COMMENTS ON MDE FRACKING REGULATIONS

Engage Mountain Maryland

EXECUTIVE SUMMARY

Engage Mountain Maryland and a coalition of more than 50 Western Maryland businesses submit these comments to explain why the regulations proposed by the Maryland Department of the Environment ("MDE") are inadequate to protect the people, economy, and environment of Western Maryland from the harmful effects of modern unconventional natural gas drilling, commonly known by the term for one of its most controversial techniques—hydraulic fracturing, or "fracking."

Fracking is a dangerous industrial process that would seriously harm the region even if MDE's regulations were stronger. It creates air, water, light, and noise pollution; requires massive supporting infrastructure, including pipelines and compressor stations; increases heavy-duty diesel truck traffic; and threatens the wholesale industrialization of our region. This would be a disaster for Western Maryland, a region known for its pristine wilderness and outdoor recreational opportunities, and for Garrett County in particular, whose economy is driven by tourism and whose tax base depends on the second-home market around Deep Creek Lake.

MDE's current proposal largely replicates the midnight proposal rushed out by the O'Malley administration mere weeks before he left office in January 2015, with only a few changes. Reflecting this hurried and disjointed process, the regulations MDE has proposed now resemble a "to-do list" more than a meaningful regulatory proposal. They are replete with vague and undefined requirements, promises of future guidance, and provisions that put the oil and gas industry in charge of critical decisions. Some of the hardest issues are left to be resolved in decisions on individual permits, including methods for controlling toxic air pollution or storing dangerous chemicals. MDE is unlikely to have sufficient time or resources during the permit-review process to address all of these important issues, because the proposed regulations require MDE to approve or deny permit applications within only 30 days, with the possibility of a single 30-day extension. On other difficult issues, like how to conduct an environmental assessment or baseline water monitoring,

MDE's proposal is mostly devoid of specific requirements, promising only to figure it out later.

The proposed regulations also fail to account for advances in the scientific understanding of the risks posed by fracking. The regulations are based on studies and regulatory work conducted by the O'Malley administration during 2013 and 2014, predating over half of the peer-reviewed scientific literature that's now available. Despite this new evidence, which overwhelmingly attests to the risks associated with fracking, MDE's current proposal fails to update the standards proposed in 2014.

Instead, the current proposal actually weakens the prior proposal in several key respects. For instance, this new proposal removes the requirement for ambient air quality monitoring before, during, or after fracking, despite numerous studies in the last two years showing that toxic air emissions are released near fracking wells. The proposal also neuters the requirement of a Comprehensive Gas Development Plan, or CDP, which was supposed to be the key bulwark against over-industrialization, environmental harms, and other community-level impacts. The new CDP is essentially advisory and no longer even needs to be approved by MDE or the Department of Natural Resources. The weakening of the CDP leaves Garrett County, which lacks zoning authority, defenseless in the face of poorly planned development and conflicting land uses.

Fracking is a threat to Western Maryland's rural way of life. Fracking will mean sprawling industrial development, including large compressor stations, pipelines, and thousands of heavy-duty truck trips, altering the face of Western Maryland and placing significant strain on the region's existing roads and infrastructure. Increased congestion, noise, and air pollution in areas that people currently visit in search of tranquility and nature will drive away tourists and visitors and harm our local economy. Our property values will also decline, as even the threat of fracking has been shown to have significant impacts on home values, especially for homes that rely on groundwater for drinking.

The boom-and-bust cycle of fracking will exacerbate this economic and social disruption. Job growth during short-lived boom periods typically draws in non-local workers, who compete for housing and social services. Left in the wake of these workers is empty housing, a local economy that suddenly has far fewer customers, and environmental damage and disruption that will forever decrease the region's attractiveness to the tourists and visitors that once sustained its economy. Rural areas like Western Maryland need to cultivate economic diversity to survive, but fracking, like most extractive industries, is known to stifle other economic development, not stimulate it.

Fracking also poses serious health risks, including chemical hazards in the air and water, physical hazards like noise and radiation, and psychosocial stressors including those

related to public safety, the potential loss of property values, and the disruption of the existing social fabric. People near fracking have been shown to suffer from hormonal disruption, premature childbirth, low-birth weight, asthma, migraines, fatigue, sinus problems, skin rashes, and other illnesses, all at increased rates.

Fracking also poses a major threat to Western Maryland's high-quality water resources, which provide drinking water, support eco-tourism, and are critical to the survival of myriad rare, threatened, and endangered species. Fracking requires truly massive quantities of water, and produces equally massive quantities of waste water, putting Western Maryland's water resources at risk from water withdrawals and waste water disposal, as well as from land-use changes, pipeline construction, and spills. As Maryland agencies have previously recognized, Western Maryland's unique geology means that its groundwater is extremely vulnerable to chemical spills.

For all of these reasons, we believe that fracking is the wrong choice for Western Maryland, especially under MDE's proposed regulations.

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Bear Creek Traders

Bello's Portraits

Blamble Electric

Blue Moon Rising

Brenda's Pizzeria

Cabin Fever Antiques & Collectibles

Chanteclaire Farm

CLS Ventures, Inc.

County Parson Honey

DCL Mountain Maids & Home Services

DCL Spas & Tubs

Deep Creek Fitness

Deep Creek Lavender Farm

Deep Creek Pottery

Eagle Rock Construction

Eloqui, Inc.

Eye For Art Gallery & Studio

Farmhouse Fete

FireFly Farms

FS Auto Trading

Garrett Events

Gatto Electric

Gatto Home Services

Glass Unlimited

Harvest Moon Catering

Harvest Moon Market

High Mountain Sports

Hughie's Ice Cream

IASO Healing Arts Studio

Joint Training Facility

Legacy Homes

Marine Plus DCL

Mary Kay Ind, Sr. Sales Director

McHenry Beverage Shoppe

McHenry Shop 'n Save

MEB Associates

Moonshadow

Mountain Flour Bakery

Mountain Maryland Kennels, LLC

Off Lake Realty & Rentals

Perkin's

Pinnacle Deep Creek, LLC

Precision Rafting

Red House School Antiques

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Salt and Pepper Studios

Sincell Publishing

Sounds Fun DJs

Spring Creek Outfitters

The Alley

The Gallagher Group, LLC

The Republican Newspaper

Thomas B. Dabney, Attorney

Trader's Coffee House

Tressler's Garage

Taylor-Made Deep Creek Vacations & Rentals

engage
MOUNTAIN MARYLAND

COMMENTS ON MDE FRACKING REGULATIONS

Prepared by Earthjustice on behalf of Engage Mountain Maryland
Submitted December 14, 2016

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I. WESTERN MARYLAND DOES NOT WANT FRACKING

These comments are submitted by Engage Mountain Maryland, represented by Earthjustice, and a coalition of 63 Western Maryland businesses who are deeply concerned about the harmful effects that hydraulic fracturing ("fracking") will have if it goes forward in Maryland. This document explains why Western Maryland does not want fracking, describing at length how fracking poses unacceptable risks to the people, economy, and environment of the region.

The Western Marylanders submitting these comments do not believe the proposed regulations for fracking, published by the Maryland Department of the Environment ("MDE") are adequate to protect their economy, rural environment, and personal safety from the harmful effects of fracking.[1] Fracking is a dangerous industrial process that would seriously harm the region even with better regulation. These regulations, the product of a rushed process, are replete with vague and undefined requirements, promises of future guidance, and provisions that put the gas industry in charge of critical decisions. MDE's failed attempt to regulate fracking with this proposal only further illustrates the need for prohibitive legislation.

Those of us that live here understand that strong majorities of Western Maryland residents oppose the introduction of fracking to our community, a fact which has been confirmed over and over through surveys,[2] online engagement, and at public meetings.[3] Fracking is a one-way street that will redefine this region of the state for decades to come. Western Maryland does not want to go down that road.

II. HOW FRACKING WILL CHANGE THE FACE OF WESTERN MARYLAND

As Maryland considers whether or not to allow fracking within its borders, it is important to consider the full scope of problems raised by modern, industrial gas drilling and not to be misled into thinking that the only difference from traditional drilling activities is the particular

[1] Specifically, these comments address the proposed amendments to Maryland's Oil and Gas regulations, at 43 Md. Reg. 1293 (Nov. 14, 2016) and the proposed amendments regarding underground injection control, at 43 Md. Reg. 1361 (Nov. 28, 2016).

[2] Maryland Voter Support for a Ban on Fracking, *OpinionWorks LLC* (Oct. 25, 2016), http://www.dontfrackmd.org/wp-content/uploads/2015/02/Maryland-Fracking-Ban-Poll-Memo-102516.pdf ("The margin of support for a fracking ban is more than two-to-one in Garrett County, with 57% in favor of a ban and 27% opposed).

well-stimulation technique. The difference between the gas drilling Western Maryland saw in the last century, and what is being proposed now, could not be more dramatic.

Fracking refers to a specific process of stimulating gas production in underground wells. This is only one part of a larger process that is often referred to as "unconventional" natural gas drilling and production. Colloquially, "fracking" is often used to refer to the whole process of unconventional natural gas drilling and production and many news articles and publications discussing "fracking" actually address the impacts of unconventional gas development more broadly.

A. Modern Well Drilling

Modern gas well drilling is a complex and industrialized process that involves intensive infrastructure development throughout the state or region where it occurs. Unlike historical gas drilling activities, modern wells in the Marcellus Shale region are drilled first vertically, up to 12,000 feet down and into the shale layer, and then horizontally for distances up to a mile or more. This process requires much more heavy equipment and supporting infrastructure than in historical gas drilling and also leads to significantly more waste production and pollution.

Modern drilling creates more noise and pollution, and may last as long as five weeks per well.[4] Drilling in the Marcellus shale is now done with triple rotary rigs over 100 feet tall.[5] Auxiliary equipment at the well pad includes industrial tanks, large fluid impoundments dug into the earth, generators (often diesel-powered and highly polluting), and hundreds of parked or idling trucks holding equipment and pumps to support the drilling and fracking process.[6] The drilling process creates massive quantities of waste that must be disposed of, including drill cuttings and mud. Because of latent radioactivity deep within the earth, drill cuttings and other materials that come back out of the well may have dangerous levels of radioactivity.[7]

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[4] MDE, *Assessment of Risks from Unconventional Gas Well Development in the Marcellus Shale of Western Maryland* at D-2 (Jan. 20, 2015) (*hereinafter*, "RA"), http://www.mde.state.md.us/programs/Land/mining/marcellus/Pages/Risk_Assessment.aspx.

[5] *Id.*

[6] *Id.; See also* Sharon Dunn. "Fracking 101: Breaking down the most important part of today's oil, gas drilling," *The Greeley Tribune* (Oct. 14, 2016), http://www.greeleytribune.com/news/local/fracking-101-breaking-down-the-most-important-part-of-todays-oil-gas-drilling; FracTracker Alliance, *Explore a Fracking Operation – Virtually*, https://www.fractracker.org/resources/oil-and-gas-101/explore (last visited Dec. 13, 2016).

[7] EPA, *TENORM: Oil and Gas Production Wastes*, https://www.epa.gov/radiation/tenorm-oil-and-gas-production-wastes (last updated Oct. 27, 2016).

Radioactive radon gas can also make its way into people's homes as a result of drilling activities, posing an additional hazard for workers and for nearby residents, animals, and crops.[8]

Horizontal drilling techniques allow the consolidation of six or more wells on a single well pad, making the well pad into an industrial hotbed for extended periods of time as first one, then the next, then the next well is drilled there, then fracked, and then refracked stage by stage. Constructing the well pad involves clearing and grading a substantial swath of land so that it can support the drilling rig. Each individual well pad is estimated to encompass about 15 acres, including 4 for the pad itself and the remainder for supporting infrastructure that needs to be located at and around the site.[9] MDE has acknowledged that the direct impacts of unconventional gas development "include the conversion of lands supporting forests, fields, and other natural resources to industrial use resulting from the well pad footprint and associated infrastructure such as roads, pipelines and compressor stations."[10]

The fracking stage, where the well is stimulated to increase production, typically involves between 3 and 5 million gallons of water. This water is mixed with a cocktail of highly toxic chemicals to facilitate the extraction process. Between 2005 and 2015, oil and gas wells fracked across the United States have used at least 5 billion pounds of hydrochloric acid, 1.2 billion pounds of petroleum distillates (including toxic and cancer-causing agents), and 445 million pounds of methanol (suspected of causing birth defects).[11] Creating the necessary pressure inside the gas well involves heavy machinery, as well. Noise from machinery used in the hydraulic fracturing process can reach approximately 72 decibels at a distance as far out as 2,000 feet.[12] That is similar to the noise you hear when operating a vacuum cleaner in your home, except it is sustained twenty-four hours a day over the course of four to five weeks.[13]

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[8] Johns Hopkins Bloomberg School of Public Health, *Increased Levels of Radon in Pennsylvania Homes Corresponds to Onset of Fracking* (April 9, 2015), http://www.jhsph.edu/news/news-releases/2015/increased-levels-of-radon-in-pennsylvania-homes-correspond-to-onset-of-fracking.html.

[9] *Id.*

[10] MDE, *Marcellus Shale Safe Drilling Initiative Study Part III Final Report Findings and Recommendations* at 53 (Dec. 19, 2014) (*hereinafter* "Rept. III").

[11] Environment America Research and Policy Center, *Fracking by the Numbers: The Damage to Our Water, Land and Climate from a Decade of Dirty Drilling* at 4 (April 2016) (*hereinafter* "Fracking by the Numbers").

[12] RA at F-8.

[13] IAC Acoustics, *Comparative Examples of Noise Levels*, http://www.industrialnoisecontrol.com/comparative-noise-examples.htm (last visited Dec. 13, 2016).

To transfer all of this equipment, water, and chemicals to a well pad, it has been estimated that approximately 9,500 heavy-duty truck trips and over 3,500 light-duty truck trips per well pad are required.[14] MDE noted during its studies that this extraordinary amount of truck traffic can be extremely disruptive to community character.[15]

During and after fracking, trucks are also needed to take equipment and wastes away from the well site, with risk of spills, exposures, and accidents both before and during transport. As pressure drives gas back up and out of the well, up to 30% of the injected fluids return to the surface as "produced water" and "flowback," along with the gas that flows upwards and out of the well.[16] Produced water is a toxic mix of the chemically-laden fracking waters mixed with salts dissolved into the water while it was deep underground. Like drill cuttings, produced water may be dangerously radioactive.[17] MDE intends for companies to reuse much of the waste water, which will somewhat lessen the massive water requirements of the fracking process. However, recycling waste waters will concentrate their toxic and radioactive contents, creating heightened hazards for nearby residents.

B. Infrastructure Needed Throughout the Region

When people talk about bringing fracking to Western Maryland, they do not just mean the introduction of isolated well pads either. Due to the horizontal reach of modern wells, and to stimulation techniques like fracking, the volume of gas produced by modern wells is far larger than what was produced by gas wells of the past century. This means significantly more infrastructure is required to process and transfer gas for market. Well pads must be connected to a vast network of pipelines that spans the entire region. MDE estimates that 1.65 miles of

[14] RA at C-3.

[15] RA at C-8 (citing NTC Consultants. *Impacts on Community Character of Horizontal Drilling and High Volume Hydraulic Fracturing in Marcellus Shale and Other Low- Permeability Gas Reservoirs* (Feb. 18, 2011), http://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/NYSERDA/ng/NTC-Report.pdf.

[16] EPA, *Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States, Executive Summary* at 31 (Dec. 2016), https://www.epa.gov/sites/production/files/2016-12/documents/hfdwa_executive_summary.pdf ("[W]ells in the Marcellus Shale typically produce 10-30% of the volume injected in the first 10 years after hydraulic fracturing.").

