
FLOW
FOR LOVE OF WATER

HYDRAULIC FRACTING AND OIL AND GAS DEVELOPMENT IN MICHIGAN: LEGAL STRATEGIES FOR LOCAL COMMUNITIES

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WHO WE ARE

FLOW is the Great Lakes Basin's only public trust policy and education center.

Our mission is to deeply educate communities and leaders about the *public trust* as a solution for sharing and preserving our common waters.

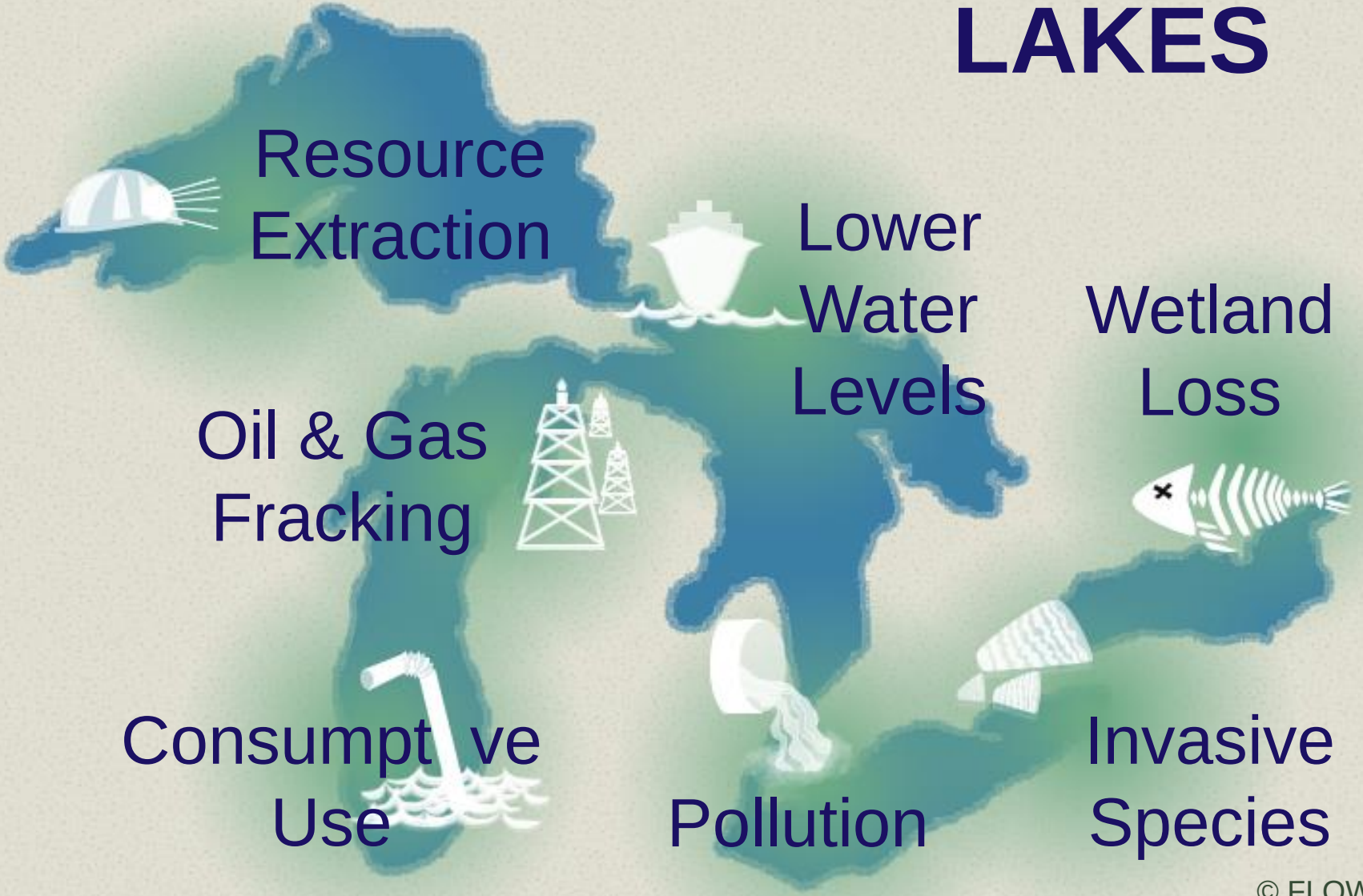
THE COMMONS

Shared resources accessible to the public

PUBLIC TRUST & THE HYDROSPHERE

Every part of the cycle of the hydrosphere can be protected as a commons under the public trust.

