

March 30, 2018

To: Members of the Delaware River Basin Committee  
From: Debi Slatkin, Bridgeton Township PA resident

## Fracking is harmful to ecosystems, watersheds

You need only look as far as the exhaustive studies by DRBC member states New York and Maryland—states that have banned fracking based on evidence—to find the likelihood that fracking and its associated activities cause adverse health outcomes and environmental impacts. You know this, and I applaud the Commission for banning fracking wells in the Basin. However, the loopholes—the associated activities you propose to allow—have potential for great harm on our invaluable waterway. **I call on you to completely and permanently ban natural gas drilling and all related activities—including wastewater processing and discharging from, and water withdrawals for, drilling and fracking operations—throughout the Delaware River Watershed. Furthermore, I call on you to oppose further fracking infrastructure (such as pipeline) development in and through our watershed as you are asked to approve these projects.**

## Clean Water, watershed and aquifer protection must be assured

I live on the hill above the Delaware River in Bridgeton Township, shown as the Delaware River North watershed in the following image:

My house and well are about 520 feet above sea level, situated very near the cliff that marks the edge of the Delaware River valley. With a 400 foot deep well, my water comes from an aquifer that is fed in large part by the Delaware River—the River is roughly 150 feet above sea level at this point.

The Delaware River is protected by DRBC's Special Protection Waters regulations that do not allow water quality to be diminished in any way. We are dependent on that protection to keep our water safe. Furthermore, the Delaware River valley comprises the New Jersey Coastal Plain aquifer (see