[17] EPA, *TENORM: Oil and Gas Production Wastes*, https://www.epa.gov/radiation/tenorm-oil-and-gas-production-wastes (last updated Oct. 27, 2016).

gathering pipelines must be installed for each new well pad.[18] Siting of gathering lines is not regulated.[19]

Gathering pipelines and other pipelines take the gas from wells to processing facilities and compressor stations. Compressor stations are large, engine-powered facilities that move the gas through the pipeline network and can be heard from thousands of feet away.[20] Unlike any one well site, compressor stations stay active and noisy for years or even decades.[21] Natural gas processing plants, which could be sited in Western Maryland and elsewhere in Maryland, are enormous, industrial facilities that chemically distill the gas that comes out of wells to produce the purified gas products used by consumers.

In a nutshell, fracking Western Maryland means exploratory drilling around the region; thousands of heavy-duty diesel trucks traversing formerly quiet, rural roadways (at all times of day and night); road construction throughout the region to access these wells and to repair state roads damaged by the excessive truck traffic; flares, some as loud as jet engines, lighting up the night sky; hundreds of miles of interconnected gas and fluid pipelines; and large, industrial gas processing and compressor stations that can be heard and smelled from miles away. Unlike the construction of an individual factory or plant, fracking threatens the wholesale industrialization of Western Maryland.

[18] RA at 16.

[19] *Id.*

[20] Marie Cusick. "State regulators take a closer listen to gas compressor stations," StateImpact Pennsylvania (Aug. 25, 2014), https://stateimpact.npr.org/pennsylvania/2014/08/25/state-regulators-take-a-closer-listen-to-gas-compressor-stations.

[21] *Id.*

THIS OR THAT

Proponents of fracking have acknowledged that this issue has divided their community, unlike anything they've seen before. The divide will only deepen once fracking begins, and citizens are faced with it's devastation to natural habitats and the rural way of life.

OR

OR

OR

Muddy Creek Falls

Nature without fracking

Local residents boast about their hometown natural landmarks. From Muddy Creek Falls to New Germany State Park, kayaking on the Youghiogeny River, or fly fishing in one of three top rated trout streams. These local treasures are not taken for granted. They are enjoyed by those who call them their own along with hoards of visitors needing to bond with nature.

The natural instinct is to share these natural wonders with guests visiting from outside the county. There's a sense of pride in showing off natures greatest gifts that humble the way of life Garrett Countian's covet.

Garrett County's recycling rate per-capita ranked among the highest in the state, reflecting a respect for the environment from residents. Recycling is not curbside pickup but requires sorting and personal transport to local collections points. A dedication to recycling is just one more example of local attitudes toward the environment.

Rock Maze, Oakland

Deep Creek Lake

Tourism without fracking

Deep Creek Lake welcomes tourist to Garrett County for all four seasons. It's a beacon to those who crave an escape from rural life and urban sprawl. Because of the water's notoriety, the whole region is now referred to as "Deep Creek" by Maryland and Pennsylvania media outlets. Guests enjoy fishing and water recreation on the lake.

The man-made lake was flooded in the 1920's to generate hydroelectric power. The McHenry Dam is still operational and issues controlled water releases to feed into the Youghiogheny River to the delight of kayakers and white water enthusiast in nearby Friendsville. An entire economy has been built around the "lake" to include dining, rental properties, vacation homes, marinas, outfitters, and related services.

The first ski slope in Maryland was built overlooking the majestic lake that firmly freezes over in January and February, allowing ice fisherman to dot the surface.

McHenry

Pleasant Valley

Agriculture without fracking

Agriculture is an important part of Western Maryland's economy and culture. Pleasant Valley is home to multi-generational Amish and Mennonite farm families that continue to farm using traditional methods and horse drawn equipment. Many of them grow organically even though they don't seek certification. They supply fresh farm eggs and meats to local butchers and residents.

The farming traditions are enjoyed by a broader community. On Wednesdays and Saturdays, farmers bring their goods to market in downtown Oakland. It's a vibrant community event that attracts hundreds of weekly shoppers both locally and those visiting Deep Creek Lake.

An array of locally grown produce, baked goods, fruits, dairy, and meat products can all be purchased directly from the growers.

Oakland Farmer's Market

Deer hoof print, Doddridge County, WV

The footprint of fracking

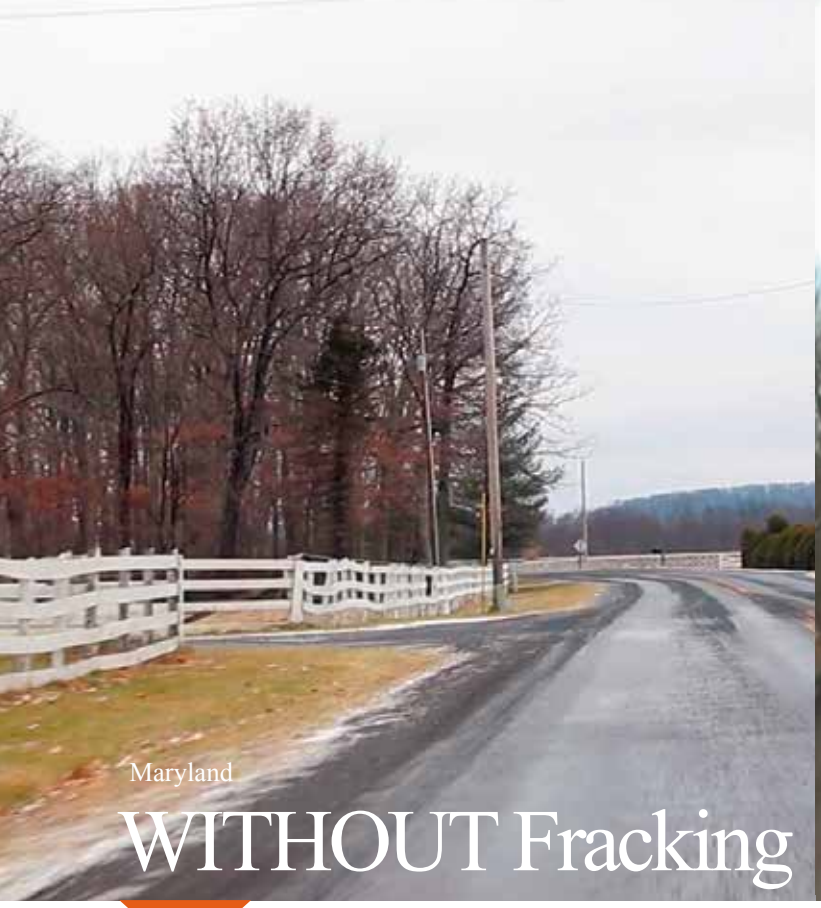
Garrett County is a rural oasis from pollution and noise familiar to urban and suburban settings. Fracking would bring sweeping changes to the landscape and the environment of Western Maryland.

Engage Mountain Maryland hosted two fracking field trips to West Virginia, where fracking consumes small towns. Touring the heavily fracked counties opened eyes to the scale of devastation that accompanies big industry. A more subtle and symbolic image was captured on top of a buried water storage pool. A hoof impression from a deer oozed oily remains from below ground.

Even without the heavy industrial traffic that is required during drilling, the lasting effects of clear-cut landscapes, large-scale infrastructure, compressor stations, and pipeline will remain.

Remarkably, while on a day-long field trip, the group saw only one industry employee drawing water from a depleted stream.

Doddridge County, WV



Maryland

WITHOUT Fracking

Pennsylvania

WITH Fracking

The change from fracking

Changes that come with fracking are no longer a surprise. Neighboring states like Pennsylvania and West Virginia are examples that Maryland can learn from. Instead, the Maryland Department of the Environment has used these states as models for fracking regulations in their proposed regulations.

Our neighbors have been swallowed up by industrialization, loosing masses of irreplaceable natural habitats and assets. Western Marylanders have grave concerns that their key assets, natural beauty, clean air, and fresh water could all be lost or crassly compromised, stripping away what makes the place they call home unique and desirable.

The predictability of an unsustainable fossil fuel extraction industry will eventually fade away taking with it the foundation of an existing sustainable economy centered on outdoor recreation and tourism.

Mobley, WV

III. THE INTERRUPTED DEVELOPMENT OF THESE REGULATIONS

MDE's proposed regulations for fracking reflect the rushed and disjointed process that produced them. It is easy to understand why this proposal reads more like a to-do list than an actual regulatory regime once one understands the process through which the proposal came about. The first draft of these regulations was rushed to press after an electoral surprise at the end of 2014. Since then, almost no changes have been made, except for a handful of targeted alterations that actually *weaken* critical provisions. Despite the fact that over 50% of the science on fracking's impacts has been developed in 2015 and 2016, there is nothing to indicate that recent studies or regulatory advancements have been incorporated or even considered.

Maryland's fracking story begins in 2009, when the first permit applications for unconventional natural gas production were filed in the state.[22] The natural gas market was expanding rapidly at that time, and companies were eager to lease mineral rights wherever drillable shale plays could be found.[23] Between 2006 and 2011, drilling companies secured leases "on roughly a third of Garrett County," totaling approximately 131,000 acres.[24]

[22] MDE, Environmental Matters Committee, *Marcellus Shale Briefing* at 3 (Jan. 17, 2013).

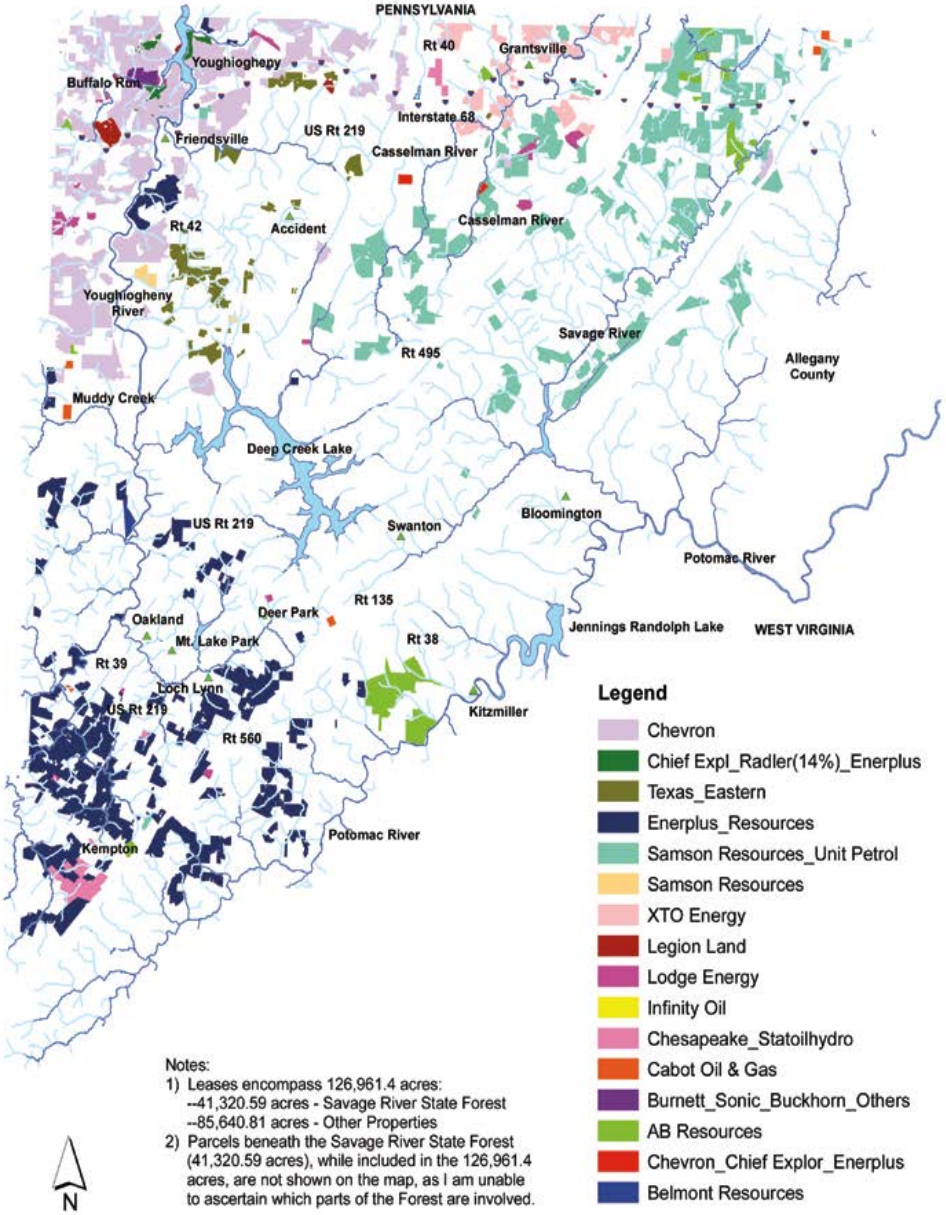
[23] *See id.* at 5 (showing prices in gas market between 2007 and 2011).

[24] Timothy B. Wheeler, "Fracking Debate Intensifies in Western Maryland," *The Baltimore Sun* (Jan. 17, 2015), http://www.baltimoresun.com/features/green/blog/bs-md-fracking-garrett-20150109-story.html.

MARCELLUS SHALE LEASES IN WESTERN MARYLAND

February 2012

Before the fracking moratorium was passed,
gas companies canvased Western Maryland to secure potential drilling sites.



Notes:
1) Leases encompass 126,961.4 acres:
   --41,320.59 acres - Savage River State Forest
   --85,640.81 acres - Other Properties
2) Parcels beneath the Savage River State Forest (41,320.59 acres), while included in the 126,961.4 acres, are not shown on the map, as I am unable to ascertain which parts of the Forest are involved.

MAP SOURCE: GARRETT COUNTY ECONOMIC DEVELOPMENT

Maryland citizens, including many in Western Maryland, pushed back. On June 6, 2011, then-Governor Martin O'Malley signed Executive Order 01.01.2011.11, halting the permitting process for existing leases and starting what became known as the Marcellus Shale Safe Drilling Initiative.[25] The purpose of the initiative was to "assist State policymakers and regulators in determining whether and how gas production from the Marcellus shale in Maryland can be accomplished without unacceptable risks of adverse impacts to public health, safety, the environment and natural resources."[26]

Governor O'Malley's Executive Order acknowledged that, "[a]s the use of hydraulic fracturing has increased, so have concerns about its potential impact on public health, safety, the environment and natural resources." Studying these impacts was consistent with the legislative findings in Maryland's Oil and Gas law, which requires oil and gas drilling be conducted "in a manner that will minimize their effects on the surrounding environment," and has long recognized that "proper evaluation of a project and the use of the most environmentally sound drilling and production methods are necessary to prevent adverse environmental consequences that would be detrimental to the general welfare, health, safety, and property interests of the citizens of the State." Md. Code Ann., Envir. § 14-101 (Legislative Findings). The General Assembly has also recognized that "there are certain circumstances where oil and gas exploration or production should be prohibited, such as when these operations will have a significant adverse effect on the environment." *Id.*

The Initiative was supposed to lay a scientific foundation for any discussion of whether to go forward with fracking and, if so, how to regulate it. The order required a three-phase study to evaluate: (1) the need for legislation to establish a revenue source or standards of liability; (2) best practices for unconventional natural gas production in Maryland; and (3) a final report to assess the risks of unconventional natural gas production in Maryland. Unfortunately, these studies were conducted at a time when the impacts of fracking were poorly understood. They were largely completed prior to the dramatic expansion in scientific research and the explosion of scientific papers published in 2014, 2015, and 2016. Although it has now been years since

[25] MD Department of Legislative Services, *Executive Orders 2011* at 28, http://mgaleg.maryland.gov/Pubs/LegisLegal/2011-executive-orders.pdf.

[26] *Id.* at 31.

Maryland completed its studies, none of them have been revisited to incorporate this recent science.

