plants don't have the equipment to handle this hazardous waste, so it's diluted and dumped into local streams — often someone's drinking water.

Some waste is trucked away, but nobody tracks the hauling, or where it is going, so it is often dumped illegally or spread on roads.

### Air Pollution [4-9]

Gas drilling machinery, processors, compressors, and pipelines pollute the atmosphere with dust, diesel fumes, fine particulate matter, and methane, as well as carcinogenic volatile organic compounds (VOCs) like benzene, toluene, ethylene, and xylene. VOC's also combine with nitrogen oxide (and sunlight) to form ozone and smog. In parts of rural Wyoming where there has been widespread drilling, the air quality is as bad as in Los Angeles.



## NOT CHEAP

### Economic Impact [4-13]

Gas production at fracking sites drops quickly — by up to 85% in 2 years — along with any claimed economic benefits.

Most of the jobs created by the gas industry only last for the first year after a well is drilled, and many jobs go to out-of-state workers who already have experience. One gas company used economic forecasting data incorrectly to exaggerate the number of jobs they would create in New York State by 900%.

### Climate Change [4-16]

Billions of cubic feet of greenhouse gases escape from loose pipe valves or are released on purpose by gas production facilities — adding emissions equivalent to 35,000,000 additional automobiles each year.

The rocks cracked during hydraulic fracturing leak greenhouse gases directly from the ground into the atmosphere.

### Water Depletion [4-19]

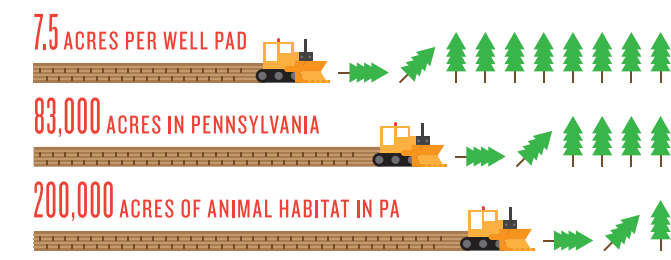
Up to 140 billion gallons of water are used to fracture 35,000 wells in the U.S. each year. That water is permanently removed from the water cycle and depletes the aquifers that supply our drinking water.

### NYC's Unfiltered Water [4-21]

NYC is one of the few cities that isn't required by the EPA to filter its water. If gas drilling contaminates the pristine water sources upstate, it will cost the city at least \$20 billion to install a filtration system and there will be no more pure water for bagels!

### Deforestation [4-23]

The Nature Conservancy has estimated that two-thirds of fracking well pads will be constructed in forested areas, clearing up to 83,000 acres in Pennsylvania alone.



[4-24]

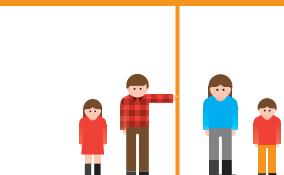
## What can you do?



The Delaware River Basin provides some of the nation's highest quality drinking water to people from New York City to Dover, DE. As of 2012, gas drilling is not allowed, but the Delaware River Basin Commission (DRBC) — made up of the governors of Delaware, New York, New Jersey, and Pennsylvania, and a U.S. Army Corps of Engineers representative — proposed regulations that would allow over 18,000 gas wells to be drilled in the Delaware River Basin.

### TELL YOUR GOVERNOR TO VOTE "NO" ON FRACKING!

Federal law requires that a full environmental impact study be conducted before adopting any such regulations.



**Delaware** | Gov. Jack Markell  
governor.markell@state.de.us  
Ph: 302-577-3210

**New York** | Gov. Andrew Cuomo  
www.governor.ny.gov/contact/  
GovernorContactForm.php  
Ph: 518-474-8390

**New Jersey** | Gov. Chris Christie  
www.state.nj.us/governor/contact  
Ph: 609-292-6000

**Pennsylvania** | Gov. Tom Corbett  
governor@pa.gov  
Ph: 717-787-2500

### CLOSE THE HALLIBURTON LOOPHOLES

Many people think federal environmental regulations will protect human and environmental health from the impacts of fracking. But because of the infamous "Halliburton Loopholes," laws protecting air, water, and drinking water, among other things, don't apply to fracking.

In 2005, Vice President Dick Cheney, former CEO of Halliburton — the company that introduced new technology that made hydraulic fracturing viable — got federal exemptions for oil and gas drilling from the Clean Air Act, the Clean Water Act, the Safe Drinking Water Act, the Resource Conservation and Recovery Act, and the Community Right-to-Know Act, among other laws.