THREATS TO THE GREAT LAKES



FLOW PROGRAMS

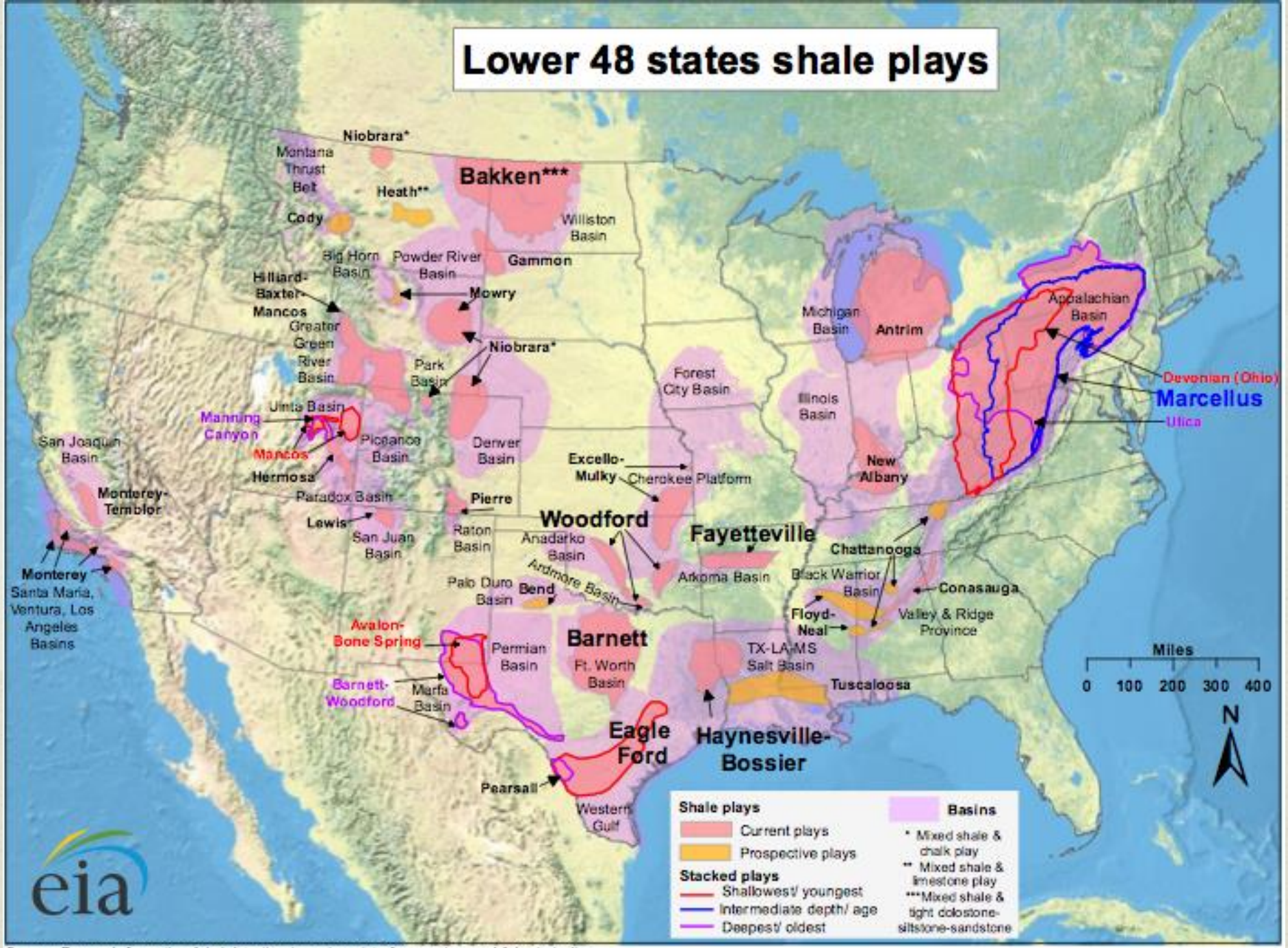
1. Public Trust Education
2. Water-Energy-Food Nexus
3. Policy on Nutrient Runoff, Extreme Energy, Water Levels, and Invasive Species
4. Diversions, Exports, and Consumptive Use
5. State and Local Regulation of Oil and Gas, including High-Volume Hydraulic Fracturing.

PRESENTATION OVERVIEW

1. Fracking: What is it?
2. Associated Fracking Risks & Impacts to Water, Air, and Land
3. Recent Developments in Michigan
4. Legal Strategies for Local Communities

FRACKING: WHAT IS IT?

ALSO KNOWN AS HIGH VOLUME HYDRAULIC FRACTURING (HVHF)



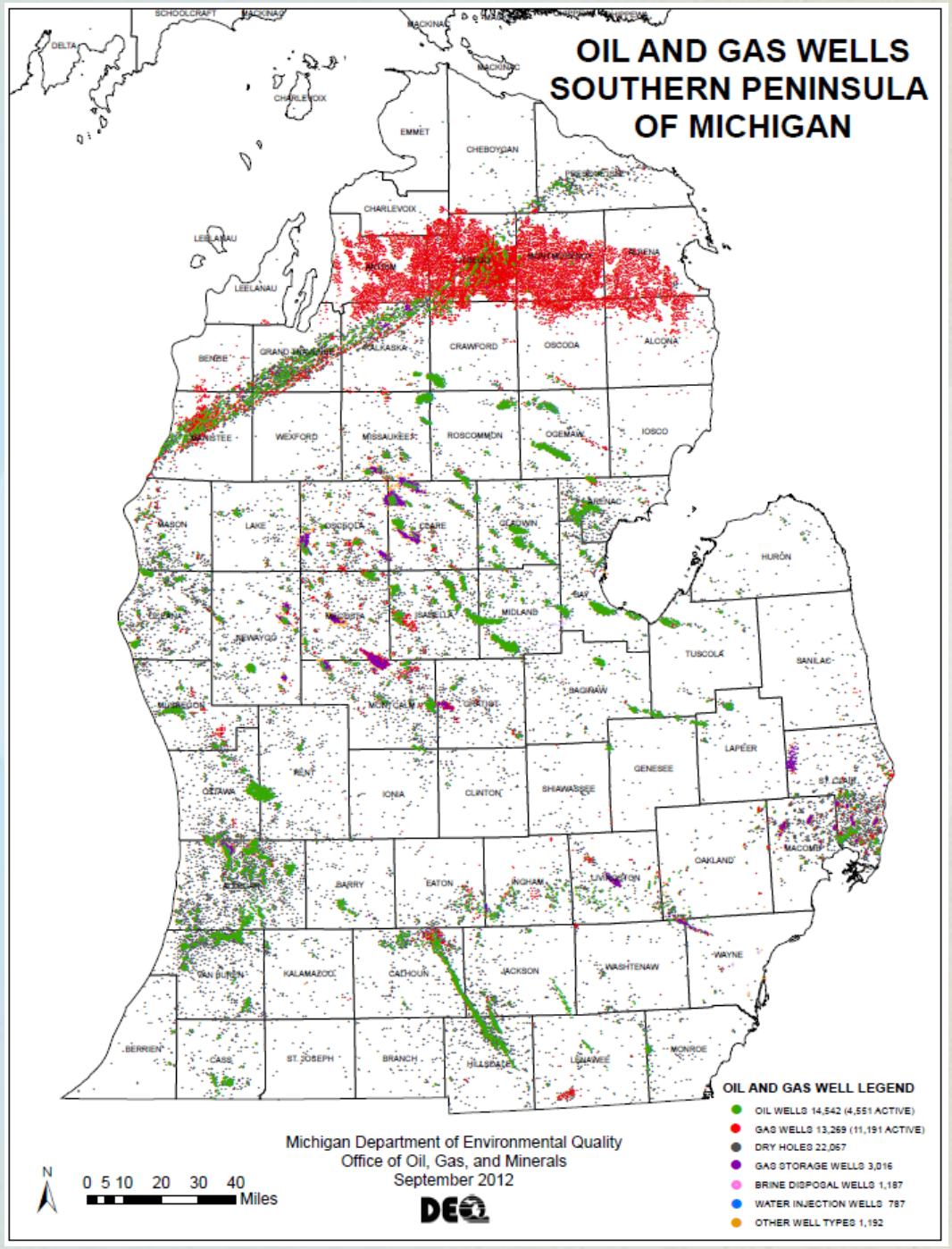
Source: Energy Information Administration based on data from various published studies.
Updated: May 9, 2011

