

High Volume Hydraulic Fracturing (HVHF) and Associated Activities in the Town of Lansing

Goal : Assess the potential impact of High Volume Hydraulic Fracturing (HVHF) and associated activities in the town and develop a strategy to address the concerns of Town of Lansing residents.

An entirely new and controversial issue has emerged here in Lansing, the southern tier and the Finger Lakes region since the last comprehensive plan was approved in 2006. This is the potential development of natural gas production, and associated industries, using the controversial technique of high volume hydrofracking (HVHF). With HVHF, 1 to 5 million gallons of fluid mixtures containing water, sand, and a long list of often toxic chemicals (some are known, some are undisclosed) are pumped under very high pressures into underground rock formations to create or enlarge fissures and pores, through which trapped oil and gas escapes so it can be collected. While drilling for natural gas has occurred here in Lansing before (most recently, exploratory wells in 2007 and 2008), the development of these wells (usually to extract gas from the Trenton-Black River formation) was on a scale that was much smaller, and with fewer wells per area, compared to Marcellus Shale HVHF development now occurring in parts of Pennsylvania. In New York State, the Marcellus Shale will be a future target in the southern tier, and the lower Utica Shale may be a target in NYS farther north.

Although many studies are currently taking place, there are many unknown impacts regarding air pollution, aquifers, and health effects related to HVHF. There is also evidence of social impacts including increased crime and increased demands for social and emergency services (Christopherson and Rightor, 2011). Roads in these areas are subject to greatly increased wear due to a heavy volume of truck traffic associated with the drilling and the HVHF process. As with other forms of energy development, communities tend to see a boom and bust cycle (Christopherson and Rightor, 2011).

At the time of this writing (winter, 2014) New York State has a moratorium on using HVHF for oil and gas extraction. Currently, the health impacts related to HVHF are being evaluated by the NYS Department of Health.

Over 130 New York State municipalities (mainly towns, but also a number of cities) have either bans or moratoriums related to HVHF in their areas. Lansing has had a moratorium in place since May 2012. The use of bans and moratoriums, under the principle of town home rule, is currently being contested in the courts. So far the lower courts have ruled unanimously in favor of home rule, and the issue is now being reviewed by the Court of Appeals, which is the highest court in New York State.

In accordance with:

Goal LU-1: Shape and improve the quality of the built environment by focusing future growth to provide for the needs of Town residents while fostering a balanced mix of agricultural, open space and recreational, residential, commercial, institutional, and office/light industrial uses.

in the Land Use and Development section new *heavy* industrial development is not encouraged.

Two separate surveys to assess the sentiment of the town about HVHF have been conducted; the first in November 2011, and the second in July 2013. In November of 2011 the Lansing Gas Drilling Oversight Committee organized an election-day survey to assess the general sentiment of the town regarding HVHF. Lansing residents could anonymously fill out a three question survey outside of each polling place in the town. There were 916 survey results which represented 45% of the voters on that day (Nov. 8, 2011). This is a very large sample size. Figures 1, 2 and 3 summarize the overall survey results.

