

Frequently Asked Questions (FAQs)

Final Rules Addressing Hydraulic Fracturing Activities within the Delaware River Basin



1. What action did the Delaware River Basin Commission (DRBC) take regarding hydraulic fracturing activities within the Delaware River Basin?

The Commission adopted and added to its Comprehensive Plan a new [Part 440 – High Volume Hydraulic Fracturing](#), codified at Title 18, Chapter III, Subchapter B of the Code of Federal Regulations, to protect the water resources of the Delaware River Basin (the “Basin”). The new regulation states in part that:

- “High volume hydraulic fracturing in hydrocarbon bearing rock formations is prohibited within the Delaware River Basin.”
- “The Commission has determined that high volume hydraulic fracturing poses significant, immediate, and long-term risks to the development, conservation, utilization, management, and preservation of the water resources of the Delaware River Basin and to Special Protection Waters of the Basin, considered by the Commission to have exceptionally high scenic, recreational, ecological, and/or water supply values. Controlling future pollution by prohibiting such activity in the Basin is required to effectuate the Comprehensive Plan, avoid injury to the waters of the Basin as contemplated by the Comprehensive Plan and protect the public health and preserve the waters of the Basin for uses in accordance with the Comprehensive Plan.”

The Commission simultaneously adopted amendments unrelated to the prohibition on high volume hydraulic fracturing to its existing rules at [18 CFR 401.35](#) and [401.43](#), concerning the classification of projects for review under Section 3.8 of the Compact and regulatory program fees. These amendments do not substantively alter Commission review requirements or fees.

2. Did the Commission adopt new rules on the exportation of water out of the Basin for hydraulic fracturing or the importation of hydraulic fracturing wastewater into the Basin?

It did not. [Resolution No. 2021-01](#) of February 25, 2021 explains that draft sections 440.4 – Exportation of water for hydraulic fracturing and 440.5 – Produced water of the proposed regulations, *are not included* in the final regulation. By a [Resolution for the Minutes](#) also adopted on February 25, 2021, the Commissioners directed the Executive Director to prepare and publish for

public comment no later than September 30, 2021 a separate set of amendments to the Comprehensive Plan and implementing regulations to update DRBC's policies and provisions concerning inter-basin transfers of water and wastewater from and to the Delaware River Basin.

In accordance with the Resolution for the Minutes, the proposed rule amendments are to include and the public notice is to solicit comment on:

- a. conditions under which an exportation of water from the Basin may be approved or prohibited;
- b. conditions under which an importation of wastewater into the Basin may be prohibited; and
- c. any other provisions concerning inter-basin transfers of water and wastewater that commenters believe are necessary and appropriate to protect the public health or to preserve the waters of the Basin for uses in accordance with the Comprehensive Plan.

3. *The Commission did not address the importation of hydraulic fracturing wastewater and the exportation of water used for hydraulic fracturing in this rulemaking. Why?*

During the comment period on the draft rule, the Commission received numerous comments about a "full fracking ban." In part in response to those comments, the Commissioners decided to remove the sections of the proposed rules on importation and exportation and to revisit this issue in a separate rulemaking. This process will afford the Commission an opportunity to fully consider its existing import and export rules, policies and practices and will provide the necessary opportunity for public comment on further amendments to existing rules and the Comprehensive Plan.

4. *How long will it take to address the rulemaking on importation and exportation?*

The Resolution for the Minutes adopted by the Commission on February 25, 2021 directs the Executive Director to publish draft rules no later than September 30, 2021. A public comment period on the draft rules will be provided, after which the Commission must review and consider all comments received, modify the proposed rule if and as appropriate in response to such comments, and prepare a comment and response document. The schedule for completion of these tasks will depend upon the level of public participation, including the volume of comments received, and the availability of resources to meet the demands of the rulemaking and other Commission priorities.