60,000 Oil & Gas Wells since 1925

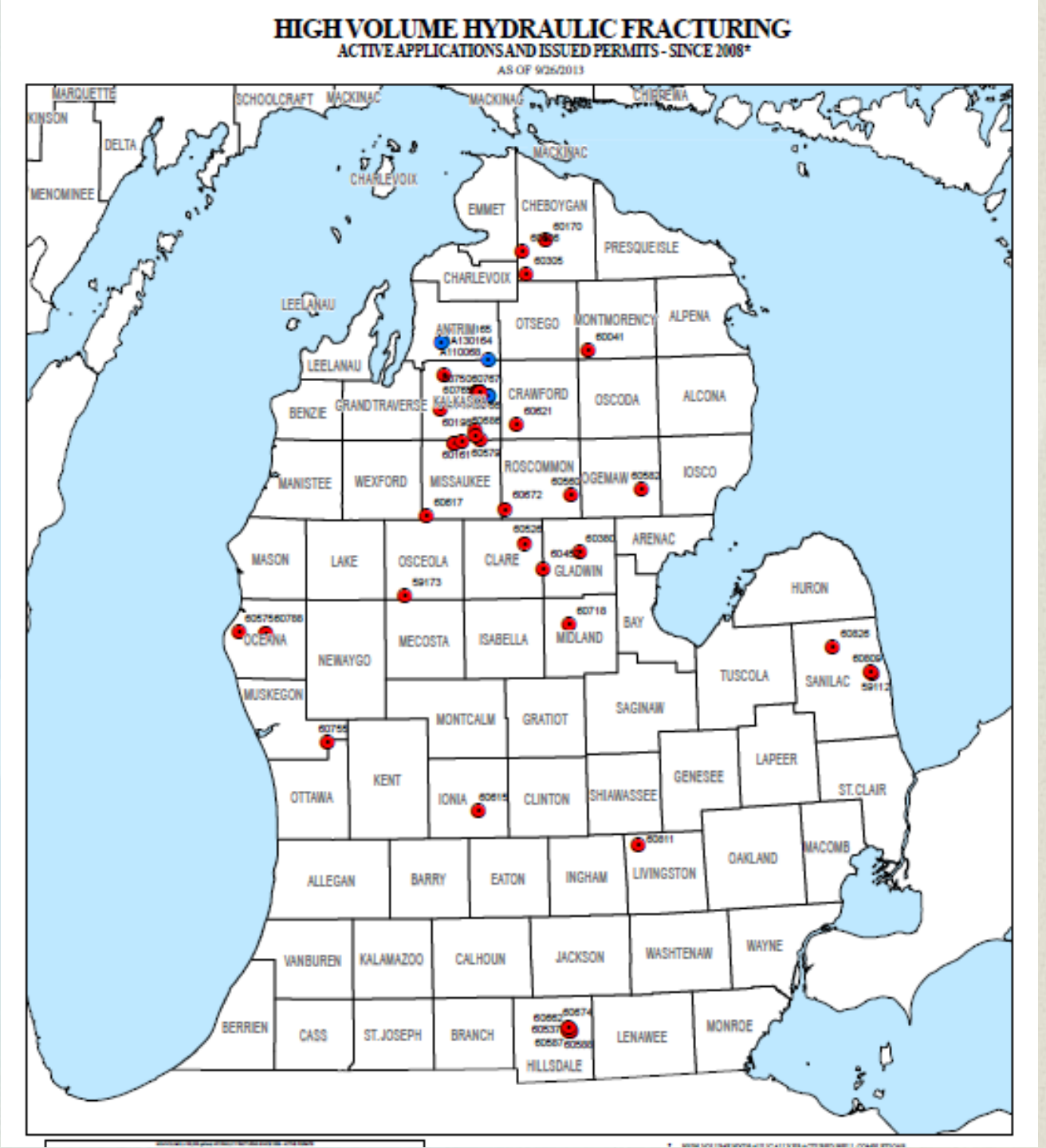
Active Wells
4,500 oil
11,000 gas
1,300 injection
3,000 storage