1. Do you favor HVHF gas development in the Town of Lansing?

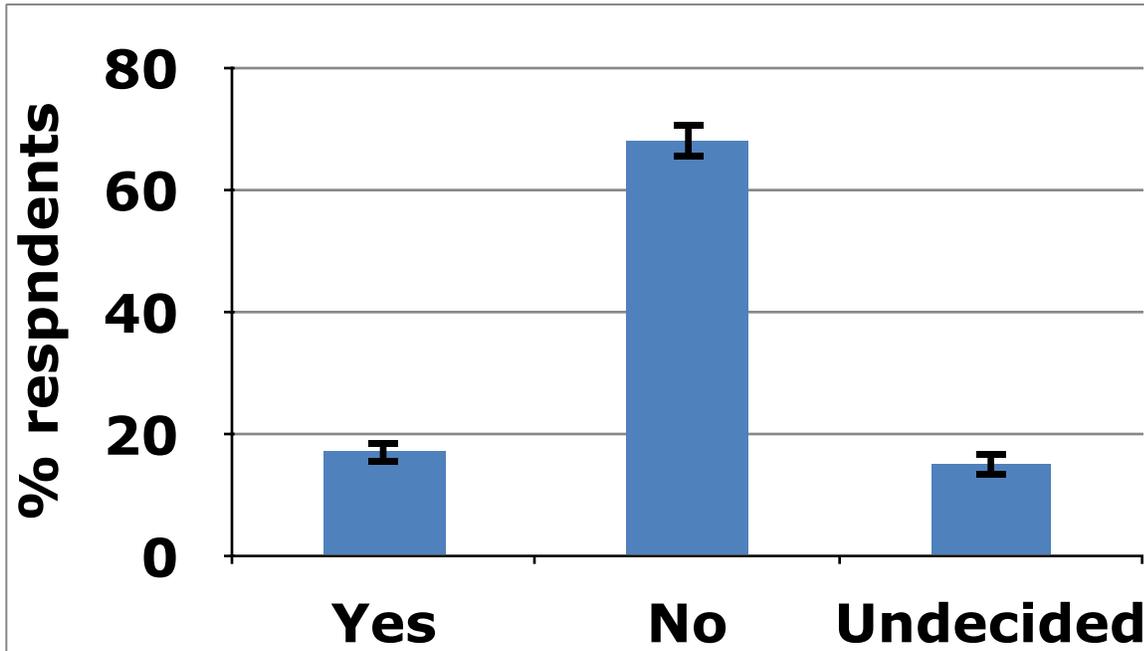


Fig. 1. Question 1 of the November 2011 voters survey.

2. Do you support stricter local laws to better control negative impacts associated with this type of gas drilling in Lansing?

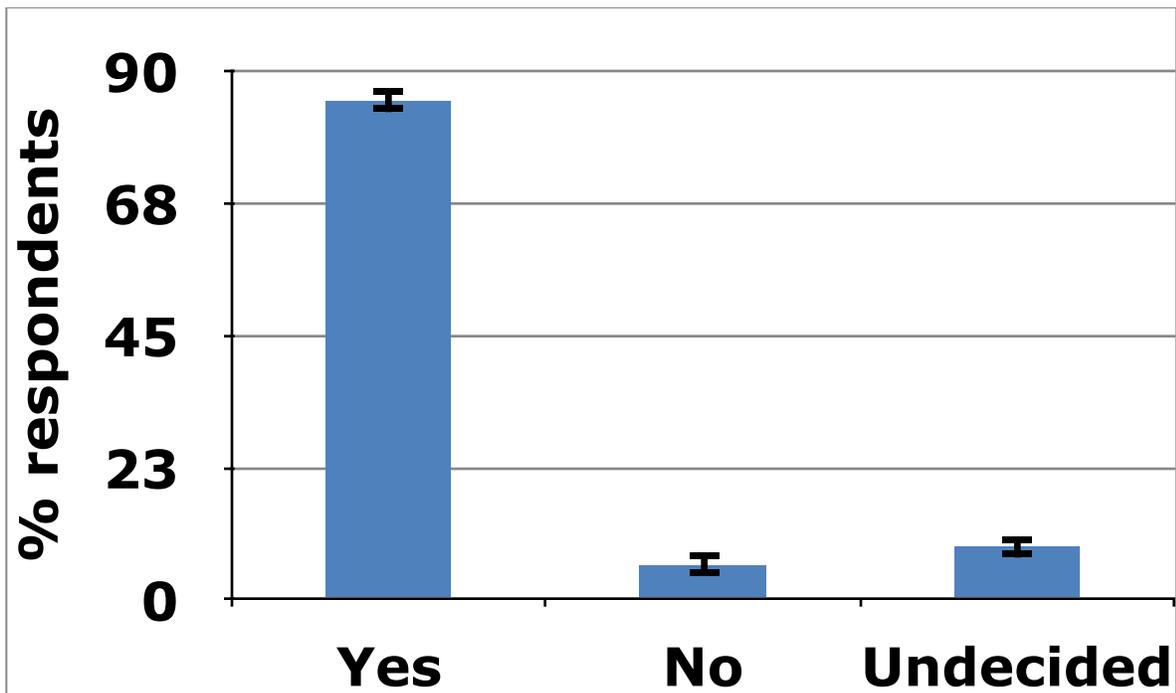


Fig. 2. Question 2 of the November voters 2011 survey.