Phase one of the Safe Drilling Study was completed in December 2011. Phase two was completed in July 2014. Many of the regulatory ideas MDE adopted in its phase two study were based on "best management practices" recommended by two scientists from the University of Maryland Center for Environmental Science's Appalachian Laboratory in a study they published on February 18, 2013 ("the Appalachian Lab Study").

The regulatory process was interrupted by the November 2014 gubernatorial elections. Governor O'Malley's Democratic successor was opposed by the unapologetically pro-fracking Larry Hogan. During the election, Hogan referred to the Safe Drilling Initiative as intentional foot-dragging and called fracking an "economic gold mine."[27] On November 4, 2014, Hogan won the election, casting sudden uncertainty on MDE's regulatory plans.

Little time remained for O'Malley's administration to ensure Western Marylanders would receive protection from the negative impacts of fracking. On December 19, 2014, MDE published the final version of phase three, the impact assessment. Then, on January 9, 2015 – about two weeks before leaving office, and only two months after the election – the O'Malley administration pushed out a last-minute set of proposed fracking regulations. The final risk assessment that MDE was working on, to study risks that would remain if *all* of the proposed best management practices were implemented, had not even been completed yet and was published about two weeks later, on the day before O'Malley left office.[28]

The January 9th proposal was full of filler provisions and placeholders—vague statements, promises to fill in parts later, and invitations to the oil and gas industry to self-regulate. In many cases, O'Malley's proposed regulations *discussed* key issues but did not actually establish concrete standards or protective requirements. Instead, the proposal relies on standards like "rigorous" leak detection and "more frequent" monitoring, terms that sound strict,

[27] "'There you go again': How Brown and Hogan did in the last debate," *Maryland Reporter* (Oct. 19, 2014), http://marylandreporter.com/2014/10/19/there-you-go-again-how-brown-and-hogan-did-in-the-last-debate.

[28] RA. Importantly, the Risk Assessment did not quantity any of the risks and made myriad assumptions to fill in the blanks left by the vague best management practices it was assessing. For example, the Risk Assessment never specified what control technologies it was assuming companies would use to limit air emissions when it assessed the risks related to air pollution. For one critique of the RA, *see Comments from Kate Konschnik, Environmental Policy Initiative, to Brigid Kenney, MDE RE: Risk Assessment* (Nov. 11, 2014), http://environment.law.harvard.edu/wp-content/uploads/2015/08/review-maryland-marcellus-shale-risk-assessment.pdf.

but that are likely to be difficult or impossible to enforce in practice, because they are too indefinite.

When Governor Hogan took office, he halted the regulatory process. The reason we have a regulatory proposal today is because, in response to the Hogan administration, Maryland's General Assembly enacted a two-year moratorium on fracking that required MDE to complete regulations by October 1, 2016.[29] Although this gave MDE a year and a half to finish the regulatory work started by the O'Malley administration, it appears little was done until this past summer. At that point, the agency announced plans to *weaken* four key aspects of the O'Malley proposal, while leaving the rest of the proposal essentially unchanged.[30] As we explain in detail below, especially in section V of these comments, none of the filler provisions were updated with meaningful requirements. None of the vague and undefined requirements were defined or replaced with specifics. No guidance was issued to fulfill the promises MDE had made in its initial proposal.

IV. THE REGULATIONS IGNORE ALL RECENT SCIENCE ON FRACKING

Public understanding of the safety risks posed by fracking has grown dramatically in recent years. At the time MDE's studies were completed, relatively little was known about fracking's impacts. New York State, which was also studying fracking at the time, concluded that too little was known about the impacts of fracking and too many dangers were present for the state to go forward with the practice.[31]

Today, "more than 80 percent of all of the peer-reviewed literature that is relevant to assessing the environmental, socioeconomic, and public health impacts of shale and tight gas development has been published since January 2013."[32] The charts below illustrate the explosion

[29] *See* Md. Code § 14-107; *see also* Md. Laws Chs. 480, 481.

[30] MDE, *Issue Papers for Stakeholder Input* (June 2016) (*hereinafter* "Issue Papers"), http://www.mde.state.md.us/programs/Land/mining/marcellus/Documents/Issue_Papers_Combined.pdf.

[31] New York State Department of Health, *A Public Health Review of High Volume Hydraulic Fracturing for Shale Gas Development* (Dec. 17, 2014), http://www.health.ny.gov/press/reports/docs/high_volume_hydraulic_fracturing.pdf. In the words of New York State Health Commissioner Dr. Howard Zucker, "[I]t is clear from the existing literature and experience that HVHF activity has resulted in environmental impacts that are potentially adverse to public health. Until the science provides sufficient information to determine the level of risk to public health from HVHF and whether the risks can be adequately managed, HVHF should not proceed in New York State."

[32] Concerned Health Professionals of New York & Physicians for Social Responsibility, *Compendium of scientific, medical, and media findings demonstrating risks and harms of fracking (unconventional gas and oil extraction)* (4th ed.) at 4 (Nov. 17, 2016) (*hereinafter* "Compendium"), http://concernedhealthny.org/compendium.

of scientific knowledge over the past few years. Nearly one-quarter of the now more than 900 available studies were published in just the first nine months of 2016.[33]

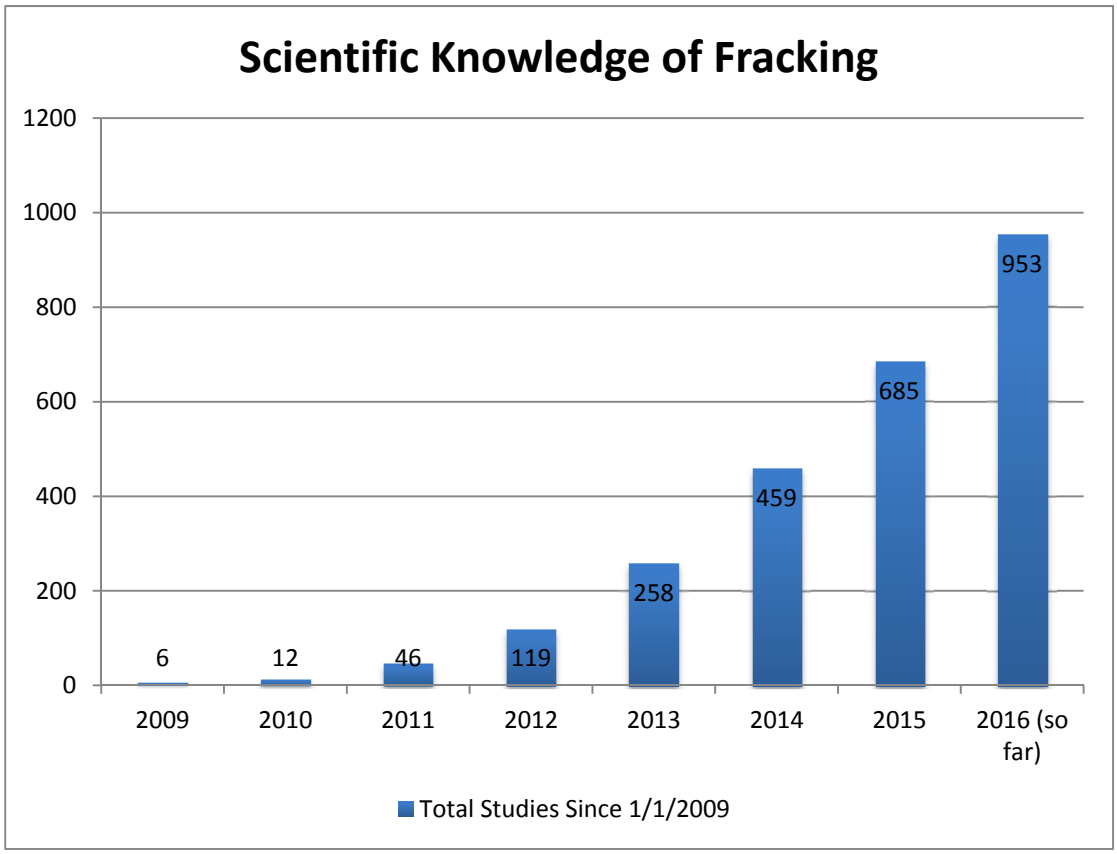


Figure 1: PSE Healthy Energy, *PSE Study Citation Database*, http://www.psehealthyenergy.org/site/view/1180; *see also* Jake Hays and Seth Shonkoff, Toward an Understanding of the Environmental and Public Health Impacts of Unconventional Natural Gas Development: A Categorical Assessment of the Peer-Reviewed Scientific Literature, 2009-2015, *PLOS One* (April 20, 2016), http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0154164.

Since the start of 2015, when the O'Malley proposal was released, there have been approximately 494 studies published, or just over 50% of all studies. Almost <u>all</u> of the studies were completed after the time the best management practices (which this current regulatory proposal is still based on) were recommended by the Appalachian Lab Study in February 2013.

[33] Compendium at 4.

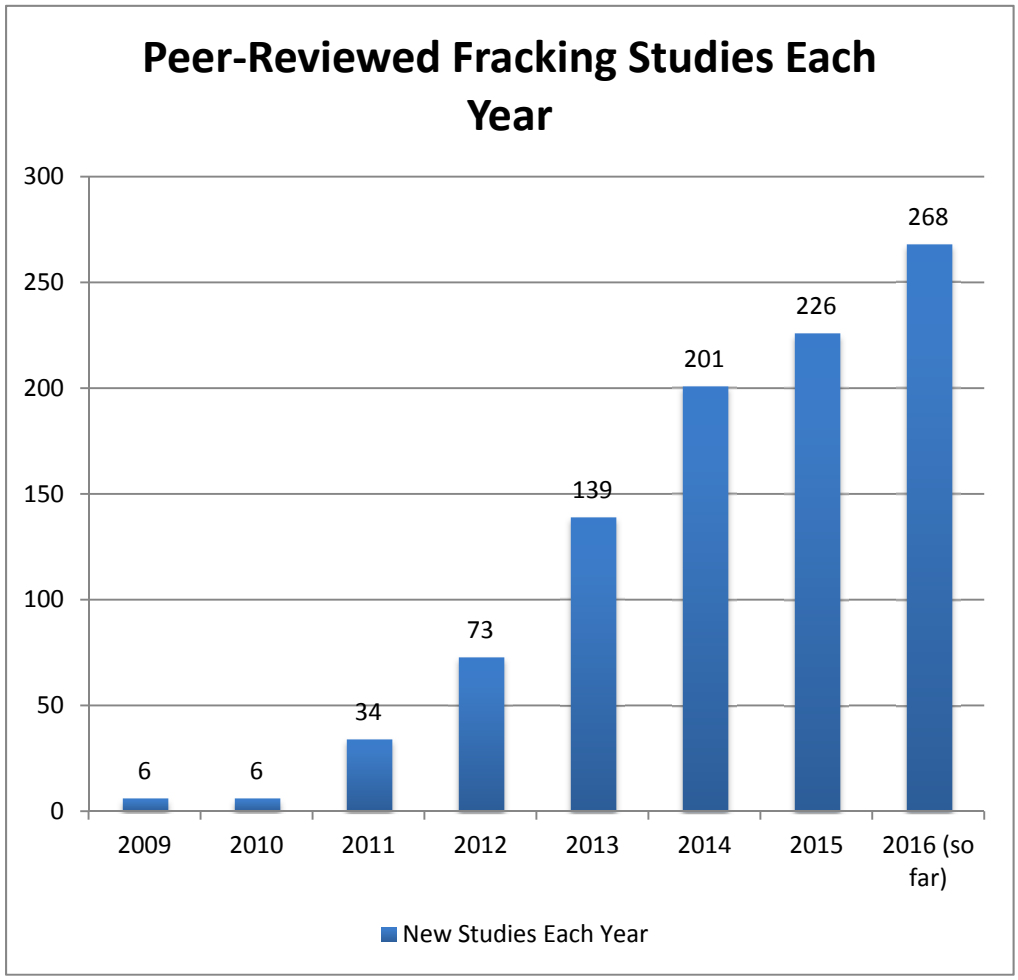


Figure 2: PSE Healthy Energy, *PSE Study Citation Database*, http://www.psehealthyenergy.org/site/view/1180; *see also* Jake Hays and Seth Shonkoff, Toward an Understanding of the Environmental and Public Health Impacts of Unconventional Natural Gas Development: A Categorical Assessment of the Peer-Reviewed Scientific Literature, 2009-2015, *PLOS One* (April 20, 2016), http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0154164.

The current proposal fails to take account of these recent scientific developments, which overwhelmingly counsel against authorizing fracking. A late-2015 review of the published, peer-reviewed literature concluded that "69 percent of original research studies on water quality found potential for, or actual evidence of, water contamination; 87 percent of original research studies on air quality found elevated air pollutant emissions; and 84 percent of original research studies on human health risks found signs of harm or indication of potential harm."[34] Every year, it

[34] Compendium at 4 (citing Jake Hays and Seth Shonkoff, Toward an Understanding of the Environmental and Public Health Impacts of Unconventional Natural Gas Development: A Categorical Assessment of the Peer-

becomes increasingly clear that fracking is dangerous to human health and safety, despite many states' attempts to regulate it.

V. SPECIFIC IMPACTS OF FRACKING AND MDE'S FAILURE TO CONTROL THEM

MDE's proposal reads like a to-do list, not a true regulatory proposal. Using undefined and broadly ambiguous terms like "safely," "more frequent," and "periodic" the agency avoids setting any meaningful or enforceable standards. In other places, the proposed regulations do not even go this far and offer only a promise that MDE will, at some point in the future, come up with standards or guidance to address a key issue. These promises were initially made back when O'Malley's midnight proposal was rushed out, but MDE still has not followed through. In many key respects, the regulations empower the oil and gas industry to regulate itself, asking industry to develop its own plans that "consider" certain factors but otherwise can be whatever industry desires. As the many examples that follow will show, these regulations give residents no assurances whatsoever that Western Maryland will be protected.

A. The Proposed Regulations Provide No Assurances of Community-Level Protection

When MDE and the Maryland Department of Natural Resources ("MDNR") examined the risk to Western Maryland's people and environment, they relied on the Comprehensive Development Plan ("CDP") provisions of the O'Malley proposal to provide protections to communities impacted by fracking. The CDP was supposed to be the key bulwark against over-industrialization, environmental harms, and other community-level impacts, and MDE recognized that a strong CDP requirement was particularly important to address landscape-level impacts and cumulative impacts. In MDE's current proposal, however, the CDP has become essentially advisory and no longer even needs to be approved by either MDE or MDNR.

The CDP requirements ask companies to forecast their development plans five years into the future and submit a plan that will "avoid, to the extent possible, the surface impacts associated with the applicant's planned development, minimize the surface impacts that cannot be avoided, and mitigate the remaining impacts." 43 Md. Reg. 1293, 1301 at § .12. Unfortunately, there are few actual constraints on what a company's plan looks like. The CDP must be submitted for comments to the public and to certain state and local agencies, but all the

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Reviewed Scientific Literature, 2009-2015, *PLOS One* (April 20, 2016), http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0154164).

company needs to do is "consider" each comment. 43 Md. Reg. 1302 at § .13(F)(1). Companies do not need to respond to the comments or explain why they chose to disregard them. Even comments from agencies carry no weight. The company "may" make changes to the draft CDP, or it may not. *Id.* at § .13(G). Then the company "shall publish the final CDP on its website", before even submitting its drilling application to MDE. *Id*. at § .13(H). No agency approval is needed for the CDP.

Moreover, the CDP is undermined by its own exceptions. The point of the CDP is to predict community-scale impacts and give the public and government some input into development planning. Unfortunately, the first wells to be drilled throughout the region are likely to be exploratory wells (also known as "wildcat wells") and these are exempt from the CDP requirement. 43 Md. Reg. 1305 at § .22(A). Once these wells are drilled, they will operate as a foot in the door because, with horizontal drilling, it is much more efficient to share well pads instead of building new ones for each well. Companies will have every reason to place additional wells in whatever location was already selected for the exploratory site – a decision made prior to the CDP.