Large federal subsidies to the oil and gas industry are what make hydraulic fracturing possible today. Ask your congressional representative to support subsidies to renewable energy programs and to cut back on the money flowing to oil and gas companies. Without the government subsidies to the shale gas industry, much of drilling and hydraulic fracturing would not be economically viable.

Let Congress know that shale gas is not the answer to our nation's energy future. And let the president know the truth: fracking for shale gas will pollute our air and our water, and increase global warming.

www.house.gov/representatives  
www.senate.gov  
www.whitehouse.gov/contact



Your local anti-fracking organization is a political force that is working to change public policy to protect the drinking water and public health of 15.6 million people.

Local groups are educating their communities, meeting with public officials, changing zoning ordinances, and even banning gas drilling in their towns. People are responding in huge numbers and getting the attention of elected leaders. But they need your help, join them today!

**Damascus Citizens for Sustainability**  
P.O. Box 147, Milanville, PA 18443  
www.DamascusCitizens.org  
DCS@DamascusCitizens.org  
Ph: 845-252-6677

**Delaware Riverkeeper Network**  
925 Canal Street, 7th Floor,  
Suite 3701, Bristol, PA 19007  
www.delawariverkeeper.org  
drn@delawariverkeeper.org  
Ph: 215-369-1188

**Catskill Mountainkeeper**  
P.O. Box 381, Youngsville,  
New York, 12791  
www.catskillmountainkeeper.org  
info@catskillmountainkeeper.org  
Ph: 845-482-5400

Find other local anti-fracking groups here:  
www.DamascusCitizens.org/  
partnerships

