

Release of treated wastewater from hydraulic fracturing contaminates lake

July 12 2017

Hydraulic fracturing has enabled a domestic oil and gas boom in the U.S., but its rapid growth has raised questions about what to do with the billions of gallons of wastewater that result. Researchers now report that treating the wastewater and releasing it into surface waters has led to the contamination of a Pennsylvania watershed with radioactive material and endocrine-disrupting chemicals. The study appears in ACS' journal *Environmental Science & Technology*.

In 2015, the unconventional oil and gas extraction method known as [hydraulic fracturing](#), or "fracking," accounted for more than one-half of oil production and two-thirds of gas production in America, according to the U.S. Energy Information Administration. The method's market share is likely to increase even further. Although the technique has resulted in a shift away from coal, which could reduce [greenhouse gas emissions](#), it produces large amounts of [wastewater](#) containing radioactive material, salts, metals, endocrine-disrupting chemicals and [polycyclic aromatic hydrocarbons](#) that could pose risks to the environment and [human health](#). A Pennsylvania report estimates that in 2015, 10,000 unconventional oil and gas wells in the Marcellus Shale produced 1.7 billion gallons of wastewater. The facilities that collect the water provide only limited treatment before releasing it into [surface waters](#). Bill Burgos and colleagues at Penn State, Colorado State and Dartmouth wanted to see what impact this strategy of treating and releasing fracking wastewater might be having.

The researchers sampled sediments and porewaters from a lake

downstream from two facilities that treat fracking wastewater in Pennsylvania. Their analysis detected that peak concentrations of radium, alkaline earth metals, salts and organic chemicals all occurred in the same sediment layer. The two major classes of organic contaminants included nonylphenol ethoxylates, which are endocrine-disrupting chemicals, and polycyclic aromatic hydrocarbons, which are carcinogens. The highest concentrations coincided with sediment layers deposited five to 10 years ago during a peak period of fracking wastewater disposal. Elevated levels of radium were also found as far as 12 miles downstream of the treatment plants. The researchers say that the potential risks associated with this contamination are unknown, but they suggest tighter regulations of wastewater disposal could help protect the environment and human health.

More information: "Watershed-Scale Impacts from Surface Water Disposal of Oil and Gas Wastewater in Western Pennsylvania" *Environmental Science & Technology* (2017).
pubs.acs.org/doi/abs/10.1021/acs.est.7b01696

Provided by American Chemical Society

Citation: Release of treated wastewater from hydraulic fracturing contaminates lake (2017, July 12) retrieved 26 April 2024 from <https://phys.org/news/2017-07-wastewater-hydraulic-fracturing-contaminates-lake.html>

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