3. Do you oppose gas drilling using HVHF and would like to see it banned from the town?

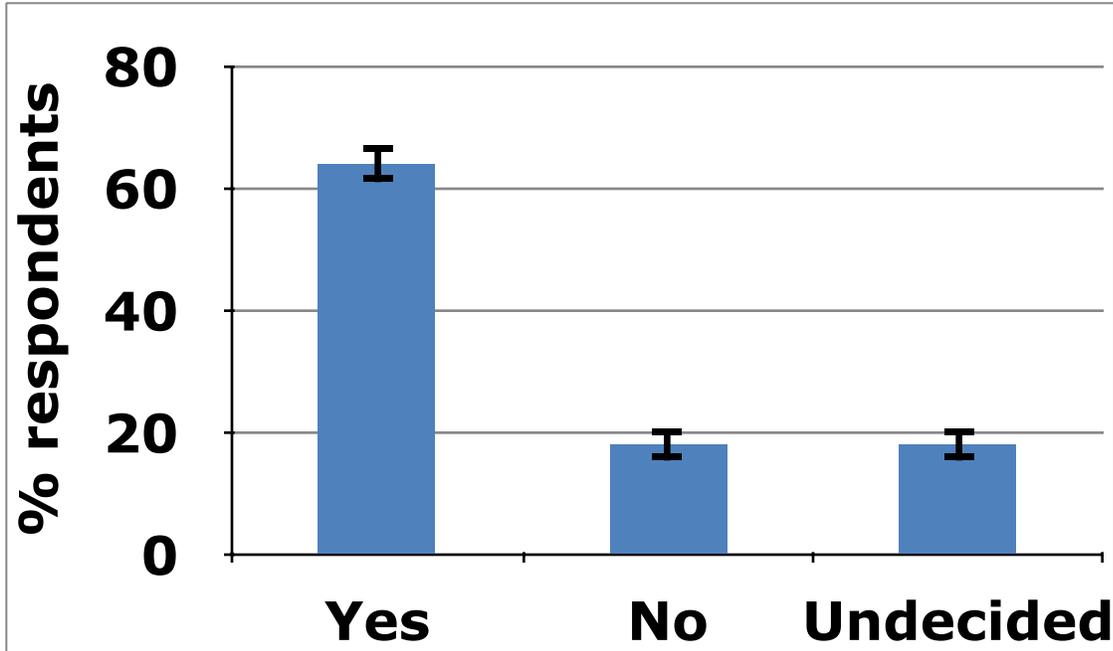


Fig. 3. Question 3 of the November 2011 voters survey.

These results were consistent across all areas of the town for all three questions. For example, the results for question 3 by voting district are shown in Fig. 4.