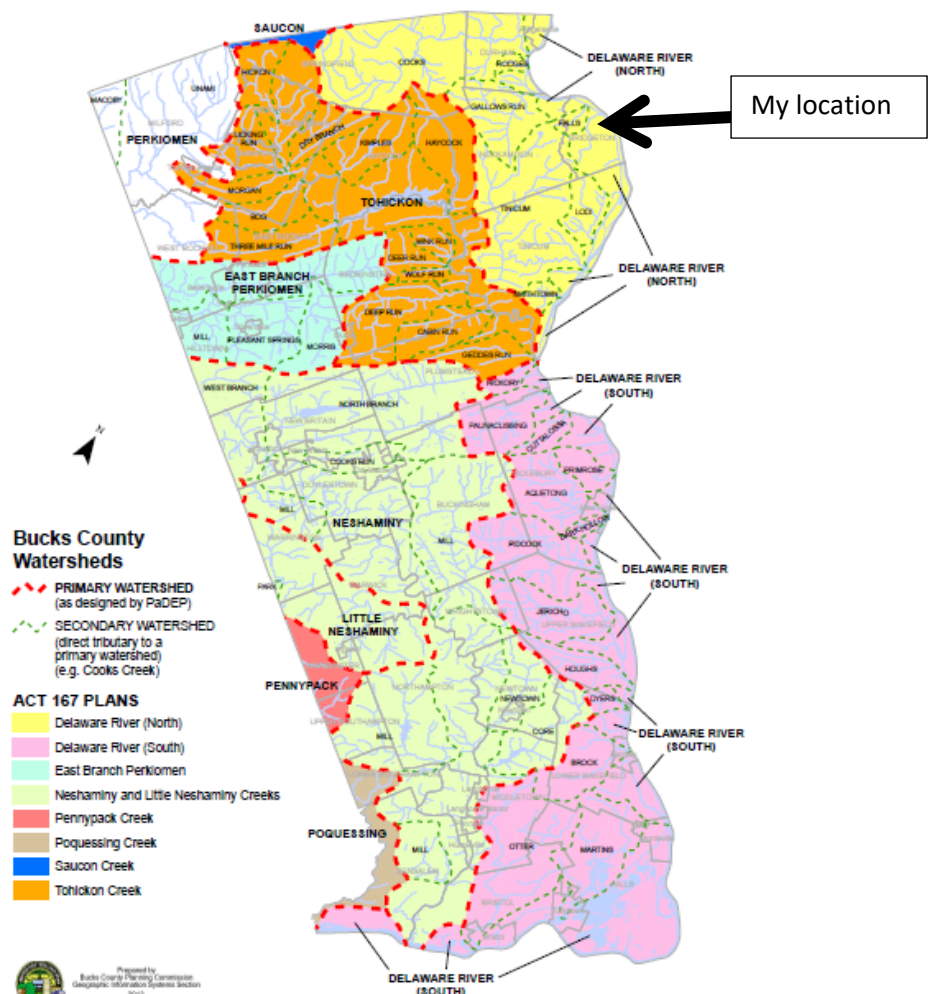


image below from the EPA Region 3 Water Protection Division Sole Source Aquifer Program (<http://www.epa.gov/reg3wapd/presentations/ssa/index.htm> ). This EPA-determined Sole Source Aquifer (SSA) provides water for millions of people—not just in my area, but downstream in large urban areas including Philadelphia.

## Mid-Atlantic Sole Source Aquifers



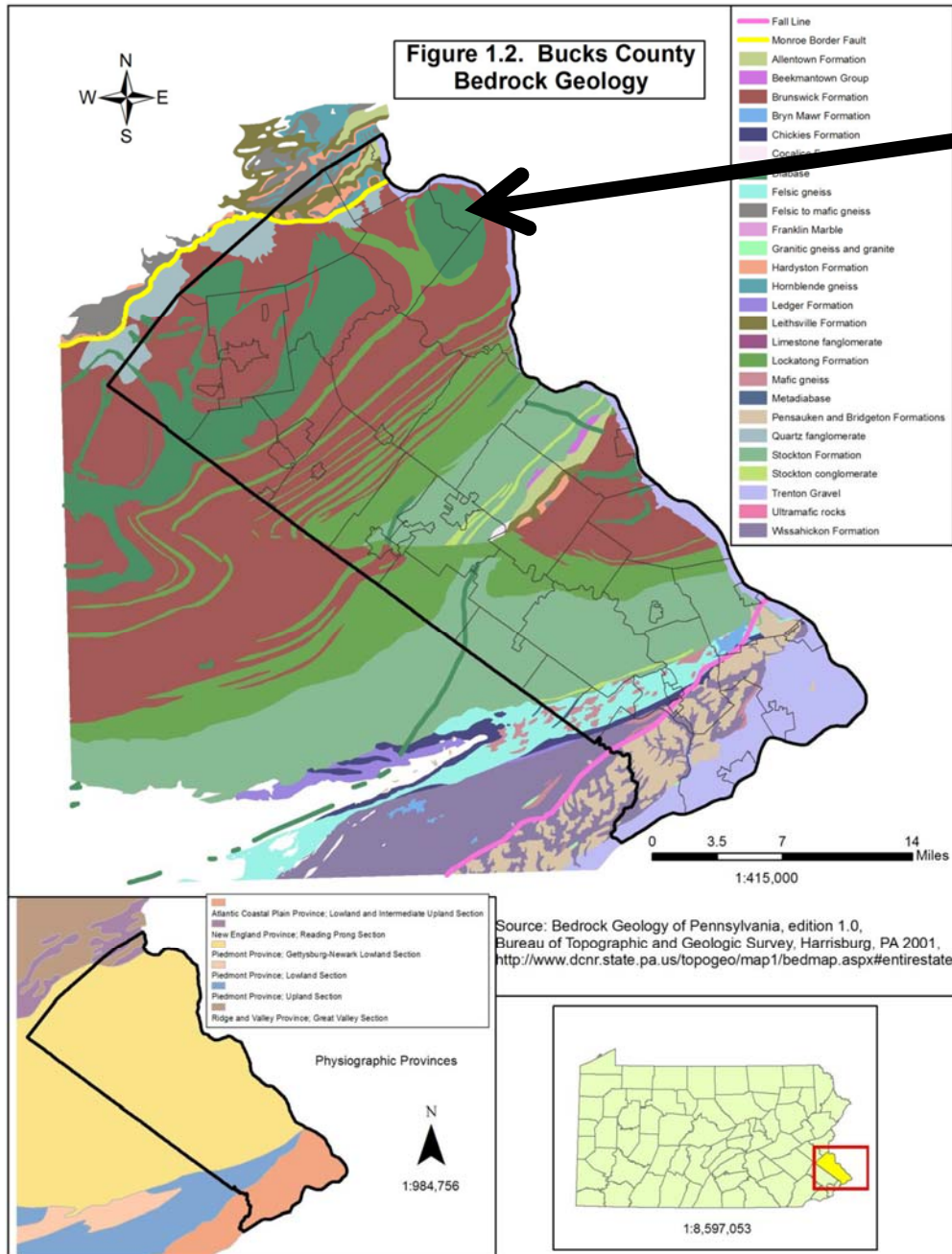
From the EPA document: “EPA defines a sole or principal source aquifer as one which supplies at least fifty percent (50%) of the drinking water consumed in the area overlying the aquifer. These areas can have no alternative drinking water source(s) which could physically, legally, and economically supply all those who depend upon the aquifer for drinking water.” This determination has been made for our river valley, and I call on you to uphold and protect this invaluable, life-supporting resource—our Sole Source Aquifer and the numerous wetlands, headwaters, tributaries and other water sources that feed it, some designated as Exceptional Value streams.