5. *What are the risks to water resources posed by the Commission's decision not to act on importation and exportation at this time?*

The near-term risks to water resources are minimal. Existing DRBC regulations require the Commission to review a proposed diversion or transfer of water out of the Basin when the amount is equal to 100,000 gallons per day or more, and to review a proposed diversion or transfer of wastewater into the basin when the amount is equal to 50,000 gallons per day or more. Under the current Comprehensive Plan and regulations, both exportations of water from the Delaware River Basin and importations of wastewater into the Basin are discouraged (see [DRBC Water Code](#)

Section 2.30.2). The Commission has approved no exportations of water from the Basin for hydraulic fracturing and no importations of hydraulic fracturing wastewater, nor are any applications for such activities currently pending. Despite incorrect reports to the contrary, the [Commission's May 2010 resolution](#) in part "postpone[ing] the Commission's consideration of well pad docket until regulations are adopted" did not address the importation of wastewater into the Basin or exportation of water from the Basin related to hydraulic fracturing and did not result in a *de facto* moratorium on these activities. The existing rules and polices, which have been in place for many years, will continue to protect the Basin's water resources while the Commission conducts rulemaking in accordance with the Resolution for the Minutes approved on February 25, 2021.

6. What is "high volume hydraulic fracturing"?

The final regulations at Part 440.2 define "high volume hydraulic fracturing" as hydraulic fracturing using a combined total of 300,000 or more gallons of water during all stages in a well completion, whether the well is vertical or directional, including horizontal, and whether the water is fresh or recycled and regardless of the chemicals or other additives mixed with the water.

7. Does the Commission have authority to prohibit high volume hydraulic fracturing within the Delaware River Basin?

Yes. The [Delaware River Basin Compact](#), a statute enacted concurrently by the United States, the states of Delaware, New Jersey, and New York, and the Commonwealth of Pennsylvania, created the DRBC to manage the water resources of the Basin. The Compact recognized "the water and related resources of the Basin as regional assets" and established the Commission as an agency through which these vital shared resources could be jointly managed. (Compact, Part 1, Recitals). The Compact defines water resources broadly to include surface water, groundwater and "related natural resources," as well as "related uses of land." (§ 1.2(i)). It directs the Commission to adopt a Comprehensive Plan "for the immediate and long range development and uses of the water resources of the basin" to which federal, state, and local agencies and private parties are bound. (§§ 3.2 and 13.1). It provides the Commission with a range of tools for developing and implementing its Comprehensive Plan, including among others, the power to adopt and implement regulations. (§§ 14.2, 3.6(b), 3.6(h)). Article 5 of the Compact grants the Commission authority to, among other things, "adopt and from time to time amend and repeal rules, regulations and standards to control such future pollution and abate existing pollution . . . as may be required to protect the public health or to preserve the waters of the basin for uses in accordance with the comprehensive plan." (§ 5.2). The Commission in its final rule determined that controlling future pollution by prohibiting high volume hydraulic fracturing in the Basin is required to effectuate the Comprehensive Plan, avoid injury to the waters of the Basin as contemplated by the Comprehensive Plan and protect the public health and preserve the waters of the Basin for uses in accordance with the Comprehensive Plan. For more information on the Commission's authority, see Section 2.1.1 of the [Comment and Response Document](#).

8. Are the members of the Commission unelected officials?

No. The [Delaware River Basin Compact](#) at Section 2.2 provides: “The commission shall consist of the Governors of the signatory states, *ex officio*, and one commissioner to be appointed by the President of the United States to serve during the term of office of the President.” Subsequent federal law requires the Commander of the North Atlantic Division of the Army Corps of Engineers to serve as the federal representative *ex officio* (as a result of holding this office). The governors are elected officials. When the legislatures (comprised of elected officials) of each of the four basin states enacted the Compact creating the Commission, they provided that its state members would be the governors.

9. Why did the Commission prohibit high volume hydraulic fracturing within the Delaware River Basin?

Resolution No. 2021-01 sets forth the reasons for the prohibition. The Commission found and determined that:

1. As the scientific and technical literature and the reports, studies, findings and conclusions of other government agencies reviewed by the Commission have documented, and as the more than a decade of experience with high volume hydraulic fracturing in regions outside the Delaware River Basin have evidenced, despite the dissemination of industry best practices and government regulation, high volume hydraulic fracturing and related activities have adversely impacted surface water and groundwater resources, including sources of drinking water, and have harmed aquatic life in some regions where these activities have been performed.
2. The region of the Delaware River Basin underlain by shale formations is comprised largely of rural areas dependent upon groundwater resources; sensitive headwater areas considered to have high water resource values; and areas draining to DRBC Special Protection Waters.
3. The geology of the region in which shale formations potentially containing natural gas are located in the Basin is characterized by extensive geologic faults and fractures providing preferential pathways for migration of fluids (including gases).
4. If commercially recoverable natural gas is present in the Delaware River Basin and if high volume hydraulic fracturing (“HVHF”) were to proceed in the Basin, then:
 - a. Spills and releases of hydraulic fracturing chemicals, fluids and wastewater would adversely impact surface water and groundwater, and losses of well integrity would result in subsurface fluid (including gas) migration, impairing drinking water resources and other uses established in the Comprehensive Plan.
 - b. The fluids released or migrating would contain pollutants, including salts, metals, radioactive materials, organic compounds, endocrine-disrupting and toxic chemicals, and chemicals for which toxicity has not been determined, impairing the water uses protected by the Comprehensive Plan.

- c. HVHF activities and their impacts would be dispersed over and adversely affect thousands of acres of sensitive water resource features, including, among others, forested groundwater infiltration areas, other groundwater recharge locations, and drainage areas to Special Protection Waters, where few existing roads are designed to safely carry the heavy industrial traffic required to support HVHF, prevent dangerous spills or provide access to remediate spills that occur.
5. For the foregoing reasons and other grounds described in the administrative record for this rulemaking:
- a. High-volume hydraulic fracturing and related activities pose significant, immediate and long-term risks to the development, conservation, utilization, management, and preservation of the water resources of the Delaware River Basin and to Special Protection Waters of the Basin, considered by the Commission to have exceptionally high scenic, recreational, ecological, and/or water supply values.
 - b. Controlling future pollution by prohibiting high volume hydraulic fracturing in the Basin is required to effectuate the Commission's Comprehensive Plan, avoid injury to the waters of the Basin as contemplated by the Comprehensive Plan and protect the public health and preserve the waters of the Basin for uses in accordance with the Comprehensive Plan.

10. Is there anything unique about the Delaware River Basin and its water resources that was considered by the Commissioners in their decision making ?

Yes. In reaching its determination to prohibit HVHF within the Basin, the Commission considered the Basin's unique geographic, geologic, hydrologic, and regulatory setting.

The portions of the Basin underlain by the Marcellus and Utica Shale formations are largely located in sensitive headwaters regions of the Basin that are predominantly rural and 85 percent forested, and thereby provide ideal protection for water resources. (See Figure 1 of the Comment and Response Document). These areas drain to waters designated and protected by the DRBC as "Special Protection Waters" due to their exceptionally high scenic, recreational, ecological, and/or water supply values and their inclusion by the United States Congress in the National Wild and Scenic Rivers System.

This area also encompasses a portion of northeast Pennsylvania in which 83 percent of river miles and related watershed areas have been designated by the Pennsylvania Department of Environmental Protection as either Exceptional Value (EV) or High Quality (HQ) waters requiring special protection.

The surface and groundwaters that the regulation protects from HVHF impacts provide drinking water to over 13 million people and contain a reservoir system that serves as one of the primary drinking water resources for over 8 million people in the City of New York. The City's three Delaware River Basin reservoirs constitute its largest source of uniquely unfiltered drinking water and are the subject of EPA's Filtration Avoidance Determinations.

Geologically, the area of the Basin underlain by the Marcellus and Utica Shales is characterized by glacial and peri-glacial surficial geology, including moraines, kames, and stratified drifts, that are particularly sensitive to surface disturbances, and are geologically distinct from shale-gas production areas outside of the Basin. The Marcellus and Utica formations generally reach their greatest depths approaching or within the Basin, and then dip steeply upward until they crop out at the Earth's surface in a belt extending through the Basin, creating greater potential for the sub-surface migration of fluids (including gases) into shallow aquifers and ground water than exists in shale-gas settings in central and western Pennsylvania and elsewhere.

The Basin is prone to droughts, water shortages, and salinity intrusion, and the flow of the main stem Delaware River is carefully managed to address these shifting conditions. Climate changes heighten the unique drought and flow management challenges for this Basin.

The statutory framework in the Delaware River Basin Compact ("Compact") provides an institutional mechanism for the four Basin states and the United States to jointly exercise their authorities to manage the Basin's water resources.