Town	North	Lansingville	Reform	Village
Hall	Lansing		Temple	

Voting District

3. Do you oppose gas drilling using HVHF and would like to see it banned from the town?

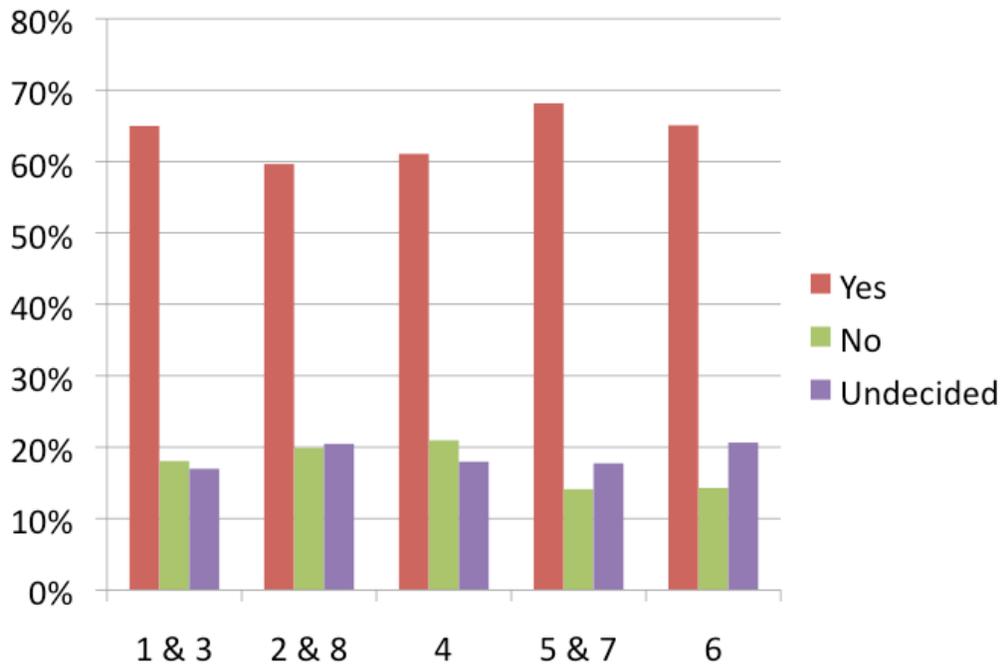


Fig. 4. Question 3 November 2011 survey results by voting district.

The survey results are very clear, although the survey was not a true random sample, but instead it represented those residents who voted and wished to fill out the survey. A very large majority of voters in the town, and across voting districts, would like to see this type of industry banned from the town.

A more professional survey carried out by the Cornell Survey Research Institute (SRI) in July 2013 (and included in this comprehensive plan) had two questions, worded differently, related to HVHF. Only one of these questions was given to a particular survey respondent to see if wording had an impact on the outcome.

The questions were: To what extent should the town encourage or discourage the following types of business and industrial development?

- 1) Natural gas industrial development known as horizontal drilling, high volume hydraulic fracturing commonly known as “hydrofracking” or “fracking”.

2) Shale oil or gas development.

Question 1) results are presented in Fig. 5.