Additionally, because exploratory wells are often not connected to any pipeline infrastructure when first built, if they "succeed" and hit gas then they can produce flares for up to 30 days while the escaping gas is burned to reduce certain air pollutants while creating others. 43 Md. Reg 1311 at § .47. Flares can be as loud as jet engines and will light up the night sky for miles around.

Furthermore, even though operators get to write their own CDPs, there are major exceptions to the requirement to follow them. First, while the CDP need only address five years of operations, they remain effective for ten years, meaning that operators can engage in five years of unplanned oil and gas development. In addition, operators are free to drill additional wells and change the order and timing of well construction without any public process except posting the change on their website and notifying MDE. 43 Md. Reg at § .13(I).Overall, the CDP provisions in the proposal will do little to actually constrain how industry behaves or to ensure the peace and safety of Western Marylanders living near fracking activities.

The other critical parts of MDE's proposed regulations for protecting the environment have received even less attention from the agency. The environmental assessment and baseline

monitoring requirements are illustrative of the fill-it-in-later approach that MDE adopts throughout its proposal.

Environmental assessments and proper baseline monitoring are critical for understanding the potential impacts of a gas-drilling project and properly planning to avoid and mitigate those impacts from the beginning. They must be carefully planned with an understanding of the types of problems that will likely occur, so that the right data is available to detect those problems and to prevent or repair them, if possible.

Instead, MDE's proposal simply states that MDE "shall develop guidance for the environmental assessment and the baseline monitoring, including sampling design, monitoring protocols, quality assurance and quality control criteria, and specifications for analysis and data submission." 43 Md. Reg. 1304 at § .19(C). No meaningful regulation is provided at all, and the baseline monitoring described is limited to water monitoring (omitting air quality). The eventual guidance needs to address common aspects of any monitoring plan or assessment – "sampling design," "monitoring protocols," and so on – but the regulations do not specify any specific criteria for these components that would establish a particular *level* of data quality (*e.g.*, no minimum number of monitors, minimum number of samples, etc.). *Id.*

MDE does require that environmental assessments minimally include a "discussion and evaluation of the possible ecological, aesthetic, historic, cultural, economic, social, or health impacts of the planned drilling and operating activity." 43 Md. Reg. 1297 at § .02(B)(27). Without any guidance yet proposed on *how* the gas industry should go about considering such factors, Western Marylanders have little assurance that these values will truly be protected. A successful environmental assessment also depends on proper baseline monitoring and evaluation of the area, and thus requires well-developed regulations defining the baseline monitoring process.

As it stands, the regulations do not even mention *what* the baseline monitoring would test for. Presumably the promise of future "guidance" is intended to address these concerns, but MDE has not yet developed guidance and it is unclear whether they have even thought about what such guidance would look like. These are critical questions and cannot be deferred, because the answer depends on a careful and scientific evaluation of the risks posed by fracking. The only changes that MDE has made since the O'Malley proposal are: (1) to *reduce* the required timeframe for baseline monitoring to one year, despite the Department of Natural Resources

explaining that two years of data are necessary to account for annual variations;[35] and (2) to *remove* the requirement that baseline monitoring include air data, the importance of which shall be discussed in the following section on health impacts.

In short, MDE has kicked the can down the road and failed to actually develop regulations to govern two of the most important parts of this regulatory proposal for ensuring environmental protection during fracking development. The agency's proposals for baseline monitoring and environmental assessments are, at best, no more than placeholders. The CDP, for its part, has become merely advisory and gives neither the public nor the government any ability to ensure that fracking development be rational and consistent with other uses or to control industrial fracking development in any way.

B. Impacts to Western Maryland's Rural Character

Garrett County has little ability to protect itself from community level impacts, especially because it lacks zoning authority.[36] Throughout its regulatory process, MDE has assumed zoning is a local matter and that counties with fracking can use zoning to protect their interests. This is not so in Garrett County. The CDP program is thus essential, yet, as explained above, is at best an advisory requirement following the Hogan Administration's revisions. The CDP no longer needs to be approved by MDE or DNR and companies have complete discretion whether or not to make changes in response to comments received from these agencies or from the public. 43 Md. Reg. 1301-1302 at § .13. In addition to the environmental impacts described above, residents of Western Maryland will face significant changes to their quality of life due to truck traffic, noise, and the development of other gas-related infrastructure throughout the region.

1. Truck Traffic

[35] *See* MDE, Marcellus Shale Safe Drilling Initiative Study Part II Interim Final Best Practices at 50 (July 2014) (*hereinafter*, "Rept. II") ("DNR emphasizes that a minimum of 2 years of pre-development baseline data is necessary to evaluate the condition and characteristics of aquatic resources, particularly the living resources, since statewide monitoring experience demonstrates there is great variability on a seasonal and annual basis.").

[36] Zoning is used by counties around the country to limit where industrial activities can take place, or to control the nuisances of industrial activity such as noise and light pollution. Zoning is essential for protecting the character and quality of life of a community when industrial activities are proposed. Only the few and far-between incorporated municipalities in the county have any ability to restrict the spread of fracking within their borders. Otherwise, Garrett County is at the whim of industry and will be unable to protect its bucolic charm from piecemeal industrialization.

Of critical concern is truck traffic. Thousands of truck trips means that key roads will suffer extremely heavy and persistent traffic, with tremendous noise and air pollution impacts as a result. The roads in Garrett County do not have sound walls like major highways. The local roads in Garrett County are designed for low traffic volumes and thus, will likely experience significant damage from truck traffic.[37] Large state roads may be built to sustain truck traffic, but local roads are not.[38] However, even the large state roads that may already exist in parts of the region are not typically designed to handle thousands of heavy truck trips, and can suffer damage from the increased truck traffic that fracking operations will bring to the area.[39] A New York study analyzing fracking's impacts on rural communities noted that road damage "could range from minor fatigue cracking (i.e., alligator cracking) to significant potholes, rutting, and complete failure of the road structure," and that the extra truck traffic "would also result in extra required maintenance for other local road structures, such as bridges, traffic devices, and storm water runoff structures."[40]

Road maintenance, repair, and upgrading will put a significant strain on county budgets. Already, road work and road maintenance eat up a large percentage of Garrett County's revenues, crowing out other needs like education, public safety, and economic diversification initiatives. "Public works," which is mostly road-related expenditures, represents almost 21% of the county budget, and roads are the biggest line item in the "capital projects" category, which makes up another 4.5%.[41] Even if money is found to improve and maintain roads, the road infrastructure needed to support the oil and gas extraction process will mean significant construction and land use changes, increasing forest loss and creating sediment pollution.[42]

Further, there is a significant risk of accidents and spills during transport and unloading.[43] MDE's proposals for limiting the risks inherent in using thousands of heavy-duty truck trips to

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[37] RA at C-6.

[38] *Id.*

[39] *Id.*

[40] New York State Department of Environmental Conservation, *Final Supplemental Generic Environmental Impact Statement* at 6-313 (2015), http://www.dec.ny.gov/docs/materials_minerals_pdf/fsgeis2015ch6b.pdf.

[41] Garrett County Government, Fiscal Year 2016 Budget (June 16, 2015), https://www.garrettcounty.org/resources/commissioners/pdf/Budgets/budget16/FY16-Approved-Budget.pdf.

[42] RA at C-11.

[43] RA at D-5; *see also* "Contamination in North Dakota linked to fracking spills [press release]," *Duke University Nicholas School of the Environment* (April 27, 2016), https://nicholas.duke.edu/about/news/ContaminationinNDLinkedtoFrackingSpills (detailing widespread water and soil contamination due to accidental spills); Brian Drollette & Desiree Plata. "Hydraulic fracturing components in

transfer chemicals and water are all conditioned on whether or not the requirements are "practicable." *See* 43 Md. Reg. 1307 at § 33(C). In other words, these are not firm requirements, but invitations to the oil and gas industry to weigh health and safety against the inconvenience and cost they might impose on industry. For instance, one option is "[i]mproving the roads to be used so that damage to the roadways is minimized." *Id.* at § .33(C)(2). This should be a requirement, not a suggestion. The maintenance and repair costs that the county will endure are considerable, and MDE needs to propose an effective means to ensure that leasing companies pay these costs and not the county.

Some of the options for reducing truck traffic are presented as little more than thought experiments. For instance, one subsection states that "[i]f proven to be safe and effective and to have less impact" a company could reduce truck impacts by establishing a centralized facility to prepare, mix, and pressurize fracturing fluid (with noise and air pollution controls) and then could deliver the water, proppant, and additives to the well pad via pipes. *Id.* at § .33(C)(4). This sounds promising, but is an admission on its face that MDE has no idea whether this would actually be "safe," "effective," or have any "less impact" than other options.

MDE's task was study the impacts itself and then propose concrete regulations based on scientific evidence showing what the most protective and effective requirements would be. This proposal makes clear that the agency has failed in its task.

2. Noise

As anyone living in a state where fracking takes places will tell you, the noise from drilling activities and fracking operations is considerable. As discussed above, the noise from fracking-related infrastructure, like compressor stations, can be even worse and can persist for many years.

MDE's proposal requires drilling companies to "reduce noise to the lowest practicable level," but neglects to define what such a level would be. 43 Md. Reg. 1311 at § .48(A). Without setting a numeric standard, this requirement will be difficult, if not impossible, to enforce. The noise regulations also require operators to come up with another "plan." The noise plan must result in the "lowest practicable noise impact" from the choice of energy source, and the operator

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Marcellus groundwater likely from surface operations, not wells," *The Conversation* (Oct. 12, 2015), http://theconversation.com/hydraulic-fracturing-components-in-marcellus-groundwater-likely-from-surface-operations-not-wells-48873 (describing study showing that chemicals detected in groundwater wells were due to spills at the ground surface, not from transport from deep shale formations).

must use and maintain "appropriate" noise reduction devices on all equipment. MDE defines neither "practicable" nor "appropriate," leaving industry with discretion to fill in the blanks.

The noise from truck traffic will also be substantial, but MDE does not regulate this directly. Like many states, Maryland has standards for vehicle noise in place but these are not designed to protect rural communities from the noise of heavy-duty truck traffic going past their homes. These are the same standards that apply to highway traffic and all other traffic in the state, and provide no special consideration for the thousands of truck trips passing rural homes in communities where fracking will take place.

3. Compressor Stations, Processing Facilities, and Waste Water Treatment Plants

MDE's proposed regulations do not in any way address compressor stations or processing facilities. The regulations also fail to address centralized water and chemical facilities, despite mentioning these possibilities in the proposed trucking regulations discussed above. Thus, the regulations cannot protect communities from the noise, smells, or industrial sprawl generated by these types of facilities.

C. Impacts to Western Maryland's Economy

MDE's regulations are unable to provide any protection to the economy of Western Maryland. It is also notable that MDE's economic analysis in the preface to these proposed regulations ignores the real impacts of fracking. Instead, MDE presumes fracking will take place and frames the regulations as having only a positive impact on affected communities, relying perhaps on the theory something is better than nothing. Yet by ignoring the real impacts of their decision to allow fracking to go forward, MDE sets itself up for failure by drafting regulations that fail to address many of the economic impacts fracking is known to have on rural communities. Garrett County is particularly vulnerable to fracking's economic impacts due to its unique reliance on tourism and on property taxes from the Deep Creek Lake area.

Fracking, like many extractive industries, follows a "boom and bust" process in rural communities.[44] Due to the pace of extraction, fracking's boom can be especially short-lived, while it is still followed by a long and painful bust. Many workers come from out of state to regions that are starting to frack, quickly driving up housing prices and displacing residents and

[44] Rept. III at 72.

tourists. In many cases, job growth from drilling mostly benefits non-local workers.[45] Studies have shown that such rapid population shifts can increase crime and drug abuse within rural communities ill-equipped to handle them. Once well construction activities slow, however, few jobs remain for fracking workers and many leave the area. The "vast majority of employment generated" by natural gas extraction is concentrated in the drilling phase, and is short-lived.[46] Left in the wake of these workers is empty housing, a local economy that suddenly has far fewer customers, and environmental damage and disruption that will forever decrease the region's attractiveness to the tourists and visitors that once sustained its economy.

1. Tourism and Fracking

Tourism, an industry premised on the region's natural beauty, tranquility, and distance from industrial disturbances like fracking, is a primary economic driver in Garrett County. Over 1.2 million tourists come to Garrett County each year.[47] Tourism in Garrett County takes the form of both a second-home and rental market around Deep Creek Lake and also diverse eco-tourism and nature-based businesses like lodges, kayaking trips, hunting and fishing activities, and so on. Over half of the county's budget is generated by property taxes near Deep Creek Lake.[48] A majority of sales tax revenue in the area is also generated by tourism, and the top two industry sectors in Garrett County in terms of employment are retail trade and accommodation and food services, both hallmarks of a tourist-rich economy.[49] Tourism is driving economic growth in the region, as well. The economic impacts study commissioned by MDE noted that in 2012-2013, tourism-induced sales tax revenue increased 6.3 percent in Garrett County and 7.3 percent in Allegany County, while statewide sales tax revenue increased only 0.8 percent.[50] In July, August, and September of 2016, tourism sales tax revenues in Garrett County grew 5.8%

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[45] *See, e.g.*, Andrew Rumbach, Natural Gas Drilling in the Marcellus Shale: Potential Impacts on the Tourism Economy of the Southern Tier at 24, http://www.fe.doe.gov/programs/gasregulation/authorizations/2013_applications/sc_economic_impact_13_161_LNG_9_29_14/Ex_20_STC_RumbachMarcellusTourism.pdf; *see also* Rept. III at 72 (discussing how to handle the "influx of workers").

[46] Andrew Rumbach, Natural Gas Drilling in the Marcellus Shale: Potential Impacts on the Tourism Economy of the Southern Tier at 24, http://www.fe.doe.gov/programs/gasregulation/authorizations/2013_applications/sc_economic_impact_13_161_LNG_9_29_14/Ex_20_STC_RumbachMarcellusTourism.pdf.

[47] Garrett County, *Tourism and Recreation*, http://www.gcedonline.com/tourism-recreaction (last visited Dec. 14, 2016).

[48] RESI at 28.

[49] RESI at 28.

[50] RESI at 80.

while the rest of Maryland only saw a growth of 3.0%.[51] Garrett County's lodging sales tax revenue collections grew 7.8% during this time, while the rest of Maryland grew only 5.5%. Similar growth occurred during the previous fiscal year as well.

Tourists are currently drawn to Garrett County because of its scenic beauty, natural areas, and rural charm. The introduction of fracking to the region and the concomitant environmental stressors will change the face of the region, as well as its reputation. The tourism industry will suffer, and Garrett County will suffer with it.[52] The ongoing noise and light pollution from fracking activities, the extensive truck traffic, the smells from diesel engine fuel used by the trucks and on the well pads, and the towering drilling rigs would ruin the picturesque landscape tourists seek out. As spills and other accidents occur, too, resultant news stories will ruin the region's reputation, undermining the appeal to potential visitors. At the same time, while the influx of a large migrant workforce will increase demand for hotel rooms, it will hurt other local businesses as recreation seekers and tourists will have a difficult time finding affordable accommodations.[53] Drilling phase workers are unlikely to purchase homes or avail themselves of long term accommodations, given the transitory nature of their work. As a result, "even a few thousand workers can overwhelm the carrying capacity of rural communities and quickly tie up hotel rooms," even in much larger cities.[54] While MDE has acknowledged this problem, it has not proposed any solutions.[55] A sudden lack of accommodations for tourists and visitors will starve many local businesses in Garrett County of the typical clientele they depend on for revenue.