You have massive evidence confirming the toxicity of fracking wastewater. It cannot be safely disposed of. Water processing plants are subject to overload and discharge by storm events. Radioactive components cannot be effectively neutralized during processing. Transport of this toxic wastewater and use of it for purposes such as road repair or de-icing foster the heavy metals, salts, volatile compounds, and radioactive components leaching into our aquifers and running off to our high value, high quality waterways.

**Allowing fracking wastewater transport, disposal, and discharge, allowing fracking infrastructure such as pipelines, allowing water withdrawals for the fracking industry will compromise our Special Protections Waters and Sole Source Aquifer. You cannot assure that our water source is uncompromised by construction, maintenance and fractures of pipelines for their full use periods. You**

cannot assure fracking wastewater will not poison our aquifers and waterways. These are not damages that can be effectively remediated after harm. You must place correct value on keeping this Sole Source Aquifer clean and unharmed: the value of our aquifer greatly exceeds the value and benefit to the fracking industry of allowing fracking waste and infrastructure here, or allowing withdrawal and export of water.

Bridgeton Township where I live is particularly vulnerable to changes in water resources outside of our township. It sits on a massive diabase formation—this is the large “boulder” that created the sharp curve in the Delaware River at our location—see the circular diabase formation in the upper right of this image at the sharp curve in the river where the arrow points:



This geology assures virtually no water recharge in Bridgeton Township. We rely on aquifer recharge from North and West of the township—Delaware River Basin watershed areas that would be compromised by activities related to fracking. Our whole area (neighboring townships, as well as Holland and Alexandria across the Delaware River in Hunterdon County) relies on well water. **Once an aquifer is compromised, it cannot be easily or effectively remediated—not even with vast amounts of money.**

## **Allowing water extraction and export will negatively impact water quantity, decrease in water quantity will harm our aquifers and watershed**

The effect not only on quality but quantity of water to our Upper Bucks County townships must be considered: the harm associated with water withdrawal and decreased flow due to infrastructure construction. The Bridgeton-Nockamixon-Tinicum Joint Groundwater Management Committee (BNTJGMC or sometimes shown as BNTGC in documents) was formally established in September 2000—a joint venture of these three Bucks County townships—to study and advise on decisions affecting the quantity and quality of the Townships’ groundwater. The BNTJGMC was formed when the alarming rate at which wells in our area were going dry was noted. From *The Morning Call* article September 19, 2006 ([http://articles.mcall.com/2006-09-19/opinion/3679236\\_1\\_drinking-water-water-supply-sustainable-development](http://articles.mcall.com/2006-09-19/opinion/3679236_1_drinking-water-water-supply-sustainable-development)):