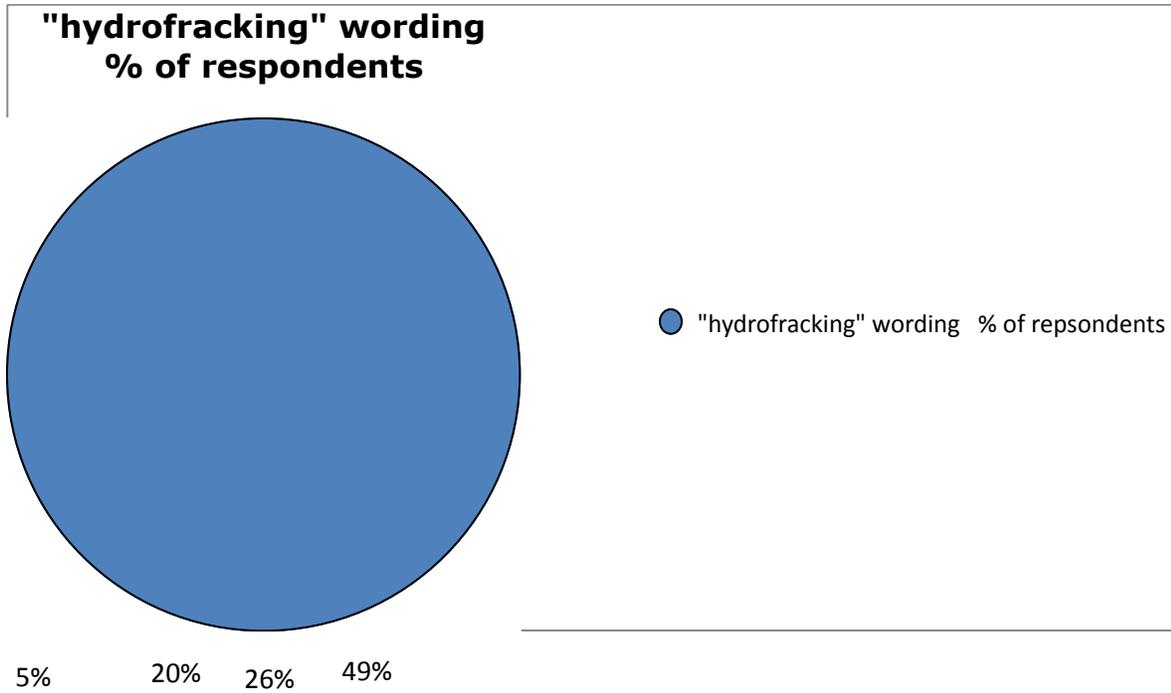


Fig. 5. Question on town comprehensive plan suvey described as “hydrofracking” or “fracking”.

Question 2) results are presented in Fig. 6.

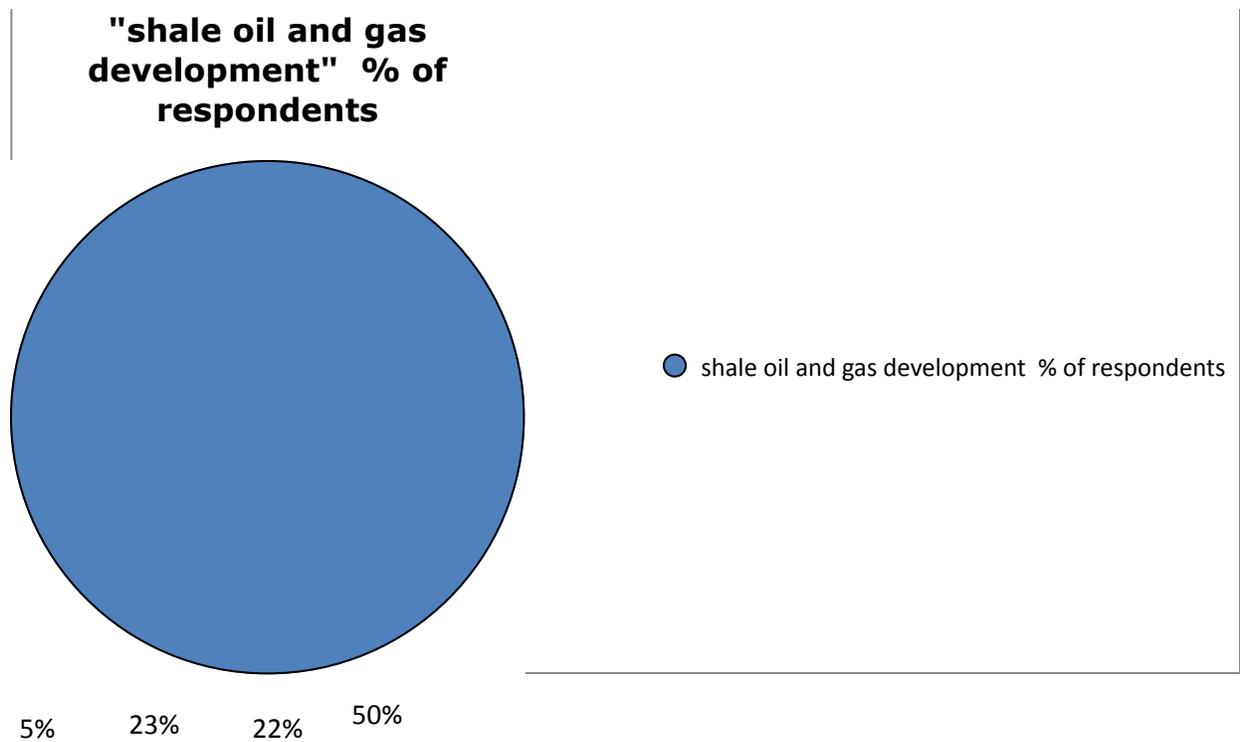


Fig. 6. Question on town comprehensive plan survey described as “shale oil and gas development”.

In both cases it is clear that this type of activity, no matter how it is defined, is opposed by approximately $\frac{3}{4}$ of the residents in the town.