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[51] Deep Creek Vacations, *Deep Creek Lake, Garrett County, Maryland Experience Highest Tourism Revenue in State*, http://www.ilovedeepcreek.com/jays-blog/deep-creek-lake-garrett-county-maryland-experience-highest-tourism-revenue-state (last visited Dec. 14, 2016).

[52] S. Christopherson & N. Rightor. How shale gas extraction affects drilling localities: Lessons for regional and city policy makers. *Journal of Town & City Management* at 12-13 (2011),http://greenchoices.cornell.edu/resources/publications/drilling/Effects_on_Drilling_Localities.pdf. *See also* T.B. Kellison, et al. Fracking & parkland: Understanding the impact of hydraulic fracturing on public park usage (2015), http://plaza.ufl.edu/tkellison/_/Fracking.html.

[53] Rept. III at 72; *see also* S. Christopherson & N. Rightor. How shale gas extraction affects drilling localities: Lessons for regional and city policy makers. *Journal of Town & City Management* at 11 (2011),http://greenchoices.cornell.edu/resources/publications/drilling/Effects_on_Drilling_Localities.pdf

[54] Andrew Rumbach, Natural Gas Drilling in the Marcellus Shale: Potential Impacts on the Tourism Economy of the Southern Tier at 10, http://www.fe.doe.gov/programs/gasregulation/authorizations/2013_applications/sc_economic_impact_13_161_LNG_9_29_14/Ex_20_STC_RumbachMarcellusTourism.pdf.

[55] *See e.g.*, Rept. III at Part M.

The Heritage Area Management Plan adopted for Garrett County confirms the importance of scenic values, natural areas, and tranquility for Western Maryland's future economic development. The approved plan, which has a goal of "enhancing preservation and developing heritage tourism infrastructure" in order to promote "economic development related to heritage tourism," recognizes that "[v]isitors to Garrett County come to experience the wild regions of Western Maryland and the County is one of the State's premiere sites for eco-tourism."[56] It also recognizes that Garrett County's "natural resources and scenic viewsheds" are a "primary draw" to the area, "highlighting the need for protection so that they can be enjoyed by future generations."[57] MDE's decision to authorize fracking throughout Garrett County, including within this Heritage Area, and MDE's failure to adopt stronger protections, are inconsistent with the objectives of the Heritage Area and with the approved management plan.

2. Property Values

Property values would also be negatively impacted if fracking proceeds in Western Maryland, a severe risk to Garrett County which is heavily dependent on property taxes for its revenue. In a testament to the long-lasting deleterious effects of creating gas drilling infrastructure, one study contracted by MDE noted that property values *still* suffer by 7-8% for homes within a half-mile of fifty-year-old *conventional* gas wells in the region that have long since been plugged and abandoned.[58] Modern well infrastructure is even more disruptive.

More recent studies have estimated that the mere *threat* of fracking within one mile can reduce the value of ground-water dependent homes (which include many in Garrett County) by up to 24%.[59] Other studies have also shown significant net losses in property value, even when factoring in the value of potential lease payments, ranging from 6.5% losses within 1.5 kilometers of a wellpad to 13.9% losses within 1 kilometer.[60] Even putting aside its impact on

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[56] Garrett County Heritage Area Management Plan Steering Committee, *Garrett County Heritage Area Management Plan* (June 2011), https://www.garrettcounty.org/resources/planning-land-development/pdf/Comprehensive%20Planning/HeritageAreaMgtPlan%202011_FINAL.pdf.

[57] *Id.*

[58] RESI at 56.

[59] Lucija Muehlenbachs, et al. The Housing Market Impacts of Shale Gas Development, *American Economic Review* (Dec. 2015), "9 Things That Will Trash Your Home's Value," *Business Insider*, http://www.businessinsider.com/what-hurts-home-value-2013-5#just-the-threat-of-fracking-drives-home-values-down-by-24-6; Sean Cockerham, "Fracking can hurt property values of nearby homes with wells, study suggests," *McClatchy DC* (Nov. 6, 2012),http://www.mcclatchydc.com/news/nation-world/national/article24739855.html.

[60] Lucija Muehlenbachs et al., *The Housing Market Impacts of Shale Gas Development*, AMERICAN ECONOMIC REVIEW, 2015, 105(12): 3633–3659, *available at* http://pubs.aeaweb.org/doi/pdfplus/10.1257/aer.20140079.

the county's revenues, declining property values can have severe and direct impacts on individuals and families. For many people, their homes represent the largest share of their personal wealth and declining home values can significantly impact their financial wellbeing.

D. Health Impacts to Residents of Western Maryland

Residents of Western Maryland living near fracking operations "will be exposed to multiple chemical hazards . . . physical hazards (noise, radiation), and a host of psychosocial stressors including those related to public safety, potential loss of property values, disruption and division of existing social fabric, crime, among others."[61] MDE's proposed regulations will not protect the people of Western Maryland from these impacts. Many of the greatest impacts from fracking will be felt most directly by those people in Western Maryland who live near well pads and fracking infrastructure and by the few local workers able to find employment during the short boom phase of gas development.

In many cases the residents exposed will be those living on adjacent tracts of property who have no say in the conduct of the industrial operations next door, but who must live daily with the toxic air emissions, constant risk of water contamination or explosions, and the ongoing industrial commotion and noise that will be taking place next to their formerly-tranquil homes. For the few Western Marylanders able to find temporary employment in the oil and gas industry, the risks will be substantial since gas field workers are on the front lines when it comes to toxic exposures and have some of the highest fatality rates in the nation.

The range of health impacts that could result from fracking are of significant concern to the residents of Western Maryland. To give a brief overview, fracking operations have been associated with increased rates of cancer and numerous other health harms for nearby residents. A recent study by the Yale School of Public Health confirmed that "numerous carcinogens involved in the controversial practice of hydraulic fracturing have the potential to contaminate air and water in nearby communities."[62] Many of the chemicals used during the fracking process are endocrine-disrupting chemicals, which have been shown to disturb hormone function in both

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[61] University of Maryland School of Public Health, *Potential Public Health Impacts of Natural Gas Development and Production in the Marcellus Shale in Western Maryland* at xxiv (July 2014) (*hereinafter*, "HIA").

[62] Denise Meyer, "Fracking Linked to Cancer-Causing Chemicals, New YSPH Study Finds," *Yale School of Public Health* (Oct. 24, 2016), http://publichealth.yale.edu/news/article.aspx?id=13714; Elise Elliott et al. Unconventional oil and gas development and risk of childhood leukemia: Assessing the evidence, *Science of the Total Environment* (Oct. 23, 2016), http://www.sciencedirect.com/science/article/pii/S0048969716322392.

males and females.[63] Exposure to endocrine disruptors is particularly harmful during pregnancy and fetal development as even a low-level of exposure at this stage has been linked to birth defects in newborns.[64] Additionally, pregnant women who reside near active fracking operations in Pennsylvania were found to have a forty percent higher risk of giving birth prematurely and a thirty percent increased chance of having their pregnancy labeled "high-risk" by their obstetrician.[65] Fracking operations are also correlated with an increase in asthma attacks, which has been attributed to the air pollution and stress that comes from proximity to these operations.[66] A study from the Johns Hopkins Bloomberg School of Public Health linked severe fatigue and migraine headaches to fracking operations.[67] Increased rates of hospitalization are also associated with the arrival of fracking activities.[68] When New York State was evaluating whether to allow fracking, the likelihood that adverse health outcomes would occur with the onset of fracking and the uncertainty that mitigation measures could actually be effective led the Health Commissioner to recommend that fracking not be allowed in New York at all.[69]

One of the most important regulatory mechanisms for reducing health impacts to residents is the setback requirement. MDE has proposed a setback of 1,000 feet from occupied

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[63] "Fracking chemicals exposure may harm fertility in female mice" [press release], Eurekalert (Aug. 25, 2016), https://www.eurekalert.org/pub_releases/2016-08/tes-fce081916.php (describing study that found a link between "chemical exposure and adverse reproductive and developmental outcomes in female mice" even in mice exposed to the lowest dose of chemicals); Endocrine Society. "Fracking chemicals tied to reduced sperm count in mice," *ScienceDaily* (Oct. 14, 2015), https://www.sciencedaily.com/releases/2015/10/151014134533.htm (describing study that found that male mice exposed to chemicals commonly used in fracking operations had reduced sperm counts and elevated levels of testosterone in their blood, which "may have implications for the fertility of men living in regions with dense oil and/or natural gas production.").

[64] Mary Ann Mercer. "Are We Fracking Away Our Health?" *The Huffington Post* (Oct. 27, 2016), http://www.huffingtonpost.com/mary-anne-mercer/are-we-fracking-away-our-_b_12675264.html.

[65] "Study: fracking industry wells associated with premature birth," *Johns Hopkins Bloomberg School of Public Health* (Oct. 8, 2015), http://www.jhsph.edu/news/news-releases/2015/study-fracking-industry-wells-associated-with-premature-birth.html.

[66] L. Song and N. Kusnetz. "Increased asthma attacks tied to exposure to natural gas production," *Inside Climate News* (July 18, 2016), https://insideclimatenews.org/news/18072016/asthma-study-marcellus-shale-pennsylvania-natural-gas-fracking.

[67] Deirdre Fulton. "Fatigue, Migraines Linked to Fracking as Case Builds for National Ban," *Common Dreams* (Aug. 25, 2016), http://www.commondreams.org/news/2016/08/25/fatigue-migraines-linked-fracking-case-builds-national-ban.

[68] Z. Schlanger. "Living near fracking wells linked to increased hospitalization rates," *Newsweek* (July 15, 2015), http://www.newsweek.com/living-near-fracking-wells-linked-increased-hospitalization-rates-354093 (describing study that found a "27 percent higher rate of cardiology hospitalizations" in areas with the most fracking wells than in fracking-free areas).

[69] New York State Department of Health, *A Public Health Review of High Volume Hydraulic Fracturing for Shale Gas Development* (Dec. 17, 2014), http://www.health.ny.gov/press/reports/docs/high_volume_hydraulic_fracturing.pdf.

buildings, homes, and schools. However, recent events and studies have demonstrated the need for a significantly larger protective area. This is especially true in region's like Garrett County, where a plethora of abandoned gas wells from the last century will increase the risk of blowout events. A blowout in Tioga County in 2012 occurred when a drilling operation got too close to an abandoned well that had been there since 1932.[70] This blowout required a one-mile evacuation zone and plans had to be made for a two-mile evacuation zone in case the well could not be brought under control.[71] Other accidents occur simply because of the high-risk nature of fracking operations. A blowout in Wyoming County in 2013, likely due to equipment malfunction, required a 1500 foot evacuation zone.[72] In April of 2012, an operator lost control of a gas well in the Niobrara Shale of Wyoming, requiring the evacuation of 67 residents within a 2.5 mile radius.[73] Vapor plumes from some wells can extend in excess of a mile around gas wells, too, with toxic sulfur compounds found at levels high enough to cause health impacts.[74]

The Health Impact Assessment commissioned by MDE also acknowledged increased cancer risks for residents within a half mile (2,640 feet) of gas wells.[75] Another study noted in the Health Impact Assessment found that expecting mothers within one kilometer (3,280 feet) of gas wells in Colorado were more likely to deliver prematurely or have low birth weight babies.[76] Mothers within 2.5 kilometers of gas wells in Pennsylvania experienced similar hazards.[77] The HIA also documented an increase in "throat & nasal irritation, sinus problems, eye burning, severe headaches, persistent cough, skin rashes, and frequent nose bleeds" among residents living within 1,500 feet of a gas well.[78] These conclusions likely underestimate the risks, because the Health Impact Assessment did not adequately study long-term impacts.

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[70] Scott Detrow. "Perilous Pathways: Abandoned Wells Don't Factor Into Pennsylvania's Permitting Process," *StateImpact Pennsylvania* (Oct. 12, 2012), https://stateimpact.npr.org/pennsylvania/2012/10/12/perilous-pathways-abandoned-wells-dont-factor-into-pennsylvanias-permitting-process/.

[71] Marsha Haley, et al. Adequacy of Current State Setbacks for Directional High-Volume Hydraulic Fracturing in the Marcellus, Barnett, and Niobrara Shale Plays, *Environmental Health Perspectives* at 15 (Feb. 19, 2016) (*hereinafter* "setback study"), http://ehp.niehs.nih.gov/wp-content/uploads/advpub/2016/2/ehp.1510547.acco.pdf.

[72] *Id.*

[73] *Id.*

[74] *Id.* at 15-16.

[75] HIA at 36.

[76] HIA at 36-37.

[77] HIA at 37.

[78] *Id.*

MDE's proposed setback fails to address these risks. It is revealing that MDE's discussion of the setback in the issue papers released during summer 2016 focused solely on the setbacks' importance for protecting residents from water contamination, ignoring these other classes of risk altogether.[79]

1. Limited Healthcare and Emergency Response Capacity in Western Maryland

Residents of Western Maryland would have a uniquely hard time diagnosing and managing health conditions caused by their proximity to fracking activities. Western Maryland's rural character means that residents often have to travel a great distance to obtain medical services and that health infrastructure is not always readily available. The Health Impact Assessment for shale gas drilling determined that Garrett County is a medically underserved area, and that it has a shortage of primary care providers and other health professionals.[80] Allegany County, where the remaining shale leases would be located, has similar vulnerabilities and is also designated a medically underserved area with a shortage of health professionals.[81] Even with recent upgrades to Garrett County Memorial Hospital, it is unlikely that the county's healthcare infrastructure could handle the sudden influx of out-of-state workers and the frequency of industrial accidents and exposures that accompany fracking.

Furthermore, Western Maryland has limited emergency response capacity in the event of catastrophic events. Firefighting and other emergency services in both Allegany and Garrett Counties are staffed primarily by volunteers and lack dedicated funding.[82] The fire department in Garrett County has already had a hard time recruiting volunteers in recent years but would need to expand considerably to be ready to handle industrial accidents at fracking sites throughout the county.[83] MDE identified Western Maryland's limited response capabilities in its impact assessment, but nothing has been changed in the intervening years.[84] Without a dedicated, well-trained, and well-funded emergency response staff, the county will not be able to adequately react to the types of catastrophic events, such as spills, fires, and explosions, that are all too common in communities with fracking.

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[79] Issue Papers at 20.
[80] HIA at 69-70.
[81] *Id.*
[82] Rept. III at 78-79.
[83] *Id.*
[84] *Id.*

MDE's proposed regulations require that fracking companies identify "specially trained and equipped personnel who will respond to a well blowout, fire, or other incident that personnel at the site cannot manage. These specially trained and equipped personnel shall be capable of arriving at the site within 24 hours of the incident." 43 Md. Reg. 1312 at § .50(I) (emphasis added). Emergency personnel who arrive the next day (*i.e.*, up to 24 hours later) are just a cleanup crew. This provision is inadequate to limit the potentially catastrophic damage from fracking-related emergencies.

2. Toxic Air Emissions

Some of the greatest dangers to residents are posed by toxic air emissions from fracking wells and infrastructure. Sources of toxic air pollution include the wells themselves, but also evaporation of the chemicals used during fracking, diesel-powered engines and trucks, leaks from equipment, and evaporation from fracking wastes, among others. Air pollution has been of increasing concern in communities around the country that have been impacted by fracking. Since Maryland's BMP study was done and the O'Malley proposal was later published, there have been numerous new studies on the dangers of air pollution from fracking and related infrastructure developments. This is one reason why recent regulatory activity by the federal government has put a significant emphasis on leak detection and repair programs and air pollution control technologies.[85] Discouragingly, MDE's changes to the O'Malley proposal have only *weakened* already-insufficient air quality protections for residents by eliminating monitoring requirements for air pollution. MDE proposes to rely entirely on periodic air quality monitoring in only two locations, leaving people elsewhere in the county and the region in the dark about what dangerous pollutants they are breathing. MDE does not even claim that monitoring in two locations is sufficient to assure that air pollution will not reach dangerous levels closer to wells and other fracking infrastructure, and it clearly is not sufficient since some of the toxic pollutants released at fracking wells only travel a few miles. Moreover, none of the vague provisions that were included in the O'Malley proposal have been fleshed out in the last year and a half since that proposal was written. Since they remain in the current proposal, all of these flaws will be discussed below.