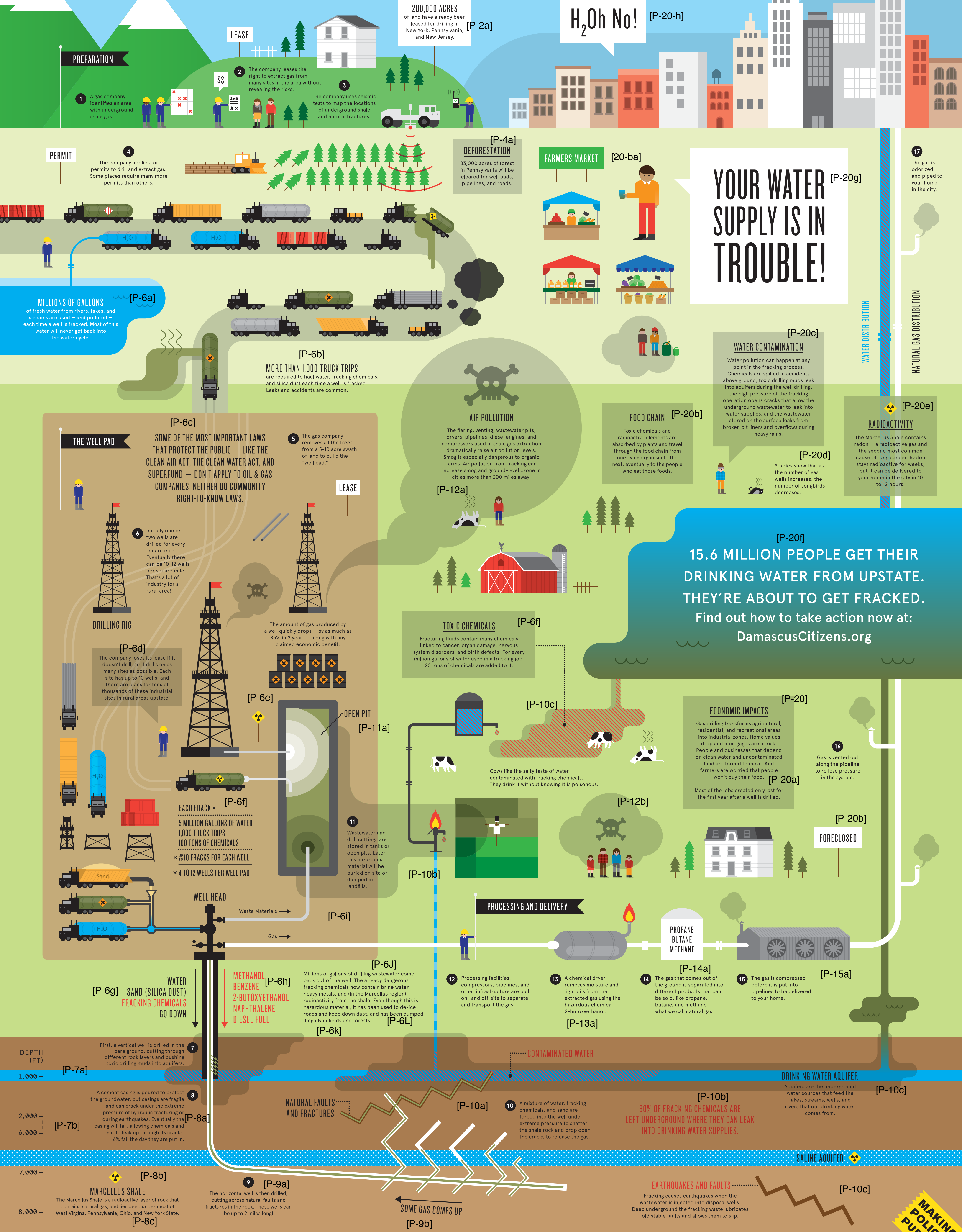


# DON'T DRINK AND DRILL!

FRACKING IS COMING TO A DRINKING WATER SUPPLY NEAR YOU. HERE'S HOW IT WORKS AND WHY YOU SHOULD CARE!

BETWEEN 4,800 AND 60,000 WELLS COULD BE DRILLED IN THE MARCELLUS SHALE. [P-2b]

NOTE: for REFERENCES use the #'s in the circles and [P-1],[P-2], etc.



**YOUR WATER SUPPLY IS IN TROUBLE!** [P-20g]

**15.6 MILLION PEOPLE GET THEIR DRINKING WATER FROM UPSTATE. THEY'RE ABOUT TO GET FRACKED.**  
Find out how to take action now at: [DamascusCitizens.org](http://DamascusCitizens.org)

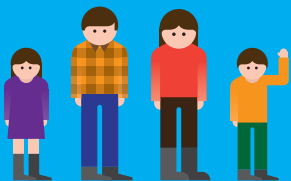
**MAKING PUBLIC POLICY**

# 15.6 million people in [B-1] New York, New Jersey, Pennsylvania, and Delaware get their drinking water from the Delaware River Basin.

That water is at risk. Hydraulic fracturing is a process that forces water, sand, and chemicals into underground cracks, under high pressure, in order to release natural gas. It causes air and water pollution, contaminates drinking water supplies, kills animals and plants, and poses serious risks to humans.

And it's coming to your drinking watershed.

Find out how hydraulic fracturing works, what can go wrong, and what you can do to protect your drinking water today.



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**MAKING POLICY PUBLIC** is a program of the Center for Urban Pedagogy (CUP). CUP partners with policy advocates and graphic designers to produce foldout posters that explain complicated policy issues, like this one. [makingpolicypublic.net](http://makingpolicypublic.net)

**COLLABORATORS**  
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**Damascus Citizens for Sustainability:** Barbara Arrindell, Ron Hine;  
**Papercut:** Minh Anh Vo, Victor Schuft



**THE CENTER FOR URBAN PEDAGOGY (CUP)** is a nonprofit organization that uses the power of design and art to increase meaningful civic engagement. [welcometocup.org](http://welcometocup.org)

**PAPERCUT** is a French creative studio based in New York, and founded by Minh Anh Vo and Victor Schuft. They specialize in illustration, branding, and editorial design. [papercut.fr](http://papercut.fr)



**DAMASCUS CITIZENS FOR SUSTAINABILITY**  
In February of 2008, alarmed by the threat posed by the shale gas extraction industry, local residents of the Upper Delaware River Valley formed Damascus Citizens for Sustainability (DCS). Through grassroots organizing, education, and litigation, DCS has sought to protect the Delaware River Watershed, an irreplaceable source of drinking water for over 15.6 million people. As the threat to people's health has grown, DCS has increasingly extended its efforts across the state of Pennsylvania and the entire Marcellus region. [DamascusCitizens.org](http://DamascusCitizens.org)

**BIG THANKS TO**  
Shana Agid, Parsons the New School for Design, Sam Holleran, Valeria Mogilevich, Clara Amenyó, Lize Mogel, Jennifer Ostroth, Lisa Garrison, Alison Rose Levy, Bruce Torrey.

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