11. *Is hydraulic fracturing allowed in the area regulated by the Susquehanna River Basin Commission (SRBC)?*

Yes, but only within Pennsylvania. High volume hydraulic fracturing is prohibited in the states of New York and Maryland—the two other states that are members of the SRBC. Information about the SRBC and its regulations concerning the use of water for natural gas well development can be found on [SRBC's website](#).

12. *Are the SRBC and the DRBC the same type of agency with some of the same Commissioners?*

The DRBC and the SRBC are both interstate and federal river basin management agencies. Each was created by its Basin states and the federal government through concurrent legislation in the form of an interstate compact. See Article 1, Section 10, Clause 3 of the U.S. Constitution. The Commonwealth of Pennsylvania and the State of New York are signatories of both compacts. In addition to these two states, the SRBC also includes Maryland (for a total of three states), while the DRBC includes New Jersey and Delaware (for a total of four states). The federal member of both commissions is the Division Commander of the U.S. Army Corps of Engineers. However, state representation on the two commissions differs. In accordance with the respective compacts, DRBC's state members are "the Governors of the signatory states," while SRBC's state members are "the governor or the designee of the governor of each signatory state." Historically, the governors of New York, Maryland and Pennsylvania have appointed the chief executive of their respective environmental agencies as SRBC commissioners. The commissioners of both SRBC and DRBC generally appoint one or more alternates to act on their behalf; however, [the commissioners for the DRBC](#) member states are elected officials (the governors of the respective states) while in practice, [the commissioners for the SRBC](#) member states are designees of the governor.

A substantive difference between the two compacts, rooted in the very different history and geography of the two basins, is in the language of their respective Articles 5. Article 5 of the [DRB Compact](#), titled “Pollution Control,” opens with the statement, “The commission may assume jurisdiction to control future pollution and abate existing pollution in the waters of the basin, whenever it determines after investigation and public hearing upon due notice that the effectuation of the [Commission’s] comprehensive plan so requires.” Article 5 of the [SRB Compact](#), titled “Water Quality Management and Control,” includes language that, although similar, appears six paragraphs into Article 5, and only after a provision expressly stating that “[t]he legislative intent in enacting this article is to give specific emphasis to the primary role of the states in water quality management and control.” Importantly, the statement in the SRB Compact in Article 5 excludes the phrase “to control future pollution and abate existing pollution.” Pollution control was one of the principle reasons the DRBC was created, and as such, has been a central focus of the Commission’s work since its inception. Since DRBC was created, it has established uniform water quality standards in the Basin, particularly within the main stem Delaware River. DRBC has taken a leading role in restoration of the Delaware Estuary, which is impaired by legacy pollution from industrial activity that occurred prior to the enactment of the DRB Compact and key federal and state environmental laws. In this regard:

- DRBC established and together with the signatory parties has implemented wasteload allocations that have restored dissolved oxygen in the Estuary from concentrations incapable of supporting aquatic life to the vastly improved levels we have today, which support robust fish populations. More information on this program can be found on the DRBC website [here](#).
- DRBC spearheaded a program that has made tremendous progress in reducing contamination from polychlorinated biphenyls (PCBs), which continue to be the cause of state fish consumption advisories for multiple species of Estuary fish. More information on this program can be found on the DRBC website [here](#).

DRBC also has taken the lead in protecting interstate waters of exceptionally high quality, including the main stem Delaware River from Hancock, New York, to Trenton, New Jersey. Through DRBC, the Basin states and federal government established the Special Protection Waters program to protect the exceptionally high water quality of the non-tidal Delaware River. The management objective of this antidegradation program is “no measurable change in existing water quality except toward natural conditions.” More information on this program can be found on the DRBC website [here](#).

The DRBC has a long history and accomplishments in the area of water quality restoration and protection, whereas SRBC has focused its regulatory authority almost exclusively on issues related to water quantity.

13. What differences exist between the Susquehanna and the Delaware River Basins that might account for the different responses of the SRBC and DRBC to hydraulic fracturing?

The two Basins are different in several key respects related to water resources. The main stem [Delaware River is an interstate water for its entire 330 river miles](#). This is not the case for [the Susquehanna River, which flows from New York through Pennsylvania and into Maryland](#) in a “stacked” or sequential manner. Within any interstate basin, upstream events may affect downstream states. However, in the Susquehanna, the downstream state is more often than not farther away than the width of the river.