[85] *See e.g.*, EPA, Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources, 81 Fed. Reg. 35,824 (June 3, 2016); EPA, Control Techniques Guidelines for the Oil and Natural Gas Industry (Oct. 2016), *available at* https://www.epa.gov/sites/production/files/2016-10/documents/2016-ctg-oil-and-gas.pdf ; EPA, *Leak Detection and Repair: A Best Practices Guide*, https://www.epa.gov/sites/production/files/2014-02/documents/ldarguide.pdf.

The Health Impact Assessment concluded that air pollution is likely to have a "high" impact on public health in Western Maryland if fracking is introduced to the region.[86] The study identified findings in peer-reviewed journals linking exposure to air pollution associated with fracking to "increased risk of sub-chronic health effects, adverse birth outcomes including congenital heart defects and neural tube defects, as well as higher prevalence of symptoms such as throat & nasal irritation, sinus problems, eye burning, severe headaches, persistent cough, skin rashes, and frequent nose bleeds among respondents living within 1500 feet of [fracking] facilities compared to those who lived >1500 feet."[87] A more recent compilation of health studies, assembled by PSE Healthy Energy identified extensive evidence of highly toxic hazardous air pollutants at fracking operations around the country.[88]

Of particular concern are the "BTEX" compounds: benzene, toluene, ethylbenzene, and xylene. BTEX compounds and other volatile organic compounds commonly found near oil and gas production sites have been linked to "several serious human health issues including neurological damage, poor birth outcomes, respiratory concerns, and various cancers, among other health effects."[89] A systematic review by PSE Healthy Energy found 36 hazardous air pollutants near oil and natural gas development from 31 peer-reviewed studies published between October 1, 2012, through October 31, 2015.[90] A study conducted by Coming Clean documented evidence of BTEX and other hazardous chemicals in the blood and urine of community members living near fracking wells.[91]

Fracking equipment also produces a lot of nitrogen dioxide and volatile organic compounds, two types of harmful gases that interact in the presence of sunlight to produce ground-level ozone pollution. Ozone is a gas that is helpful when found high up in the atmosphere (the ozone layer), but when it is formed near the ground it can actually be quite harmful to human health. Ground-level ozone also travels great distances, meaning that ozone formed in Western Maryland can impact the rest of Maryland, as well as other states along the

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[86] HIA at xx.

[87] *Id.*

[88] PSE Healthy Energy, Hazardous Air Pollutants from Oil and Gas Development in the United States: A Systematic Review of the Peer-Reviewed Literature from 2012-2015 (March 2016) (*hereinafter* "PSE Lit. Review"), https://www.regulations.gov/document?D=EPA-HQ-OAR-2010-0505-7683.

[89] *Id.* at 18.

[90] *Id.*

[91] Coming Clean, *When the Wind Blows: Tracking Toxic Chemicals in Gas Fields and Impacted Communities* at 5 (June 2016), http://comingcleaninc.org/assets/media/documents/When%20the%20Wind%20Blows.pdf.

eastern seaboard. Parts of Maryland are still in non-attainment for ozone. In fact, Maryland has recently requested urgent action from EPA to crack down on ozone precursor emissions from other states.[92] MDE's near-simultaneous adoption of weak regulations for fracking within the state, with its associated air pollution, is ironic.

The proposed regulations are inadequate to protect Western Maryland residents from these air-pollution risks. The final risk assessment published by MDE on January 20, 2015, admitted a "high probability of air emissions" during all phases of fracking, even with all of the regulations proposed by the O'Malley administration in place.[93] It further conceded that MDE had "insufficient data or modeling information to reasonably determine consequences," and that there was "uncertainty about which specific control technologies would be employed."[94] MDE has done nothing to resolve these gaps and uncertainties. The proposed regulations reflect this lack of knowledge.

MDE proposes to require that operators use "top-down best available technology" to control air emissions, but the regulations fail to define this term. 43 Md. Reg. 1308 at § .36. In fact, the regulations make clear that MDE will determine what this is at an unspecified, later date. *See id.* at § .36(C). Based on past statements by MDE, it seems like MDE actually plans to let industry propose what technology it will use and then "MDE will analyze top-down [Best Available Technology] demonstrations from applicants and approve the applicants [Best Available Technology] determination before a permit is issued."[95] It is worth noting here that MDE's proposed regulations only give the agency 30 days to review permit applications, with a possible extension of 30 more days if MDE so requests. 43 Md. Reg. 1304 at § .17(E), (F). MDE needs to comprehensively review the available control technology ahead of permit applications (*i.e.*, when developing its regulations) and issue regulations that require whatever technology actually is best.

Instead of detailed conclusions regarding what technology will truly keep Western Marylanders safe, the proposed regulations look more like an aspirational to-do list for the agency. To be fair, a few helpful items are included, like a requirement for low-bleed or no-bleed

[92] Letter from Secretary Ben Grumbles to Administrator Gina McCarthy, http://news.maryland.gov/mde/wp-content/uploads/sites/6/2016/11/MD_126_Petition_Final_111616.pdf (Nov. 16, 2016).

[93] RA at 2.

[94] *Id.* at 2-3.

[95] *See* MDE, *Marcellus Shale Safe Drilling Initiative Study Part II Interim Final Best Practices* at 42 (July 2014) (*hereinafter* "Rept. II")..

pneumatic controllers (these terms still need to be defined, though, with precise bleed limits). But for the most part, the proposal consists of vague and hopeful-sounding items like "[i]mproved compressor maintenance to reduce emissions;" "[a] rigorous leak detection and repair program;" and "[a] pipeline inspection, maintenance, and repair program." 43 Md. Reg. 1308 at § .36(C). None of these "requirements" are defined or explained.

The leak detection and repair ("LDAR") program is especially important and has played a central role in recent federal rulemakings, which are now subject to litigation and to political uncertainty. LDAR is one of the most important measures companies can take to minimize toxic air emissions and greenhouse gas leaks from equipment.[96] Unfortunately, MDE has provided hardly any regulation to flesh out what its LDAR program will look like. The proposal asks companies to submit their own written plan for leak detection and repair, which will be approved as part of the permitting process. The plan has to "address" various considerations like "training," "more frequent monitoring," and "repairing leaking components," but no actual details are offered. 43 Md. Reg. 1308 at § .39(B). But nowhere does MDE specify how often companies must conduct inspections or how large a leak must be before companies are obligated to repair them. MDE says repairs must be made "promptly," but fails to define the term.

3. Waste Disposal Issues

When gas wells are stimulated with the hydraulic fracturing process, millions of gallons of water are injected into the well along with tens of thousands of gallons of chemicals.[97] Fracking proponents emphasize that less than 1% of what's injected into the ground is chemicals, but 1% of the 3-5 million gallons is a lot of chemicals. Some of these are highly potent toxins and endocrine disruptors, too. Furthermore, when injected fluids, drilling muds, or other materials penetrate deep into the earth, they can become radioactive from exposure to underground isotopes.

Drill cuttings – small rock particles that are sheared off during drilling, much like sawdust during carpentry – are known to potentially be radioactive because they can originate from radioactive elements within the shale formation and must be handled very carefully. MDE's

[96] EPA, *Leak Detection and Repair: A Best Practices Guide* at 2, https://www.epa.gov/sites/production/files/2014-02/documents/ldarguide.pdf.

[97] Christopher D. Kassotis, et al. Endocrine-Disrupting Chemicals and Oil and Natural Gas Operations: Potential Environmental Contamination and Recommendations to Assess Complex Environmental Matters, *Environmental Health Perspectives* (Aug. 27, 2015), http://ehp.niehs.nih.gov/wp-content/uploads/advpub/2015/8/ehp.1409535.acco.pdf.

proposed regulations for dealing with radioactivity require that equipment and wastes likely to be exposed to radiation must be tested by a qualified consultant for radioactivity. 43 Md. Reg. 1313 at § .54(G). MDE states that "[i]f cuttings show no level of radioactivity beyond background as established by a qualified consultant obtained by the operator, and the material meets all criteria established by [MDE], including sulfates and salinity," then MDE may permit on-site disposal of the cuttings. *Id.* at § .54(H).

MDE has not defined any of the additional "criteria" for drill cuttings or other potentially radioactive materials. Criteria necessary to protect the health and safety of residents should be determined now and specified in the regulations. Furthermore, there is no reason why the level of radiation considered safe enough to justify on-site disposal should vary between drilling companies. MDE should have identified a safe level – what it considers to be background – and set a numeric standard in its regulations to ensure residents are protected from dangerous radioactive waste. This number is too important to leave undefined.

It is also critical to ensure the safe disposal of flowback and produced water, the fluids that come back up to the surface when a well is drilled and once it starts producing gas. These fluids are highly toxic, containing a mix of fracking chemicals and underground shale particles that may be radioactive. MDE has prohibited the spreading of this flowback and produced water on land, and claims to have prohibited its disposal in underground injection wells, too. 43 Md. Reg. 1312 at § .54; 43 Md. Reg. 1361, 1362 § .04(B). Additionally, MDE has required that waste waters only be sent to waste water treatment facilities specifically permitted to accept that water. 43 Md. Reg. 1312-1313 at § .54(B). Many Western Marylanders have been led to believe that fracking waste waters would therefore be sent out of state for treatment and/or injection elsewhere. But the proposed regulations may not be as protective as commonly believed.

Whether MDE intended this or not, the proposed regulations could be read to allow injection of fracking waste waters into underground reservoirs, abandoned conventional gas wells, or other repositories around the state. MDE's proposed regulations for waste waters state that a person "may not dispose of drilling fluids, hydraulic fracturing fluid, flowback, or other fluid brought to the surface in connection with natural gas storage operations or conventional oil or natural gas production," in an underground injection well in Maryland. *Id.* at § .54(D). Produced water, which is specifically mentioned in other parts of the proposed waste water provisions is conspicuously absent from this list. When words are mentioned in one place and

then left out elsewhere in a document, it is traditionally assumed by courts that this omission is intentional and meaningful.[98] MDE's proposed provision also seems to specifically leave out unconventional natural gas production activities, which is the term that applies to all modern fracking activities.

Furthermore, the underground injection well ban that MDE proposed on November 28, to complement the revised oil and gas regulations, bans only the injection of "hazardous waste." Natural gas exploration and production wastes, including all fracking wastes, have been specifically exempted from the definition of "hazardous waste" in Maryland and federal law.[99] The proposed injection well regulations also ban the construction of underground injection wells for oil and gas wastes (so called "Type II" wells). But by failing to ban the injection of these wastes into existing underground repositories, MDE has left a large hole in its regulatory regime. Western Maryland is dotted with abandoned gas wells that could conceivably be used to store these wastes, and MDE's proposal does not ban the use of already existing underground wells. Using these old wells to store wastes would be disastrous, given that many of them were drilled decades ago when well technology was not nearly as advanced. These loopholes could expose Western Marylanders to enormous risks.

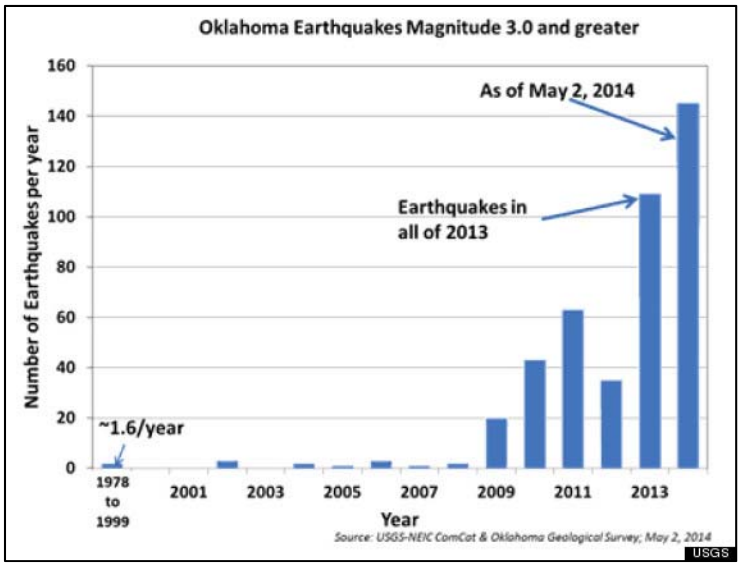

Figure 3: "Oklahoma Earthquake Risk Prompts Rare Warning," *The Huffington Post* (Mary 6, 2014), http://www.huffingtonpost.com/2014/05/05/oklahoma-earthquake-risk_n_5269280.html.

[98] *See, e.g.*, *Hamdan v. Rumsfeld*, 548 U.S. 557, 578, 126 S. Ct. 2749, 2765, 165 L. Ed. 2d 723 (2006); *Keene Corp. v. United States*, 508 U.S. 200, 208, 113 S. Ct. 2035, 2040, 124 L. Ed. 2d 118 (1993).

[99] Md. Code Regs. 26.13.02.04-1 (exempting "Drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil, natural gas, or geothermal energy" from the definition of hazardous waste); *see also* EPA, *Proper Management of Oil and Gas Exploration and Production Waste*, https://www.epa.gov/hw/proper-management-oil-and-gas-exploration-and-production-waste (last updated April 26, 2016).

It is especially important to unambiguously prohibit underground injection of fracking wastes now that this practice has been positively linked to earthquakes in other parts of the United States. A 2015 article reported that nearly two dozen peer-reviewed studies had concluded there was a connection between the underground disposal of fracking waste waters and earthquakes.[100] Oklahoma, which used to experience hardly any earthquakes, experienced 6,720 earthquakes during 2015.[101] The increase in earthquakes has followed the expansion of fracking development in the state.

4. Water Contamination

Fracking has been linked to numerous instances of surface and groundwater contamination. Western Maryland is acutely vulnerable to groundwater contamination from industrial activities like fracking, due to its unique geology and many residents' reliance on groundwater wells for drinking water. An estimated two-thirds of Garrett county residents obtain drinking water from individual groundwater supplies.[102] There are over 14,200 drinking water wells in Garrett County serving a population of only about 30,000.[103] Fifty-eight percent of these wells are located near gas leases obtained prior to the permitting moratorium.[104] Groundwater is also the primary source for public drinking water systems in Garrett County.[105] Undeveloped properties are also vulnerable to groundwater contamination. In most cases their future development, and thus their value, depends on a safe supply of drinking water.

Groundwater can become contaminated through surface spills or leaks that seep into groundwater or through failures of the underground steel and cement casings that the industry uses to isolate gas wells, which allows fracking fluids to escape directly into groundwater. An advisory committee convened by MDE recognized in 2008 that "[g]round water in some parts of Maryland, particularly in limestone regions, is extremely vulnerable to contamination from the

[100] "Exploring the Link Between Earthquakes and Oil and Gas Disposal Wells," *StateImpact Pennsylvania*, https://stateimpact.npr.org/oklahoma/tag/earthquakes (last visited Dec. 13, 2016).
[101] *Id.*
[102] RA at G-4.
[103] HIA at 136.
[104] *Id.*
[105] *Id.*

surface, including spills."[106] MDE has also acknowledged that, at the time it proposed the O'Malley regulations, "a comprehensive study of the causes of spills ha[d] not been done."[107] Water contamination events can be catastrophic for residents. Records from Pennsylvania's Department of Environmental Protection demonstrate over 280 instances of private well water contamination related to fracking operations since 2007.[108] On the other hand, a Pennsylvania nonprofit has identified over 1,200 complaints of drinking water contamination in 17 out of 40 counties in Pennsylvania.[109] In 2014, a torn liner in a fracking waste water impoundment in Pennsylvania lead to unquantified amounts of groundwater contamination and necessitated the removal of up to 15,000 tons of contaminated soil.[110] In 2015, a waste water pipeline spilled nearly 3 million gallons of fracking wastes into a creek that feeds into the Missouri River, a drinking water source for Williston, North Dakota.[111]. In 2014, a fire broke out at a fracking site in Ohio, trucks began to explode, and "more than 25,000 gallons of chemicals, diesel fuel, and other compounds were released during the accident," much of which flowed into a tributary of the Ohio River, which also supplies drinking water for many towns.[112]

One EPA report estimated 1.3 spills on or near well pads for every 100 fracked wells in Colorado and estimates in Pennsylvania have ranged from 0.4 to 12.2 spills per 100 fracked wells.[113] The likelihood of spills on a per-well pad basis is significantly higher because of the modern trend towards clustering multiple wells at a single well pad and then using horizontal drilling to expand their reach outward once underground.