MI ranked 12th in nation for natural gas production

Source: DEQ

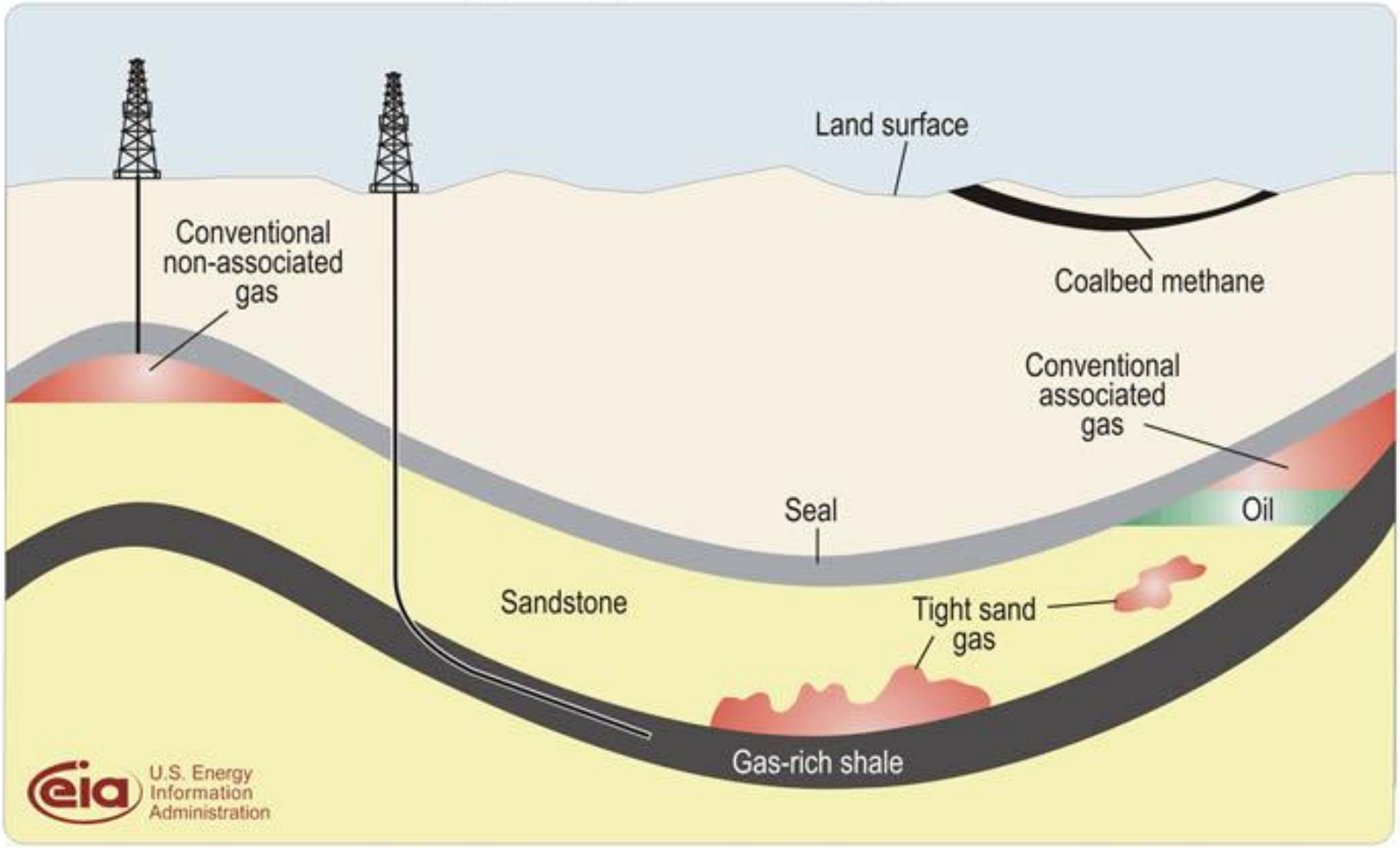


- **52 Permitted HVHF wells**
- **17 pending HVHF wells**
- **10 producing HVHF wells**