As noted in the response to no. 6 above, acting jointly through the DRBC, the member states and federal government, after significant public input, have classified the entire non-tidal reach of the main stem Delaware River and portions of its tributaries within national recreation or “Wild and Scenic” management areas as [“Special Protection Waters” \(SPW\)](#) due to their exceptionally high scenic, recreational, ecological, and/or water supply values. It is expected that practically all of the development and related disturbances from high volume hydraulic fracturing would occur in the drainage area to approximately 144 river miles (73 percent) of the basin’s SPW waters. Notably, a 73-mile reach of the mainstem Delaware River with a drainage area overlying the Marcellus and Utica shales also has been included by the United States in [the National Wild and Scenic Rivers system](#). Such a designation has not occurred in the neighboring Susquehanna River Basin.

In the Susquehanna Basin, all surface water quality classifications are established by the individual states for waters within their state, and never jointly as in the case of DRBC’s SPW.

In addition, up to 900 million gallons per day of water are exported from the Delaware River Basin to support the water supply needs of millions in New York City and portions of New Jersey outside the Delaware Basin. It is possible that because out-of-basin diversions from the Susquehanna are not nearly as significant as from the Delaware, a comparable level of concern on the part of out-of-basin water users regarding the sufficiency and quality of main stem flows has not arisen in connection with SRBC’s hydraulic fracturing permitting actions.

14. Has DRBC reviewed the SRBC water quality data relating to natural gas development in the Susquehanna River Basin?

Yes. DRBC carefully reviewed the SRBC reports entitled “Continuous Water Quality Trends in the Susquehanna River Basin—2016 Summary Report” (“Summary Report”) and [“Continuous Water Quality Trends Adjusted for Seasonality and Streamflow in the Susquehanna River Basin,”](#) the full report on which the Summary Report is based (“Report”). The SRBC statement on water quality most referenced by commenters on the DRBC rules was not presented in the “Conclusions” section of either document, but rather in the section of each on “Next Steps.” The full text reads:

To date, the Commission’s remote water quality monitoring network has not detected discernible impacts on the quality of the Basin’s water resources as a

result of natural gas development, but continued vigilance is warranted. The Commission's next steps with the program include selecting a subset of stations with increasing conductance trends to further investigate the cause of increasing conductance.

SRBC's conclusions and underlying data indicate that there was a trend in water quality changes associated with specific conductance, which can be an indicator parameter for hydraulic fracturing aqueous wastes. The "Conclusions" section of the SRBC Summary Report states:

The results of this study illustrated various trends in water quality parameters at a relatively small number of stations, although no clear cause or correlation with human activity could be discerned. Out of the five separate water quality parameters examined, at least one significant trend was observed at 40 out of the 53 stations. Of these 40 stations, a total of 57 significant water quality trends were identified [[see Report, Table 6, page 22](#)]. The Commission observed more trends for conductance than any of the other four parameters. For this reason, the stations with specific conductance trends were a major focus of the analyses. Less than 20 percent of stations with increasing conductance trends also experienced trends in dissolved oxygen, temperature, or turbidity, making it difficult to analyze for the cause of the trend.

Acknowledging the need for more work to be performed, the "Next Steps" section of the Report states that:

Water quality trends will be re-examined when there are 10 years of continuous data at each station. The extended timeframe will allow for more robust analysis of the data, and also allow additional supplemental data, such as discrete water chemistry samples, to be collected in each watershed. In addition to revisiting the trends, any changes to water quality conditions will also be evaluated against the aquatic biological community data collected within the monitored watersheds.

[The Report](#) (at page 14) also states that SRBC's analysis resulted in "inconclusive evidence for the presence of fractured wells influencing conductance trends."

In addition, the SRBC data do not include adequate indicator parameters related to the impacts from high volume hydraulic fracturing. SRBC's report focuses only on the water quality parameters of pH, specific conductance, water temperature, dissolved oxygen, and turbidity. Of these parameters, only specific conductance is likely to be correlated with the very limited indicator parameters for hydraulic fracturing aqueous wastes.