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[106]Advisory Committee on the Management and Protection of the State's Water Resources, *Water for Maryland's Future: What We Must Do Today* at 10 (July 1, 2008).

[107] Rept. III at 31.

[108] Pennsylvania Department of Environmental Protection. *Water Supply Determination Letters*, http://files.dep.state.pa.us/OilGas/BOGM/BOGMPortalFiles/OilGasReports/Determination_Letters/Regional_Determination_Letters.pdf.

[109] Joshua B. Pribanic and Melissa Troutman. "Public Herald 30-Month Report Finds DEP Fracking Complaint Investigations Are 'Cooked' and Shredded," *Public Herald* (Sept. 15, 2015), http://publicherald.org/public-herald-30-month-report-finds-dep-fracking-complaint-investigations-are-cooked/.

[110] Mike Jones and Scott Beveridge. "DEP: Jon Day impoundment contaminated groundwater," *Observer Reporter* (June 10, 2014), http://www.observer-reporter.com/apps/pbcs.dll/article?AID=/20140610/NEWS01/140619952.

[111] Ernest Scheyder."Millions of gallons of saltwater leak into North Dakota creek," *Reuters* (Jan. 22, 2015), http://www.reuters.com/article/us-usa-north-dakota-spill-idUSKBN0KV1ZR20150123.

[112] Mariah Blake. "Halliburton Fracking Spill Mystery: What Chemicals Polluted an Ohio Waterway?" *Mother Jones* (July 24, 2014), http://www.motherjones.com/politics/2014/07/halliburton-ohio-river-spill-fracking.

[113] Fracking by the Numbers at 11; Brantley, et al., "Water Resource Impacts during Unconventional Shale Gas Development: the Pennsylvania Experience," *International Journal of Coal Geology* (June 2014); Rahm, et al., "Shale gas operator violations in the Marcellus and what they tell us about water resources risks," *Energy Policy* (July 2015).

Despite advances in technology and evolving regulatory requirements, casing failures – that is, failures of the cement and steel layers that insulate modern gas wells – remain ubiquitous. One recent study found that the rate of failure among fracking operations was 6.2%, or a little over one in every twenty wells.[114] Notably, the failure rate for unconventional gas wells (*i.e.*, modern, fracked wells) was six times higher than the failure rate in conventional gas wells.[115] Another study by scientists at Cornell reported a failure rate over 40% for unconventional gas wells during a seven-year period.[116]

Groundwater can be protected through comprehensive regulation of fluids at the well pad, and through detailed testing and verification of cement and casing integrity within the well. MDE's proposed regulations have a few good things to offer in these areas, but also have a few very notable problems.

One such problem lies in MDE's regulations that limit the use of impoundments to "fresh water." Impoundments are large holes that are used to store fluids and are sometimes lined with plastic sheeting to insulate groundwater. MDE has limited the use of impoundments to only "fresh water" storage. 43 Md. Reg. 1306 at § .29. Unfortunately, MDE has defined "fresh water" based only on its "total dissolved solids," which is a measure of dissolved minerals, metals, and ionic substances in the water, such as salt or dissolved iron. 43 Md. Reg. 1297 at § .02(B)(32). This definition entirely ignores whether or not hydrocarbons or other potentially toxic organic chemicals are dissolved in the water.

Prior to fracking, various chemicals are added to water to create the fracking fluid used to mobilize gas molecules from the shale. MDE's proposal thus allows industry to mix its fracking fluids in the same impoundments where water is stored prior to fracking. Because MDE is assuming only fresh water will be placed in these impoundments, its regulations do not provide for adequate lining of impoundments, leak detection, or water level monitoring to even partially mitigate the risks of storing toxic chemicals in impoundments. *See* 43 Md. Reg. 1306 at § .29. Standardized Maryland pond construction guidelines are not adequate to handle highly toxic and sometimes corrosive fracking chemicals. Without adequate protections, there is considerable risk

[114] Robert B. Jackson, "The integrity of oil and gas wells," *PNAS* (July 29, 2014), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4121783/.

[115] *Id.*

[116] Anthony R. Ingraffea, et al., "Assessment and risk analysis of casing and cement impairment in oil and gas wells in Pennsylvania, 2000-2012," *PNAS* (June 30, 2014), http://www.pnas.org/content/111/30/10955.full.

that dangerous chemicals will seep into Western Maryland's groundwater through the base of the impoundment, as a result of spills and runoff when ponds overflow during rainstorms or industrial accidents.

MDE's proposed regulations also fail to set meaningful standards for the storage of non-liquid chemicals. The proposed regulation simply states that non-liquid chemicals should be "stored safely" and protected from contact with precipitation or water. What it means to be stored safely is not specified, leaving this issue to the discretion of the oil and gas industry.

MDE has also proposed regulations to require fracking companies to provide residents with drinking water in the event of contamination. 43 Md. Reg. 1314 at § .59. This is based on the presumptive impact area law passed by the General Assembly in . 2012. However, this provision adds a requirement that if it is shown that "contamination was not the result of activities relating to the gas well or that the contamination existed before the commencement of activities allowed by the permit and was not worsened by those activities," then the fracking company can require the property owner to reimburse it for the cost of all drinking water provided. 43 Md. Reg. 1315 at § .59C(4)(b) It is grossly unfair to impose this cost on residents and property owners that may already be suffering from contaminated water, particularly given that MDE could instead require the party that causes the contamination to reimburse the company. This proposed provision puts vulnerable families at risk of becoming financially liable to fracking companies whenever their water is contaminated and the company starts providing replacements. Many residents will not want to take this risk, and will end up without the protection that would otherwise by afforded by the presumptive impact area law. MDE has completely subverted the General Assembly's intent.

5. Trade Secrets Make it Harder for Residents to Protect Their Health

All of the health risks that MDE leaves Western Marylanders to face will be compounded by MDE's willingness to let the gas industry keep secret the identities and quantities of chemicals used in its fracking fluids. MDE proposes to allow fracking companies to "attest[]" that the contents of their fracking fluids are "trade secrets," without any review of this attestation by the agency.43 Md. Reg. 1307 at § .31. When community members do not know what compounds they are being potentially exposed to, they have no way to monitor exposures. Laboratory tests and monitoring equipment must all be tailored to the particular types of chemicals expected – it is extremely difficult to just test a sample of air, water, or blood and see

what is in it. Concerned citizens who know what to test for could ask their doctors to take blood or urine samples, for instance, or could purchase third-party air monitoring equipment to capture air samples and submit them to independent labs for analysis These are critical tools for residents who are experiencing health impacts from fracking and need to diagnose the cause of their suffering. Residents are also unable to take preventative action by testing their water wells, because they will not know what to test for.

E. Impacts to the Environment

The natural environment is one of Western Maryland's most valuable resources, attracting tourists, retirees, and all manner of outdoors enthusiasts to the area. Many small businesses depend on the region's beauty to attract customers to the region. As MDE has recognized in the past, Western Maryland "has some of the state's most important natural areas and offers diverse outdoor recreational opportunities that rely on exceptionally high value natural resources."[117] In one analysis, MDE estimated that "[m]ore than 350,000 acres of Garrett County have at least one priority resource area designation" due to their ecological or environmental importance.[118] Less than 10% of the areas leased by drilling companies in 2012 did not overlap with at least one of these areas.[119]

Maryland's GreenPrint program, which assessed the ecological network throughout Maryland to determine priority areas for ecological conservation, determined that Garrett County had the greatest amount of GreenPrint resources of any Maryland county. [120] Seventy-seven percent of the county has been mapped under the program as being of high ecological value, yet only about thirty percent has any sort of conservation status or protection.[121]Allegany County ranks fourth in the state for GreenPrint resources. [122] Sixty-five percent of the county's land has been identified having high ecological value, yet only forty-two percent has any special

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[117] Rept. III at 52.

[118] Maryland Department of Natural Resources ("MDNR"), *Marcellus Shale Gas Development in Maryland: A Natural Resource Analysis* at 20 (Feb. 27, 2012), http://www.mde.state.md.us/programs/Land/mining/marcellus/Documents/Meetings/MAC_NaturalResourcesAnalysis.pdf.

[119] *Id.*

[120] Rept. III at 52.

[121] *Id.*; *see also* MDNR, Land Acquisition and Planning, http://dnr.maryland.gov/land/Pages/Green-Infrastructure-Mapping.aspx.

[122] *Id.*

conservation status.[123] These highly important ecological areas, important habitat for rare, threatened and endangered species, will stand in the path of the oil and gas industry if fracking goes forward. MDE has estimated in 2012 that "[w]ell site footprints alone may directly impact up to 5,155 acres of" GreenPrint resources in Garrett County, while overall development could potentially impact "[m]ore than 42,417 acres" of these "'best of the best'" natural resources."[124] MDE's proposed regulations offer no protection at all to most of this ecologically valuable area. For a subset of these areas—those that are classified as "special conservation areas"—the regulations direct MDE to consult to MDNR, but they do not allow any additional time for this consulation, and the deadline for action on permits is so short that meaningful consultation may prove impossible. Further, the proposed regulations do not give MDNR—the agency with wildlife expertise—any authority to act in the application and permitting process, nor do they require MDE to take any action, even if "necessary" to protect the special conservation area. In those circumstances, MDE "may" take action. 43 Md. Reg. at § .19(h).

Western Maryland also has a large number of Tier II stream segments, which are designated high quality waters. This includes the Youghiogheny River,[125] a water source which provides drinking water to the town of Friendsville, and has for years attracted whitewater rafters to the region.[126] In its 2012 analysis, MDE expected impacts to approximately 22 of 33 Tier II stream reaches in Garrett County.[127]

These high quality waters are particularly sensitive to the type of land use changes that will occur from the construction of gathering pipelines at each new well pad, which would then cross streams and disrupt stream habitat.[128] These pristine waters are one of Western Maryland's most valuable resources and not only provide support for a diverse ecosystem but also draw

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[123] *Id.*

[124] MDNR, *Marcellus Shale Gas Development in Maryland: A Natural Resource Analysis* at 13 (Feb. 27, 2012), http://www.mde.state.md.us/programs/Land/mining/marcellus/Documents/Meetings/MAC_NaturalResourcesAnalysis.pdf.

[125] MDE, *High Quality (Tier II) Waters in Garrett County* (March 2010), http://www.deepcreekanswers.com/maps/HighQualityWaters.pdf.

[126] Candus Thomson. "Gushing in Garrett," *The Baltimore Sun* (June 2, 2007), http://articles.baltimoresun.com/2007-06-02/sports/0706020118_1_artificial-whitewater-western-maryland-garrett.

[127] MDNR, *Marcellus Shale Gas Development in Maryland: A Natural Resource Analysis* at 19 (Feb. 27, 2012), http://www.mde.state.md.us/programs/Land/mining/marcellus/Documents/Meetings/MAC_NaturalResourcesAnalysis.pdf.

[128] Rept. III at 53.

tourists to the region for recreational activities, such as fishing and boating.[129] Water resources are critical to many of the tourism businesses in Garrett County and access to this vital and limited resource would be severely threatened by the introduction of an industry like fracking.[130]

MDE and DNR have recognized that land use changes associated with fracking have a strong potential to negatively impact water quality, with cascading effects for ecosystems and natural resources. The Departments have concluded that "cumulative surface development" should be maintained at less than 2 percent in high-value watersheds, and that this limit on land-use change should be adopted as a performance measure and enforced through Comprehensive Development Plans, citing "evidence that aquatic habitat and aquatic diversity become degraded by stormwater runoff well before the percentage of impervious surface reaches 10%[,] that brook trout are almost never found in watersheds where impervious surface exceeded 4%," and that loss of some species, "particularly stream salamanders, can occur in watersheds with only 0.3% impervious surface."[131] The high-quality watersheds in Garrett and Allegany Counties are at risk of severe degradation from increasing surface development associated with fracking.

Fracking a single well typically requires 3-5 million gallons of water. Permit applications received by MDE between 2009 and 2011 estimated *daily* usage of 20,000 gallons per well during drilling, and total usage per well of 3-7 million gallons during high-volume fracking.[132] Drilling companies typically withdraw water directly from nearby water sources, like streams or rivers, to minimize transport costs. Withdrawing such large quantities of water can adversely impact aquatic ecosystems and can render streams and rivers unfit for tourist and recreational uses like fishing and boating.[133]

Before finalizing regulations authorizing fracking, MDE should have completed a more comprehensive assessment of risks to water resources and water ecosystems in Western Maryland, particularly risks associated with the massive water withdrawals that fracking will bring. Maryland agencies have long recognized the need for the Fractured-Rock Water Supply

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[129]RA at G-3.

[130] Regional Economic Studies Institute, *Impact Analysis of the Marcellus Shale Safe Drilling Initiative* at 90 (Sept. 22, 2014) (*hereinafter*, "RESI") (describing water as "one of the most widely used and scarce resources shared between existing businesses and residents in Western Maryland.").

[131] MDE and MDNR, *Marcellus Shale Safe Drilling Initiative Study: Draft Partial Response to Comments on Draft Best Practices Report* at 10 (March 29, 2014).

[132] RA at G-1.

[133] *Id.* at G-2.

Study which would "provide tools for predicting the seasonal impacts of ground water withdrawal from fractured-rock on the water resource and on the health of stream biota."[134] The Fractured-Rock area of Maryland refers to the unique geology of the area and encompasses Garrett and Allegany Counties.

MDE and MDNR have recognized that the Fractured-Rock Study is needed to "provide water managers, policy makers, and planners with a sound basis for determining how much water is potentially available for future growth, and help them weigh the costs and benefits of current water management practices against alternatives." [135] "Water regulators, planners, and policy makers need to know how much water can be withdrawn from wells and streams without causing adverse impacts to the resource or other users. Studying the effects of water withdrawals may indicate that the cumulative impacts of increased population growth combined with other consumptive uses are resulting in adverse impacts."[136] Such a study would also "highlight specific areas of Maryland's fractured-rock terrain that are more susceptible to adverse impacts from consumptive uses."[137] Water withdrawals are known to "reduce base flows and decrease habitat availability for aquatic species."[138] "Reduced water volume also increases the concentration of pollutants, posing another threat to species."[139] "Water managers and planners need better information about when a water withdrawal is likely to impact the stream ecology."[140]

MDE's regulations will fail to prevent or minimize the impacts from water withdrawals. MDE's regulations require that, "if practicable," operators "shall arrange to acquire water for drilling and hydraulic fracturing from one or more permanent or semi-permanent water supply access points with large capacity and storage options" to decrease the risks related to withdrawals. 43 Md. Reg. 1308 at § .34. Whether a water body is considered a "permanent" or

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[134] Advisory Committee on the Management and Protection of the State's Water Resources, *Water for Maryland's Future: What We Must Do Today* (July 1, 2008).

[135] USGS, MDNR & MDE, *Sustainability of Water Resources in the Fractured-Rock Area of Maryland* (2009), https://pubs.usgs.gov/fs/2009/3009/pdf/FS2009-3009.pdf.