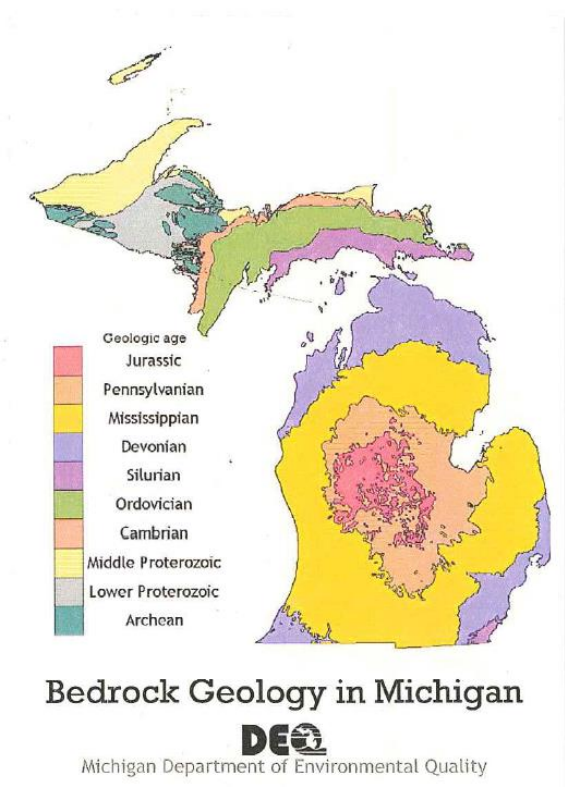


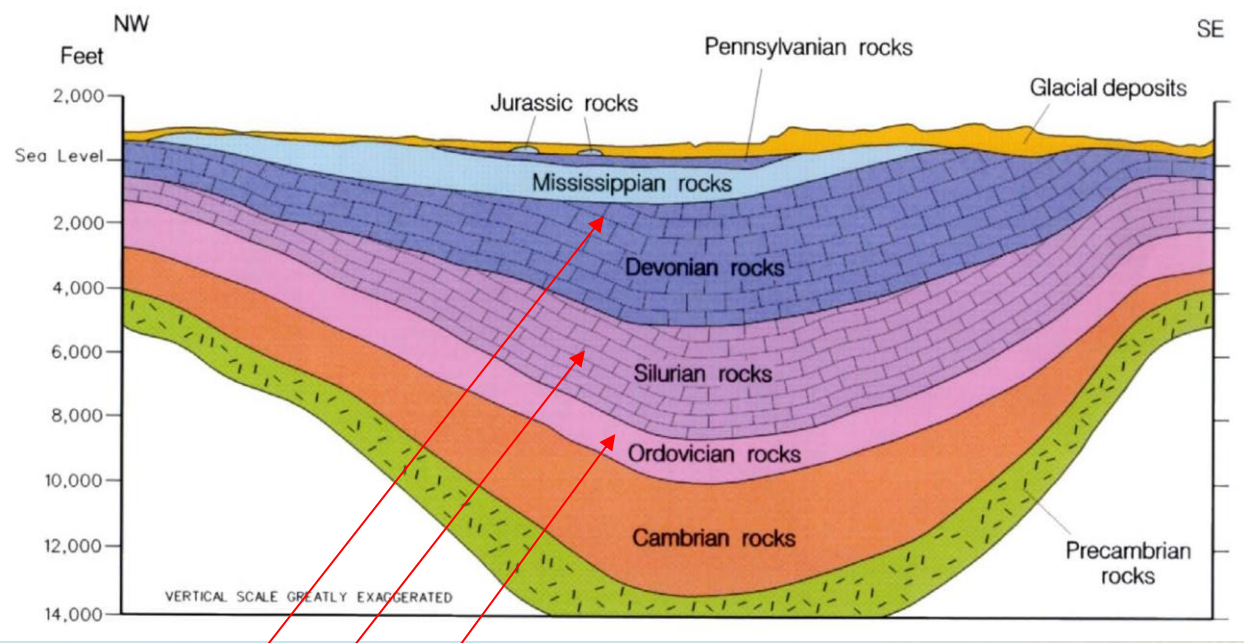
Map Source: Michigan Department of Natural Resources

