

Name _____

Student ID _____

Date _____

Hydrofracking and Forests

1. Read “Fracking Fury” by Janna Palliser. Based on this reading, answer the following questions:
 - a. What is hydrofracking?

Hydrofracking is a mechanical process that allows us to get natural gas from shale rock that is deep underground. Large cracks, or fractures, are created by pumping lots of fluid (water and chemicals) down into a well and into the rock. When the rock begins to fracture, natural gas that was inside the rock moves up and is captured by the drilling process.

- b. Where is the closest shale gas available to you?

Answers will vary.

- c. Complete the chart below, based on the reading.

Benefits of Hydrofracking	Drawbacks of Hydrofracking
<i>Provides a source of energy – natural gas</i>	<i>Uses a lot of water</i>
<i>Provides jobs</i>	<i>Can pollute groundwater</i>
<i>Natural gas is a cleaner fuel than coal or oil</i>	<i>Creates a lot of polluted waste water</i>
<i>Less reliance on foreign sources of gas</i>	<i>Can cause earthquakes</i>
	<i>May affect human health from water or air pollution associated with the drilling</i>

- d. Based on what you have read, do you think hydrofracking should be allowed to continue? Explain your answer, using evidence from the article.

Answers will vary.

2. Use the graph below to answer the following questions. This study, conducted by scientists at Duke University, examined methane concentrations in drinking water wells located at various distances from Marcellus gas wells in Pennsylvania.

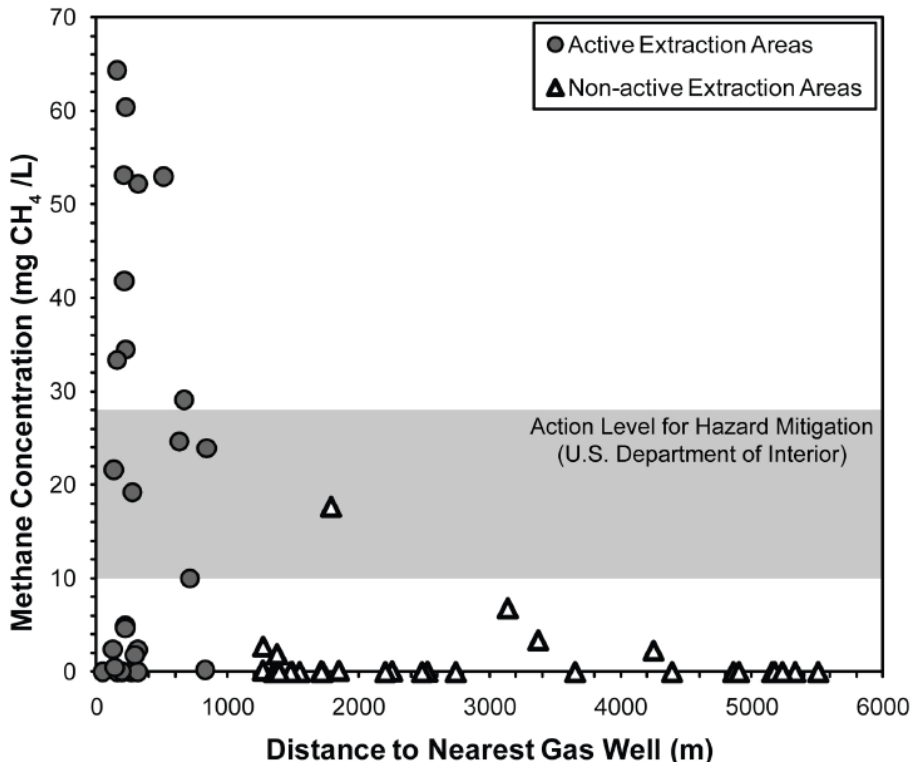


Figure 3 from Osborn, S.G., A. Vengosh, N.L. Warner & R. Jackson. 2011. Methane contamination of drinking water accompanying well-drilling and hydraulic fracturing. *Proceedings of the National Academy of Sciences* 108: 8172-8176.

a. What is the difference in methane concentration between active and non-active extraction areas?

The methane concentration in wells near active drilling sites varies a lot more than the concentration in wells near non-active sites. More of the values are higher near the active sites.

b. What is the range in methane concentration for sampling sites that were in active extraction areas within 1000m from a gas well?

The range is from 0 to 65 mg CH₄/L.

c. What do you think could be the cause of the variability in methane concentration in active extraction areas?

The methane concentration could vary because of the way in which the well was drilled, the underlying geology, how close the groundwater is to the well, etc.

3. In this investigation, you will focus on the potential ecological consequences of hydrofracking on ecosystems. You will be using a study that investigated the impact of spraying flowback water,

or the water that comes back out of the wells, onto forests. This study measured the following variables in the forest soil where the water was sprayed:

- a. pH
- b. Total Nitrogen
- c. Chloride
- d. Phosphorus
- e. Iron
- f. Sodium

Based on what you have read, make a prediction about which variable you think will show the greatest change between the control and the treatment forest:

Answers will vary but students may have picked up on the issue of “brines” in the reading, or they may have heard about salty water coming back up out of the ground as flowback water.

4. Justify the answer to #3 – why did you pick the variable that you did? Give a specific reason from the article (or another article). Cite your source.

If students selected brine (chloride), they can point to the statement in Fracking Fury (pg 22): “One study found wastewater...had increased concentrations over time of total dissolved solids, chloride, barium, calcium, water hardness, and levels of radioactivity.”