[136] *Id.*

[137] *Id.*

[138] Center for Biological Diversity, *Petition to List 404 Aquatic, Riparian and Wetland Species From The Southeastern United States As Threatened Or Endangered Under The Endangered Species Act* at 11 (April 20, 2010), https://www.fws.gov/southeast/candidateconservation/pdf/Petition_404Aquatic.pdf.

[139] *Id.*

[140] USGS, MDNR & MDE, *Sustainability of Water Resources in the Fractured-Rock Area of Maryland* (2009), https://pubs.usgs.gov/fs/2009/3009/pdf/FS2009-3009.pdf.

"semi-permanent" water supply has little to do with minimizing the impacts of withdrawing millions of gallons of water from it. Moreover, there is no indication that such sources are numerous enough in Western Maryland to accommodate the extreme volumes of water necessary for fracking over a period of years, and this regulation will dry up and become meaningless as soon as it is no longer "practicable" to comply.

Furthermore, MDE and MDNR do not have the monitoring network necessary to assess the health of Western Maryland's streams, rivers, and groundwater on an ongoing basis, and would be unable to detect when impacts were starting to occur. An MDE Advisory Committee noted in 2008 that "Maryland's current monitoring network is inadequate to assess the health of its water resources in all areas of the State, with its varied and complex natural settings. A broader and more reliable network of monitoring locations is needed for stream flows, ground water levels and water quality parameters."[141] Their Final Report concluded that "[i]t is . . . essential to conduct the Coastal Plain Aquifer Study and the Fractured Rock Water Supply Study."[142] The Final Report further noted that it is "critical" that MDE's decisions regarding water use in Western Maryland use a methodology "adequate to ensure that seasonal variations, drought conditions, cumulative withdrawals and differing use scenarios do not adversely impact aquifers, streams or stream biota."[143]

MDE cannot rely on its water appropriation regulations to protect these streams and associated resources. As MDE's Advisory Committee noted in 2008, the water appropriation regulations do not afford any special protection to Tier II and Tier III streams. "Methods and standards for data collection, analysis, monitoring and flow-preservation thresholds designed to protect Tier II and Tier III waters" are still missing.[144] These safeguards are even more necessary to address the unique threats of large-scale hydraulic fracturing.[145]

As the MDE Advisory Committee explained:

> Water appropriation permits routinely contain conditions limiting the average daily withdrawal and provisions requiring a permittee to report an estimate of the total water use for each month of the

[141] Advisory Committee on the Management and Protection of the State's Water Resources, *Water for Maryland's Future: What We Must Do Today* at 11 (July 1, 2008).

[142] *Id.*

[143] *Id.* at 22.

[144] *Id.* at 29.

[145] *See* Rept. III at 47 ("While any freshwater withdrawal could have an impact, unconventional gas development is unusual in that it requires large volumes within a compressed time frame.")

> preceding calendar year. Some water systems have submitted this information late or not at all, and this has handicapped MDE in its efforts to manage the resource and evaluate applications for new permits. Furthermore, recordkeeping violations undermine the integrity of any regulatory program. Currently, MDE must go to court to obtain penalties against violators of water appropriation laws or permits. Judicial enforcement actions are very time consuming and resource-intensive for MDE and its legal staff, and are therefore usually reserved only for egregious violations and behavior.[146]

As the Final Report concluded, "A regulatory program that depends largely on self-monitoring and reporting will not be successful if there is no effective sanction against those who fail to comply."[147] Further, MDE does not require applicants for water appropriation permits to do any assessment of risks to stream ecology, or to survey for endangered species that might be affected. The form provided by MDE requires applicants only to specify whether they know or don't know of any.

MDE should have gathered additional information on the relationship between water withdrawals, stream flows, and species survival to inform its development of these fracking regulations. As the USGS has recognized, "the relations between streamflow and biological taxa are not well understood. A framework for the necessary analyses has been developed… for the different flow-ecology thresholds (fig. 5), but the relation between hydrologic alteration and ecological condition varies greatly and is not yet defined for streams in Maryland."[148] MDE and MDNR even committed to "develop additional scientific guidance for monitoring and assessing potential ecological impacts to sensitive streams as a result of water withdrawals."[149] But now MDE is finalizing these fracking regulations without having followed through. Without this understanding, MDE cannot protect Western Maryland's people and environment from the adverse impacts of fracking on water resources.

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[146] Advisory Committee on the Management and Protection of the State's Water Resources, *Water for Maryland's Future: What We Must Do Today* at 30 (July 1, 2008) (emphasis added).

[147] *Id.*

[148] USGS, MDE & MDNR, *A Science Plan for a Comprehensive Assessment of Water Supply in the Region Underlain by Fractured Rock in Maryland* at 6 (2012), https://pubs.usgs.gov/sir/2012/5160/pdf/sir2012-5160-508.pdf.

[149] Rept. III at 16.

Western Maryland also has vast forests that provide habitat to wildlife and attract many tourists and outdoor adventurers seeking to hike, camp, hunt, or explore Maryland's wilderness. Large-scale development of fracking will mean installation of pipelines all over the region, fragmenting these forests and disrupting streams, further reducing viable habitat for Western Maryland's wildlife. In particular, when forests are segmented by the pipelines, it reduces the amount of "deep forest interior" that certain species, especially birds, require for feeding and reproduction.[150] Stream crossings will disrupt aquatic habitat and can also lead to increased bank erosion and sedimentation of waterways.[151] MDE proposes to mitigate forest impacts through the incorporation by reference of Pennsylvania's guidelines for gas development in state forests, but those guidelines are not protective. 43 Md. Reg. 1299 at § .03(A). To the contrary, they expressly state it is "paramount" that department staff "recognize and understand the rights of private subsurface owners and not require specific actions."[152]

F. Impacts to Endangered Species

Western Maryland has a high concentration of rare, threatened, and endangered species, including the northern goshawk, green salamander, summer sedge, Indiana bat, southern water shrew, and eastern hellbenders. Many are found within "Irreplaceable Natural Areas," a Maryland GreenPrint designation that means that the habitat and species in the area will not recover if they are lost due to surface development.[153] There are also "many aquatic species, including Brook trout, that require cool, clean and aerated streams in order to thrive and reproduce," and are therefore imperiled by fracking in various ways.[154] These stream dependent-species are likely to be harmed by spills, water withdrawals, and declines in water quality from land use change. For rare, threatened, and endangered species, these negative impacts may jeopardize their survival in the state.The scientific information that is available suggests that several species listed as endangered in Maryland are vulnerable to harm from fracking. By failing to fully assess these risks to species and the measures necessary to protect these species in

[150] *Id*. at 53.

[151] *Id.*

[152] Pennsylvania Department of Conservation and Natural Resources, *Guidelines for Administering Oil and Gas Activity on State Forest Lands* at 5 (2013) (emphasis added), http://www.dcnr.state.pa.us/cs/groups/public/documents/document/dcnr_20028601.pdf.

[153] Rept. III at 52-53.

[154] Rept. III at 47.

developing the proposed fracking regulations, including consulting with MDNR on measures to protect species, and by failing to adopt stronger protections, MDE has failed to ensure that fracking authorized under the proposed regulations will not jeopardize the continued existence of these species.[155] One is the Eastern Hellbender. According to MDNR, the Hellbender is a large aquatic salamander that can grow as large as two feet.[156] Hellbenders prefer clear, fast-flowing streams, and are pollution intolerant. Today, according to MDNR, their Maryland range is limited to mountain streams and rivers of Garrett County. "Because hellbenders are sensitive to water quality changes, they are threatened by anything that reduces water quality or flow of their streams: sedimentation from erosion, mine run-off, dam construction, pollution."[157] Hellbenders are known to be harmed by "forestry, road construction, and urban development."[158] Even in Great Smoky Mountains National Park, hellbenders are threatened by habitat loss and degradation: "Salamander populations have been eliminated within [Great Smoky Mountain National Park] streams downstream from road building and areas where road fill was utilized in projects near streams."[159]

Another endangered Maryland species that is vulnerable to the effects of fracking is the Southern Water Shrew, also called the West Virginia Shrew, whose range is confined to the Appalachian-Allegheny Mountain chain. According to the Pennsylvania Natural Heritage Program, the Southern Water Shrew depends on small mountain streams for its diet. Environmental stresses that are damaging brook trout populations are also "seriously erod[ing] the aquatic food base needed to sustain" the shrew.[160]

MDE's changes to the CDP requirements, outlined in section V.A. above, effectively preclude meaningful action to protect species. Without opportunity to review—and, if necessary, disapprove—a comprehensive plan, MDE will be left to consider impacts and risks to species on

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[155] *See* MD Nat. Res. Code § 10-2A-06(c).

[156] MDNR, *Rare, Threatened, and Endangered Animal Fact Sheet*, http://dnr2.maryland.gov/wildlife/Pages/plants_wildlife/rte/rteanimalfacts.aspx?AID=Hellbender (last visited on Dec. 14, 2016).

[157] *Id.*

[158] Center for Biological Diversity, *Petition to List 404 Aquatic, Riparian and Wetland Species From The Southeastern United States As Threatened Or Endangered Under The Endangered Species Act* at 269 (April 20, 2010), https://www.fws.gov/southeast/candidateconservation/pdf/Petition_404Aquatic.pdf.

[159] *Id.* at 270.

[160] Pennsylvania Natural Heritage Program, *Southern Water Shrew Fact Sheet*, http://www.naturalheritage.state.pa.us/factsheets/11436.pdf.

a wellpad by wellpad basis, at the permit approval stage. MDE will have neither the information nor the time, in the context of that process, to adequately assess and address population-level threats to rare, threatened, and endangered species.

Brook trout themselves are not currently listed as endangered or threatened in Maryland, "[b]ut unless steps are taken to reverse brook trout population decline, the species could be at risk of becoming regionally threatened within three to four decades."[161] In addition, according to MDNR, "Brook trout are considered a biological indicator species because they represent a whole suite of unique aquatic and terrestrial organisms that occupy and share the same habitat. Loss of brook trout from a system indicates negative changes to the habitat and overall system."[162]

MDE and MDNR, through their participation in the Chesapeake Bay Program, have identified Priority Brook Trout Conservation Strategies, including protecting remaining highly functional wild brook trout habitat "from detrimental changes in land use and water use practices."[163] Maryland also has a statewide Brook Trout Fishery Management Plan, developed in 2006 by the Fisheries Service, which has the goal of expanding brook trout habitat through conservation and reintroduction in Western Maryland streams. [164] MDNR has found that land use change is a serious threat to brook trout. "Loss and alteration of habitat is the biggest threat to brook trout resources. In many situations, developers, county regulatory agencies and state agencies have inadequate knowledge and understanding of how development and other anthropogenic activities impact brook trout populations."[165] "In watersheds where human land use exceeds 18% brook trout populations cannot survive. If impervious surface area is greater than 0.5% in a watershed brook trout will typically be extirpated."[166]

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[161] Chesapeake Bay Program, *Brook Trout*, http://www.chesapeakebay.net/managementstrategies/strategy/brook_trout (last visited Dec. 14, 2016).

[162] MDNR, *Maryland Brook Trout Fisheries Management Plan* at 7-8 (2006) http://dnr2.maryland.gov/fisheries/Documents/MD_Brook_Trout_management_plan.pdf.

[163] Chesapeake Bay Program, *Brook Trout Outcome Management Strategy 2015-2025* at 2, http://www.chesapeakebay.net/documents/22040/2d_brook_trout_6-24-15_ff_formatted.pdf

[164] MDNR, *Maryland Brook Trout Fisheries Management Plan* at 7-8 (2006) http://dnr2.maryland.gov/fisheries/Documents/MD_Brook_Trout_management_plan.pdf.

[165] *Id.* at 42.

[166] *Id.* at 7.

Currently, "[o]f the remaining 151 streams where brook trout populations are found [today in Maryland], over half are in westernmost Garrett County, the least developed area of Maryland."[167] Furthermore, only 3 subwatersheds in Maryland are considered "intact" for brook trout. All are located in Western Maryland, and thus at risk from land use change, spills, and water withdrawals associated with fracking. One analysis by MDE estimated that nearly 1 in 4 leases held by drilling companies in 2012, and "an associated 22,000+ acres" of gas development activity may affect trout habitat and fishing areas.[168]

VI. CONCLUSION: THE IMPORTANCE OF CONCRETE, ENFORCEABLE REGULATIONS

MDE has written these proposed regulations in a way that defers many of the hardest and most critical decisions to be resolved in future guidance or during the permitting process. This has the effect of keeping these decisions away from public scrutiny. Additionally, it will make these regulations nearly impossible to enforce because the regulations themselves are devoid of meaning.

Everything depends on the permit. But MDE has set up a system that fast-tracks the approval process for these permits, despite packing all of these critical decisions into that process. MDE allows itself only 30 days to approve or deny a permit, with the possibility of a single 30 day extension should MDE so request. 43 Md. Reg. 1304 at § .17(E),(F). MDE does not have the option of working with the company to improve its application, and is instead locked into either granting the permit or denying it and preparing to face a legal appeal.

Because MDE has provided so few specific requirements in this proposal, and left industry with so much discretion to fill in the blanks, evaluating a permit requires MDE to consider the merits and quality of every applicant's: environmental assessment, baseline monitoring, comprehensive development plan, construction and operation plan (§ .23), stormwater management plan (§ .25), sediment and erosion control plan (§ .26), transportation plan (§ .33), demonstrations of best available technology for various types of air pollution control equipment (§ .36), "rigorous" leak detection and repair plan (§ .39), casing and cementing plan (§ .40), integrity and pressure testing plan (§ .41), power plan to address noise

[167] *Id.*

[168] MDNR, *Marcellus Shale Gas Development in Maryland: A Natural Resource Analysis* at 26 (Feb. 27, 2012), http://www.mde.state.md.us/programs/Land/mining/marcellus/Documents/Meetings/MAC_NaturalResourcesAnalysis.pdf.

(§ .48), spill prevention and emergency response plan (§ .50), invasive species plan (§ .52), and drilling and operating reclamation plan (§ .53). There is no way that MDE is going to be able to thoughtfully analyze each of these in the short time frame provided to it.

The permits will mirror the regulations. Because MDE has provided so few requirements for what each of these plans actually require, the permits it approves can be equally vague. This makes permit evaluation easy for the agency, and makes enforcement all but impossible. MDE's resources have been cut over the past several years and its enforcement record in other areas has been abysmal.[169] There is no reason to think the agency will dedicate any more resources to enforcing these fracking regulations.

Importantly for industry, even if MDE does determine a permit has been violated, the proposed regulations cap the maximum penalty that MDE can impose at $50,000, hardly a fraction of the profits that fracking companies can obtain from a single well. 43 Md. Reg. 1315 at § .61. The performance bond that MDE can require to ensure compliance with its permits is also capped at this amount, rendering it equally toothless in the face of gas industry profits. 43 Md. Reg. 1313 at § .55.

In summary, these proposed regulations fail to protect Western Marylanders from fracking's many pernicious impacts to our health, economy, environment, and way of life. Western Maryland does not want fracking. If the state decides to let fracking go forward, we sincerely hope that the state will consider recent scientific evidence on fracking's impacts and draft a new set of regulations that have at least some chance of protecting our community.

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[169] Robert L. Glicksman and Yee Huang. Failing the Bay: Clean Water Act Enforcement in Maryland Falling Short, *Center for Progressive Reform* (April 2010), http://scholarship.law.gwu.edu/cgi/viewcontent.cgi?article=1681&context=faculty_publications; *see also* Yee Huanh, "New CPR Report Finds Maryland Failing to Enforce Clean Water Act," Center for Progressive Reform Blog (April 8, 2010), http://www.progressivereform.org/CPRBlog.cfm?idBlog=CED9A96D-A8AE-BCC4-4829D9749EB1E55B.

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