Schematic geology of natural gas resources



GEOLOGY OF MI SHALE





Antrim Shale

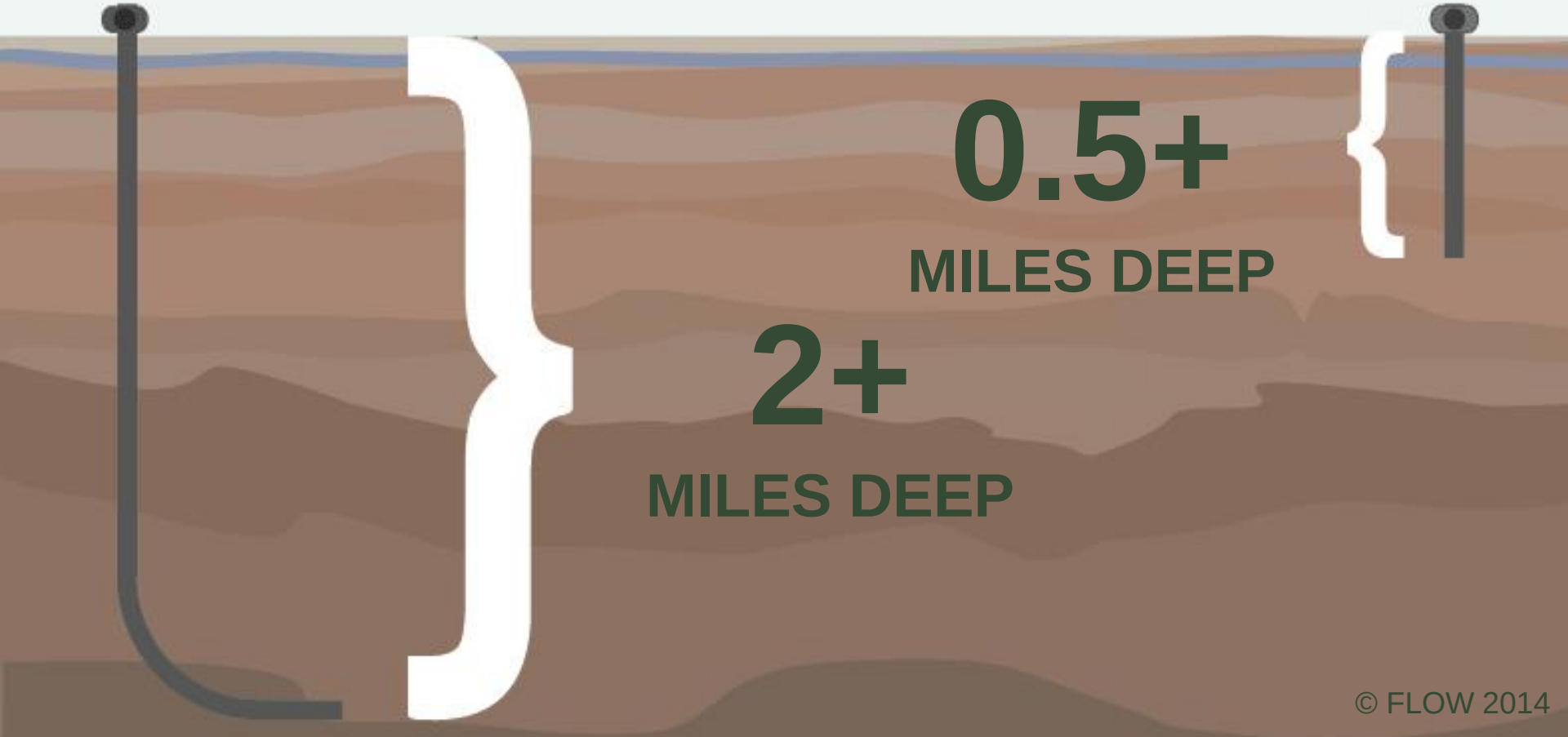
Niagaran

Utica-Collingwood

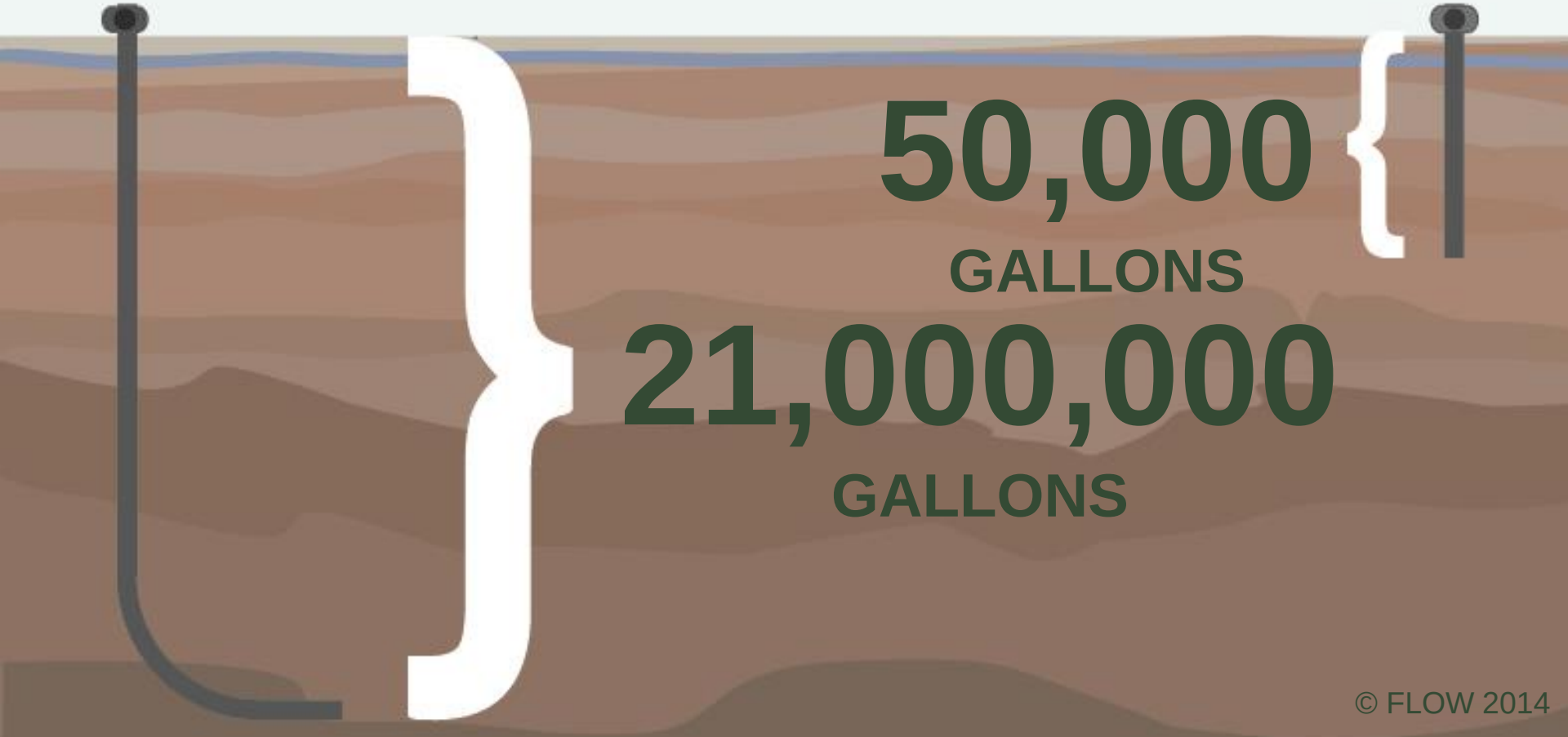
FRACKING:

HORIZONTAL vs. VERTICAL

WELLS DRILLED



WATER USED PER WELL
HORIZONTAL vs. VERTICAL



FRACK PAD

FRACKING FLUID

- **99.5% water & sand**
- **0.5% additives**
  - Acid (hydrochloric, acetic or muriatic)
  - Biocide (Glutaraldehyde)
  - Breaker (Ammonium persulfate)
  - Corrosion inhibitor (Formamide)
  - Crosslinker (Borate salts)
  - Friction reducer (Petroleum distillates BTEXs, TMBs, Methanol and PNAs)
  - Gel (Guar gum or hydroxyethyl cellulose)
  - Iron control (Citric acid)
  - Clay stabilizer (Potassium chloride)
  - pH adjuster (salts, Sodium or potassium bicarbonate)
  - Proppant (Sand)
  - Scale inhibitor (Poly- & ethylene glycol mixtures & glycol ethers)
  - Surfactant (Isopropanol)
  - (equals 40,000 gallons with 8 million gallon frack or 105,000 gallons with 21 million gallon frack)

FRACKING FLUID

- Over 750 chemicals known in 900 fracture fluid products; at least 29 known carcinogens
- Proprietary products
- Up to 21 million gallons of fresh water used per well.