The Bridgeton-Nockamixon-Tinicum Joint Groundwater Management Committee has studied the rate at which water refills the local aquifer. Due to geological conditions, a two-acre lot in Nockamixon does not support the water needs of a typical home, about 400 gallons per day. For the aquifer to collect that amount of water, it has to come from a much larger area of land.

The average well depth in Pennsylvania is 180 feet. The wells in Nockamixon average 300 feet. The problem will only get worse. Drilling your well deeper is only a temporary (and costly) solution.

From the Nockamixon Township website: “The BNTJGC proposes and conducts scientific studies, regulatory reviews and educational programs. It also works to facilitate coordination of related municipal programs that ensure a safe, reliable and adequate water supply to support intended uses within the capacity of available groundwater resources.”

The BNTJGC, with funding from the EPA, commissioned a study by Princeton Hydro *Groundwater Recharge Assessment In Diabase Terrane—Implications For Potable Water Supply and Natural Resource Stewardship in Bucks County, Pennsylvania* that investigates headwaters catchment over a multi-year period to characterize interactions between surface and groundwater flow systems. From the report Abstract: “This study included development of a water budget to account for the various hydrologic inputs, outputs, and storage components. Additional lines of evidence were derived using stream flow frequency and base flow analysis methods to characterize water movement and water storage traits. Lastly, because amphibians respond primarily to water-based environmental cues, the local salamander community was surveyed repeatedly in the study setting in order to correlate its members’ occurrence along a hydrologic gradient.” And most importantly

Findings of this study demonstrated that most rain and snow that enters headwaters catchments in Coffman Hill diabase terrane remains near the land surface. Following a rain (or melt) event, part of the water in the setting rapidly flows out through a network of

small stream channels. Storage capacity in the headwaters catchment is limited due to the thin veneer of soil and the clay-dominated soil types that prevail. On a somewhat delayed basis, additional water also moves laterally and continuously through the thin (10 to 15 feet thick), shallow soil layer between the land surface and the top of bedrock. These local groundwater flowpaths discharge into headwaters wetlands, springs, and streams; their discharge rates adhere to seasonal patterns. Even during seasonal periods in which evapo-transpiration demands are low, the residence time for groundwater that infiltrates the soil is less than 45 days.

The outcome of this study is consistent with a potential for deep groundwater recharge of not more than one or two inches per year; equivalent to less than 5% of annual precipitation. Moreover, this study demonstrates that the functional hydrologic role of wetlands in diabase terrane is both to provide temporary, seasonal water storage and to serve as outlets from which shallow groundwater flowpaths drain the local landscape. Stream-dependent salamander richness and abundance across all life stages is maximized at groundwater discharge settings and minimized where hydroperiod becomes interrupted in the catchment.

In diabase terrane, the local flowpath structure is vital to the integrity of aquatic resources (e.g., streams, wetlands, springs); however, local flowpaths exert little to no influence on the deep groundwater zones that serve as potable supply in the region. Because local groundwater flowpaths dominate the headwaters catchment settings, **proper stewardship of the diabase region's exceptional natural resources warrants implementation of management strategies that ensure the integrity of the shallow groundwater zone. However, the shallow groundwater zone is functionally tied to the integrity of forest, spring, wetland, and stream in the diabase headwaters.**

Although preliminary, this study also suggested that the potential exists to conduct targeted, "rapid" salamander surveys within forested headwaters catchments during early spring in order to readily identify and map the overall hydroperiod status of the catchment. [emphasis mine]

The full text of the report, incorporated here by reference, can be found:

[https://www.grwa.wildapricot.org/Resources/Documents/BNT-Hydro-Report\\_Draft-10Mar09.pdf](https://www.grwa.wildapricot.org/Resources/Documents/BNT-Hydro-Report_Draft-10Mar09.pdf)

You can easily find newer citations than the following that I have on hand showing decrease in water levels in our area. Here, a 24 August 2011 story by WFMZ (<http://www.wfmz.com/news/Water-Woes-For-An-Upper-Bucks-County-Township/302004>) reports on findings from a BNTGC report showing decreasing water levels in our area, including testimony from a Kintnersville PA resident of the impact on his well:

Where's the water? Groundwater levels in one Bucks County community have been shrinking. And now residents and officials want to know if all the new neighbors are to blame. WFMZ's Jackie Shutack has the story. >> REPORTER: Homeowner Tom Spier says he has had to drill his way out of a water mess in the Kintnersville area in Upper Bucks County.

>> TOM SPIER/HOMEOWNER: "We have a newer well that was put in 11-12 years ago when the middle school opened, and it's just been slowly going downhill ever since."

>> REPORTER: Spier says he used to reach water at 87 feet in his well. Recently he drilled to 250 feet to get more water.. but water pressure is still an issue.

>> TOM SPIER/HOMEOWNER: "You're not creating enough pressure to keep everything clean, it's not the way you expect a new well to be."

>> REPORTER: Tuesday night, the Bridgeton Nockamixon Groundwater management committee presented the results of a water study to the Tinicum Township Supervisors.

>> ROBERT STANFIELD/BRIDGETON NOCKAMIXON GROUNDWATER MANAGEMENT CMTEE:

"There have been declines in the water level, in the wells by up to 100 feet. 1:50 If there was a drought, they might run out of water entirely."

>> REPORTER: Aside from digging deeper, many people say their next step is to take their fight to the state legislature.

>> ROBERT STANFIELD/BRIDGETON NOCKAMIXON GROUNDWATER MANAGEMENT CMTEE:

"We think the municipalities need some authority, but with assisted guidance from the state."

>> TOM SPIER/HOMEOWNER: "If our government allows new development and that's causing the problems, obviously, they have to do things to solve that issue there."

>> REPORTER: For now, Tom and his neighbors continue to deal with low water pressure, hoping they don't have to continue to drill for water.

This trend has continued and area residents are needing to drill deeper wells for their potable water. Allowing water extraction and export will negatively impact our already compromised water quantity.

Furthermore, allowing the construction and maintenance of fracking infrastructure such as pipelines would have a high potential for damaging our aquifer:

- disturbing pockets of toxic substances that have been adequately contained in soil from landfills or reclamation/remediation sites,
- release of heavy metals such as arsenic by blasting during the construction;
- destruction of wetlands and headwaters that feed and maintain the purity of the aquifer;
- cutting through our fragile ecosystem, thus inhibiting and changing routes of water flow;
- release of silt and construction substances into waterways during and after construction;
- destabilizing steep slopes and riparian buffers that are part of and protect the waterways;
- leeching of chemicals used to maintain right-of-ways;
- release of toxins from fractured, broken or exploded pipeline;
- denuding vegetation and clearcutting forests—lands that are necessary for the health of the aquifer—this project proposes nearly 70% of fresh cuts and the majority of the project falls within the Delaware River watershed; and
- creating swaths of land that would be managed as cleared areas and exponentially increase impervious surface (mowed tracts are much closer in level of water runoff to paved land than are natural meadows and forested lands).

**In summary, the DRBC must place high value on our aquifers and watershed and permanently and fully ban fracking *and its related activities*—the latter are allowed under your draft regulations and I ask you *ban all fracking activities, including wastewater storage, processing, and discharge; and water withdrawal and export*. As you are asked to consider fracking infrastructure projects affecting our area, I ask you to deny permits and approvals.**