A [2016 report by the USGS and the Northeast Midwest Institute \(USGS/NEMWI\)](#)¹ entitled "Water data to answer urgent water policy questions: monitoring design, available data and filling data gaps for

¹ Betanzo, E. A., Hagen, E. R., Wilson, J. T., Reckhow, K. H., Hayes, L., Argue, D. M., and Cangelosi, A. A. (2016). Water data to answer urgent water policy questions: Monitoring design, available data and filling data gaps for

determining whether shale gas development activities contaminate surface water or groundwater in the Susquehanna River Basin,” examined the SRBC’s and other monitoring programs. Significant findings by the USGS/NEMWI study team included:

- The existing surface water quality data in the Susquehanna River Basin are insufficient to detect water-quality change related to shale gas development. . . .
- The publicly available groundwater quality data in the Susquehanna River Basin are not sufficient to detect whether shale gas development is contaminating groundwater, and the available data are not adequate to serve as the foundation of a new monitoring program.

[A NEMWI briefing sheet](#) accompanying the report also stated:

Historical monitoring sites are not located near hydraulic fracturing well pads, and more recent monitoring programs lack the frequency needed to detect water quality change to support timely decision making.

. . . .

Recent targeted monitoring programs through the Susquehanna River Basin Commission and Pennsylvania Department of Environmental Protection are monitoring in appropriate locations, but additional sampling frequency, parameters, and streamflow data are needed before water quality trends can begin to be detected.

As noted, the SRBC data do not comprehensively or definitively address the question of long-term impacts to water resources. If a study were to be undertaken to address long term water resource impacts in the Susquehanna River Basin by the PADEP, PADCNR, SRBC or others, the USGS/NEMWI study should be used as guidance for scope development. Section 2.3.3.1, Drinking Water Resources, of the Comment and Response Document discusses documented impacts to water resources in the Susquehanna River Basin from high volume hydraulic fracturing activities, including impacts to private drinking water wells.

A [2019 “Technical Summary” by the SRBC](#) describes results from the SRBC’s Remote Water Quality Monitoring Network (“RWQMN”) for 16 selected stations (from among the full network of 59 stations) in watersheds that drain portions of, or that flow through, state forest lands. Although the purpose of the technical summary is not stated, the report documents statistics for three continuous monitoring parameters, a water quality index based on nine other parameters, and an analysis of biological monitoring. The technical summary report itself contains no conclusions. After carefully reviewing the data and information provided in the summary, DRBC found the results presented in the report to be

determining whether shale gas development activities contaminate surface water or groundwater in the Susquehanna River Basin. Washington, D.C.: Northeast-Midwest Institute Report, U.S. Geological Survey. <https://www.nemw.org/wp-content/uploads/2016/06/Susquehanna-River-Basin-Shale-Gas-Development-Study-Report.pdf>

inconclusive regarding impacts of HVHF activity in the Susquehanna River Basin for the reasons set forth below:

- The report describes some possible explanations for selected results but does not rule out impacts from natural gas development or state any conclusions regarding impacts of the natural gas industry on surface water quality. The report does not conclude that natural gas development has had no impact on monitored streams.
- The drainage areas for the 16 stations monitored are not representative of the range of intensity of HVHF activity in the Susquehanna River Basin. None of the 16 stations monitors a stream draining an area characterized by a well pad density of greater than 0.6 pads/mi². Seven of the other RMQMN stations (not included in the report) monitor streams draining areas with well pad densities greater than 0.6 pads/mi² and as high as 1.27 pads/mi². None of the 16 stations is located downstream from a HVHF wastewater treatment plant.² Impacts to surface waters in the Susquehanna River Basin caused by treatment plants treating HVHF wastewater have been documented by the [U.S. EPA in a 2018 Report](#).³ The 16 drainage areas covered by the SRBC's 2019 report account for only 4 percent of the Susquehanna River Basin.
- The 2019 SRBC report uses a Water Quality Index ("WQI") that does not relate closely to potential HVHF impacts. The WQI is designed to relate to other human activities: abandoned mine drainage, agriculture, and urban development. As a result, the relation of the WQI to potential HVHF impacts is unclear. The nine water quality parameters used to calculate the WQI do not include many that are most indicative of HVHF activity, such as barium, bromide, calcium, gross alpha, gross beta, lithium, magnesium, radium-226, radium-228, strontium, suspended sediment, total dissolved solids, uranium, and specific conductance. The water quality of a stream might be rated "good" or "excellent" according to the WQI, yet the stream could be impacted by one or more of these other HVHF-related constituents.
- Although the 2019 SRBC report lists the fractured well density in each monitored drainage area, no attempt is made to relate this factor or other natural gas metrics to any water quality results.
- The scope of the 2019 SRBC report does not include any analysis of water quality trends. Trends in water quality parameters could provide an early indication of water quality degradation, even in waters that meet water quality criteria and are considered to have "good" water quality.
- As described previously, the 2016 study by the Northeast-Midwest Institute and the U.S. Geological Survey concluded that the existing surface water quality data in the Susquehanna River Basin are insufficient to detect water-quality change related to shale gas development. If impacts to water quality from HVHF activities are occurring, they may not be detected through analysis of the data being collected in the Susquehanna River Basin.