FLOW BACK & DISPOSAL

- Captured at well head, stored in ASTs, loaded onto trucks, transported & then typically deep well injected.
- 25 – 33% “flow back” as waste water

STATE PIONEER WELL (2010)

State-Pioneer Well 1-3, Missaukee County drilled by Alberta-based Encana Corp, Canada's largest natural gas producer.

Produced 2.5 million cubic feet of gas/day for 30 days.

~$12,500 gas/day or $375,000/month.

Fracked with 5,880,000 gallons of fresh water in 15 stages (140,000 bbls or 980 hauler trucks).

New drilling permit August 2013 on same site

OIL & GAS STATE LAND LEASING
STATE LAND LEASES

Auction Date	Acres Leased	Avg. $ per Acre	Total Sales
May 2010	118,117.00	$1,510.18	$178,377,990.56
October 2010	273,689.00	$37.42	$10,241,235.34
May 2011	35,051.99	$22.02	$771,994.40
October 2011	46,658.63	$31.54	$1,471,621.62
May 2012	91,225.42	$45,22	$4,125,448.60
October 2012	147,547.92	$20.25	$2,991,081.44
May 2013	36,970.67	$36.66	$1,491,629.30
October 2013	11,933.29	$50.24	$599,587.02
Totals	761,193.92	---	$200,070,588.28

Michigan Department of Natural Resources

STATE OF MICHIGAN - DEPARTMENT OF NATURAL RESOURCES

GREGORY STATE GAME AREA

- General Map -

Livingston County

Area headquarters: Waterloo DNR Wildlife Office
13578 Seymour Road, Grass Lake, MI 49240 ; phone 517- 522-4097

Legend:

State Land: Wildlife /Game Area

Parking: Prepared Lots
Boating: Prepared Ramp, Rustic or Drop-in, Marsh in Area
Roads: Highways, Paved Roads, Gravel and Dirt Roads, Two-Tracks, Trails
Water: Lakes, Ponds, Rivers, Streams, Seas.Streams,Drains
Political: Town-Range-Section Lines
Other: Railroads, Power Lines / Pipes

Try MI-HUNT the DNR's online interactive mapping tool! www.michigan.gov/mihunt

GPS Coordinates at flags points:

[1] Parking lot, west unit
Lat.42°29'32"N, Long.84°03'38"W.

[2] Parking lot, east unit
Lat.42°28'46"N, Long.83°58'40"W.

0 0.5 1 2 Miles

Important!: 150 yards (450 feet) Hunter Safety Zones are enforced around all buildings and structures at all times.

Look for Watchable Wildlife viewing areas in this area, for this sign and more information about wildlife trails or features.

For more information on this or other areas, visit the DNR online www.michigan.gov/dnr or scan this QR-block.

Hunter Monies Help Make This Area Possible

Map Revised 12/02/2013 -WLD /MLS

ASSOCIATED FRACKING RISKS & IMPACTS TO WATER, AIR, AND LAND

POTENTIAL RISKS & IMPACTS OF FRACKING

1. Intensive Water Use -- Permanent Loss, competition with uses such as farming, residential, recreation

2. Chemical Disclosure – Proprietary info

3. Surface Water Contamination and Spills

POTENTIAL RISKS & IMPACTS OF FRACKING

4. Groundwater Contamination – PA, WY, TX, CO,

5. Wastewater Disposal – Handling, Transport, Deep Injection Wells

6. Earthquakes -- deep injection wells

POTENTIAL RISKS & IMPACTS OF FRACKING

7. Industrial Land Use – Facilities, Roads, Pipelines, Tanks, Pits
8. Nuisance Impacts – Traffic, Odors, Noise, Silica Dust, Light
9. Public Health Concerns -- Air Contamination from flaring, vents, releases.
10. Social and Economic Concerns – boom/bust cycles, infrastructure planning

FRACKING & WATER USE

Nationwide: 5-8 million gallons of fresh water used per well.

Michigan: up to 321 million gallons of fresh water used per well.

MICHIGAN WATER USE

In the next several years, Encana's proposed 500 new wells are estimated to use a total of 4 billion gallons of groundwater.

Source: Bridge Magazine, June 25, 2013

IMPACTS ON WATER RESOURCES

- **100% permanent loss from hydrologic cycle**
- **Intensive short term removal**
- **Competition with other users**
- **Impacts are local to flows, levels, quality, aquatic resources and fish**

WHAT'S AT STAKE?