The wording in the voter survey 2 years earlier is different, and question 3 of that survey is more strongly worded (e.g. in question 3, 64% would like to see a town-wide ban on HVHF), but the overall conclusions are similar. This type of heavy industry is opposed by a large majority of the town.

By October 2009 a number of gas leases were signed, representing ~40% of the land area of the town. These leases were signed before the terms “hydrofracking” and “Marcellus Shale” were known to most people. The leases represented either mineral rights (but not surface rights) for potential drillers, or mineral and surface rights. Since that time it appears that leases in the town have generally not been renewed, an indication that gas companies no longer consider that this area would be productive in terms of gas extraction.

The NYS DEC 2011 Revised Draft SGEIS (Supplementary Generic Environmental Impact Statement) (DEC, 2011) that was designed to allow gas drilling permits for

HVHF wells, gives an indication of why gas leases designed to exploit the Marcellus Shale have not been renewed. Chapter 4 of the SGEIS discusses the geology related to the Marcellus Shale, and the Utica Shale. Several features must come together for an area to have profitable gas potential. These include the percent organic matter in the shale formation, the depth, the maturity of the shale, and the thickness of the formation. Generally in order for a shale formation to be productive it needs to be rich in organic content, deep underground (for pressurization purposes), of the right maturity so that the organic material is converted into gas, but not lost out of the formation, and thick enough that the “fracking” can access a large region surrounding the horizontal well piping. Areas that meet these criteria are called the “fairway”. Even back in 2011, the U.S. Geological Survey (USGS) showed that Lansing was not in either the Marcellus Shale fairway or the Utica Shale fairway (see Figs. 7 and 8, respectively).

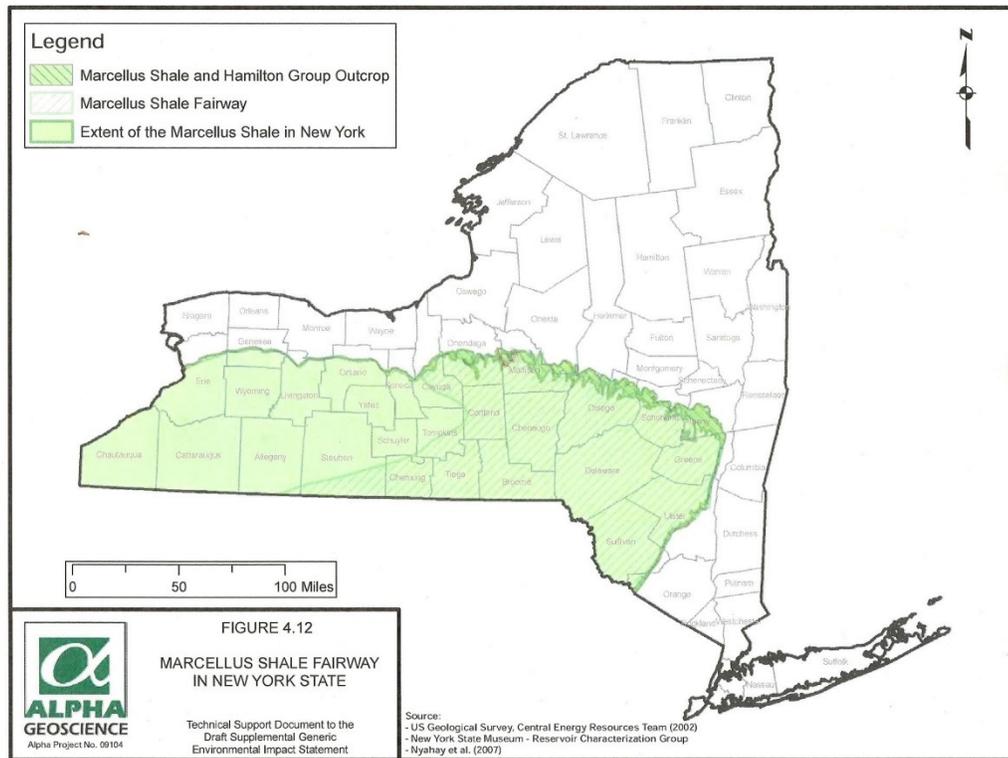


Fig. 7. The extent of the Marcellus Shale and Marcellus Shale fairway in New York (from 2011 draft SGEIS).