² *Id.*

³ *See*, U.S. Environmental Protection Agency. (2018). Detailed study of the centralized waste treatment point source category for facilities managing oil and gas extraction wastes. (EPA-821-R-18-004). Washington, D.C.: U.S. Environmental Protection Agency. https://www.epa.gov/sites/production/files/2018-05/documents/cwt-study_may-2018.pdf

DRBC has carefully reviewed the SRBC data and is fully aware of the reliable scientific analysis that demonstrates the limitations of these data.

15. *What is specific conductance and why does it matter?*

Specific conductance (also, “conductance”) is a measure of how easily an electrical current can pass through water. This parameter is easily measured and recorded with a meter. It is especially sensitive to the salts and ions that are defining characteristics of hydraulic fracturing fluid and produced water from fracturing activities. The [2016 SRBC report](#) discussed in no. 14 above states (at page 4):

. . . changes in conductance are caused by human impacts in a watershed. Within the Susquehanna River Basin, these impacts may include abandoned mine drainage, agricultural runoff, urban runoff, and unconventional natural gas (UNG) fracking fluid spills or leaks.

16. *The federal government and states regulate hydraulic fracturing. Isn't that good enough without DRBC rules and a prohibition?*

The Commission acknowledges the responsible regulatory oversight by the PADEP and the federal government, as applicable. However, based on an extensive scientific and technical analysis, the Commission has determined that, notwithstanding industry best practices and federal and state requirements, if high volume hydraulic fracturing were to proceed in the Basin, spills and releases of HVHF chemicals, HVHF fluids and HVHF wastewater; leaks through defective or degraded wellbore casings; migration of fluids (including gases) and wastewater through the subsurface; and other incidents associated with HVHF activities would likely contaminate drinking water aquifers, groundwater and surface water of the Basin and impair the Commission’s Comprehensive Plan. To effectuate the Comprehensive Plan for the immediate and long-range development and use of the Basin’s water resources, as the Compact requires, the Commission has determined that a prohibition on HVHF within the Basin is required. For more information, please see Section 2.1.2 of the Comment and Response Document.

17. *The 2016 U.S. EPA Report, Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States, did not recommend a prohibition on hydraulic fracturing. Did DRBC use this report ?*

Yes. The purpose of the [U.S. EPA’s 2016 report](#) was not to make policy recommendations, and it did not do so. However, the Executive Summary of the report states, “The scientific information in this report can help inform decisions by federal, state, tribal, and local officials; industry; and communities.” DRBC used this report and numerous other sources of information to inform its decision making.

The following excerpt from the Executive Summary of the 2016 U.S. EPA report sets forth the report's conclusions in part:

The hydraulic fracturing water cycle describes the use of water in hydraulic fracturing, from water withdrawals to make hydraulic fracturing fluids, through the mixing and injection of hydraulic fracturing fluids in oil and gas production wells, to the collection and disposal or reuse of produced water. These activities can impact drinking water resources under some circumstances. Impacts can range in frequency and severity, depending on the combination of hydraulic fracturing water cycle activities and local- or regional-scale factors. The following combinations of activities and factors are more likely than others to result in more frequent or more severe impacts:

- Water withdrawals for hydraulic fracturing in times or areas of low water availability, particularly in areas with limited or declining groundwater resources;
- Spills during the management of hydraulic fracturing fluids and chemicals or produced water that result in large volumes or high concentrations of chemicals reaching groundwater resources;
- Injection of hydraulic fracturing fluids into wells with inadequate mechanical integrity, allowing gases or liquids to move to groundwater resources;
- Injection of hydraulic fracturing fluids directly into groundwater resources;
- Discharge of inadequately treated hydraulic fracturing wastewater to surface water resources; and
- Disposal or storage of hydraulic fracturing wastewater in unlined pits, resulting in contamination of groundwater resources.