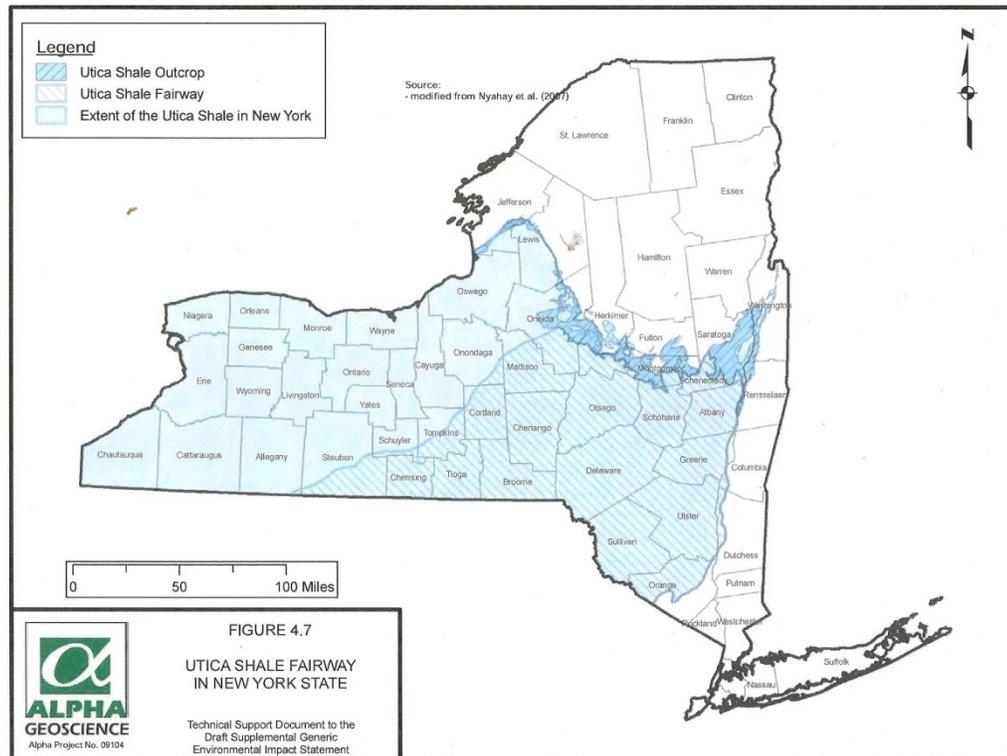


Fig. 8. The extent of the Utica Shale and Utica Shale fairway in New York (from 2011 Draft SGEIS).

Further work since then, based on data from both New York and Pennsylvania drilling activity, has shrunk the area of potential economic gas production from the Marcellus Shale to a much smaller area of New York. The southern parts of Chemung, Tioga, Broome and Delaware) counties, directly north of Pennsylvania are likely the only areas where there is serious potential for significant gas development (Northrup, 2013). These regions are near the most productive gas producing areas in northern Pennsylvania. Other areas are either too thin, too shallow or over mature for significant gas production. The Utica Shale appears to be too thin and over-mature as a significant gas reserve.

Additional issues make Lansing an inappropriate area for gas development. Most areas currently zoned for heavy industry (salt mine, quarry and electric power production) are located along Cayuga Lake, which is an area completely unsuitable

for drilling. The extensive salt mining below and near the lake would make drilling and HVHF incompatible in this area. Road deterioration from the high volume of truck traffic associated with HVHF would add an undue burden to town taxpayers. Social concerns such as increased crime rates and increasing rents, both brought about by the influx of out-of-town workers coming to the area, are common in gas development areas (Christopherson and Rightor, 2011). Potential water pollution, air quality issues, noise and light pollution, and significant landscape modification from access roads, well pads, and pipelines are all concerns that are most likely additional reasons why the survey results show very little support for HVHF in the town, even if there would be short-term economic benefits for some members of the Lansing community.

The likelihood of direct gas development in Lansing in the next decade appears to be small. However, associated activities related to gas development to the south of Lansing can still impact the town. Drill cutting material (material brought up from the drill hole during the course of drilling) has to be removed from drilling areas and disposed. An abundance of “produced water”, water and chemicals that return to the surface after a hydrofracking event, has to be disposed or recycled. This produced water contains many toxic substances that include those found in the original frack fluid injected into a well, plus materials that are picked up in the liquid as it interacts with the rock formation that is “fracked”. Some of these substances are heavy metals, various salts, and NORMS (naturally occurring radioactive materials). Some of these materials are already entering NY state streams and rivers, coming over the border from inadequate “treatment facilities” located on north flowing streams in Pennsylvania (Warner et al., 2013). The brine produced water has been intentionally spread on roads as a dust control and deicing compound. Sometimes it is spread illegally as an easy method of disposal. The town of Lansing should ban all such spreading activity since many contaminants are contained in this brine.

Most gas leases allow for older gas wells that are no longer producing gas to be used for disposal of wastewater from active wells. In Ohio and other areas where this practice has taken place, earthquakes have occurred. In addition, the transport of waste and the injection into the subsurface represent risks to aquifers and the community. There are some non-producing gas wells in Lansing and they have the potential to be Oil/Gas waste injection wells. The potential for collateral damage

presents a strong argument for the town to pass a ban related to heavy industry AND to the importation of toxic waste products from outside the town. The two town survey results, done approximately two years apart, both support this position.

Summary

- 1) High Volume Hydraulic Fracturing (HVHF) was not an issue in this town or in this region when the previous Lansing Comprehensive Plan was published.
- 2) The Marcellus Shale is where current HVHF is being employed in Pennsylvania.
- 3) At present there is a moratorium on HVHF in New York State. There is also a Town of Lansing moratorium on gas drilling, which is effective until May 15, 2014. The use of Home Rule to issue moratoriums and bans by municipalities related to HVHF are being reviewed by New York State's highest court (the Court of Appeals).
- 4) Two separate surveys in Lansing both indicate that a large majority of residents in Lansing are opposed to this type of heavy industry in the town.
- 5) It is unlikely that the Town of Lansing would be a productive area for extracting natural gas from the Marcellus Shale, and the Utica Shale.
- 6) There is potential for "collateral impacts" (e.g. the spreading of toxic waste brine on roadways and/or the use of old wells in Lansing for injection of "produced water" or "flowback" from fracking operations south of Tompkins County).

Recommendation:

The potential for negative environmental and health impacts, and the strong opposition to HVHF development by Lansing (and Tompkins County) residents, supports the banning of HVHF drilling and associated activities (e.g. waste disposal) in Lansing.

References

Christopherson, S. and Rightor, N. (2011) How shale gas extraction affects drilling localities: lessons for regional and city policy makers. . Journal of Town & City Management 2:1–20

DEC (2011) Revised Draft SGEIS on the Oil, Gas and Solution Mining Regulatory Program (September 2011) Well Permit Issuance for Horizontal Drilling and High-Volume Hydraulic Fracturing in the Marcellus Shale and Other Low-Permeability Gas Reservoirs <http://www.dec.ny.gov/energy/75370.html>

Northrup, J. (2013). New York Shale Gas Potential – Executive Summary. An overview of shale gas potential in New York was presented at Cornell University on October 30th, 2013 by Lou Allstadt, Jerry Acton, Brian Brock and James "Chip" Northrup. Available at: <http://www.scribd.com/doc/182830924/New-York-Shale-Gas-Potential-Executive-Summary-James-Chip-Northrup>

Warner, N.R., Christie, C.A., Jackson, R.B. and Vengosh, A. (2013). Impacts of shale gas wastewater disposal on water quality in western Pennsylvania. Environmental Science and Technology 47 (20):11849-11857. Doi: 10.1021/es402165b