The above conclusions are based on documented instances of impacts to water resources for all stages of the hydraulic fracturing water cycle. Identified impacts generally occurred near hydraulically fractured oil and gas production wells and ranged in severity, from temporary changes in water quality to contamination that made private drinking water wells unusable. In the course of carefully reviewing the comments submitted on the Commission's draft rules, the Commission considered the large body of scientific research published since the U.S. EPA issued its 2016 report. The Commission found that additional research has largely confirmed and expanded upon the EPA's findings, supporting the conclusion that HVHF poses immediate and long-term risks to water resources, human health, and aquatic life in the Delaware River Basin. For more information see Section 2.3.1 of the Comment and Response Document.

18. Did the DRBC prohibit high volume hydraulic fracturing to address energy source policies?

Although the Commission members recognize the importance of energy conservation and renewable energy sources to any long-term national, regional, or state energy policy, the Commission does not set energy policies for the nation, the region or our member states. In accordance with the authority conferred on the Commission by the Delaware River Basin Compact, the proposed rules for high volume hydraulic fracturing and related activities are limited to addressing the planning, development, conservation, utilization, management, and control of the water resources of the Basin to meet present and future needs.

19. Is natural gas production commercially viable in the Delaware River Basin?

The geologic setting in the region of the Delaware River Basin underlain by gas-bearing shales is unique. As Section 1.7 of the Comment and Response Document sets forth in some detail, the Basin geology is not similar to that of areas west of the Basin, where natural gas development is commercially productive. As noted in Section 2.6.6 of the Comment and Response Document, available geological information, field data and industry experience suggest that the potential for natural gas development in the Delaware River Basin may be limited. For example:

- Commentors have suggested that a 60-square-mile portion of Wayne County, Pennsylvania adjacent to and west of the Delaware River Basin within the Susquehanna River Basin (where no prohibitions exist) is “productive”; yet, no natural gas development has occurred there.
- [PADEP Oil and gas maps](#) and records display a fairly defined arc of plugged natural gas wells five and more miles west of the Delaware River Basin divide. Immediately west of this arc, drilling activity appears to be extremely dense, while immediately east of it, active gas wells are entirely absent.
- Retired Penn State University geosciences professor Terry Engelder has referred to a Marcellus “line of death” (Engelder’s term)⁴, representing the estimated margin at which the Marcellus Shale play reaches thermal over-maturity, or the transition point (west to east) at which commercially viable quantities of dry natural gas have been effectively “baked out” over geologic time. The Delaware River Basin is east of this transition point.

⁴ See, Zhou, Y., Nikoosokhan, S., and Engelder, T. (2017). Sonic properties as a signature of overpressure in the Marcellus gas shale of the Appalachian Basin. *Geophysics*, 82(4): D235-D249. <https://library.seg.org/doi/pdf/10.1190/geo2016-0547.1>

20. Why did it take so long for the Commission to act after the close of the public comment period on March 30, 2018?

For several reasons, this rulemaking process has been lengthy. First, rulemaking is a deliberative process that takes time, regardless of the subject matter. When, as here, many thousands of public comments are received, additional time and effort is required to carefully review, sort, distill and consider all oral and written submissions. Second, this rulemaking involved a technically complex subject on which scientific understanding continues to evolve. Many of the comments submitted on the draft rules consisted of, or were accompanied by, technical reports. The Commission has considered a large body of scientific research, technical literature and reports, studies, findings, and conclusions of other government agencies, of which many are among the 475 sources comprising the section of the Comment and Response Document titled “References.” Third, the Commission staff sought input from and conferred with subject matter experts in the technical agencies of DRBC’s member states and the federal government for assistance in developing the final rules and supporting record. Such coordination takes time. Finally, the Commission’s resources are limited. The staff available to support this effort also perform other mission-critical and non-discretionary work, including time-sensitive undertakings required by the Compact and or requested by stakeholders.

END OF SECTION

ADDITIONAL QUESTIONS AND ANSWERS WILL BE ADDED AS REQUIRED