1. Increasing Water Amounts Needed

1. MI Water Consumed (2/2014)

2. Industrial Nature of Operations

3. Cumulative & Unprecedented Impacts

4. Future of Fracking in MI

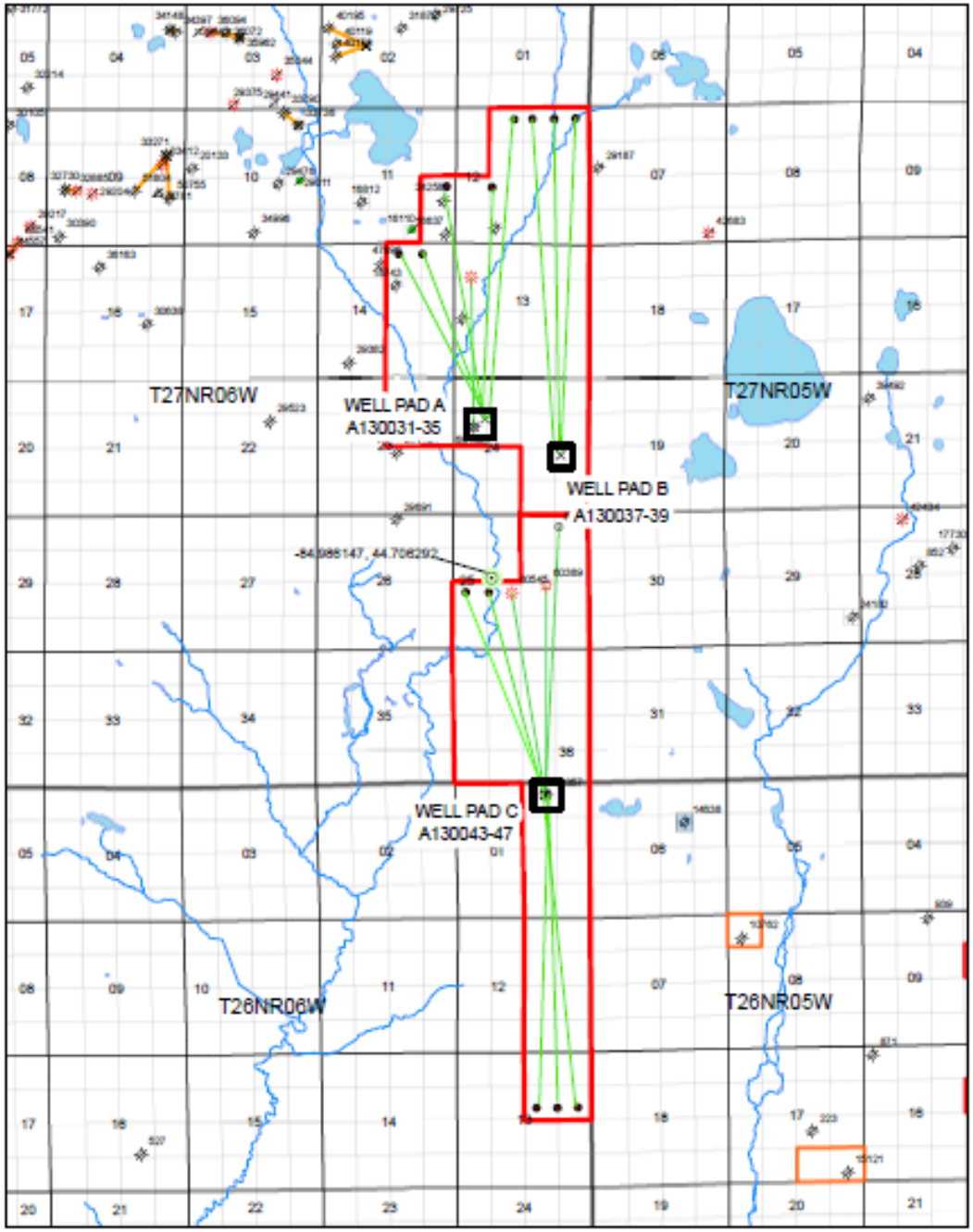
RECENT FRACKING DEVELOPMENTS IN MICHIGAN

KALKASKA COUNTY

Water Use Per Fracked Well

Wells	Actual Reported Water Use (mg)	Completion Date	Status
Excelsior 1-13 HD1	5,860,772	10/25/2011	producing
Excelsior 1-25 HD1	8,461,635	11/8/2011	producing
Excelsior 2-25 HD1	12,562,096	10/31/2012	producing
Excelsior 3-25 HD1	21,112,154	10/30/2012	producing
Garfield 1-25 HD1	12,539,639	12/1/2012	pipeline completed
Totals	60,536,296	---	---

ENCANA EXCELSIOR AND OLIVER APPLICATIONS



KALKASKA & CRAWFORD COUNTIES

Estimated Water Use Per Fracked Well

Wells	Estimated Water Use (mg)	Location	Status
Westerman	8,400,000	Kalkaska (private lands)	completed
Beaver Creek	14,700,000	Crawford Co. (state lands)	pipeline completed
Totals	23,100,000	---	---

MUNICIPAL WATER FOR FRACKING KALKASKA COUNTY

- Westerman well estimated water needs in DEQ permit = 8.4 million gallons

- Water Withdrawal Assessment Tool (WWAT) estimated that 900 gallons per minute would cause “no adverse resource impact”

MUNICIPAL WATER FOR FRACKING KALKASKA COUNTY

- **9 water wells didn't produce**
- **About 2.1 millions gallons of water purchased from the Kalkaska & Mancelona municipal systems**
- ***Highlights* the Need for a Pump Aquifer Yield Test and Baseline Studies**

LIMITATIONS OF THE WWAT

- **Overestimates water availability**
- **Underestimates most surface water impacts**
- **Fails to adequately analyze groundwater impacts**

STRENGTHENING THE WWAT

- **Baseline testing before fracking**
- **Update tool to analyze short-term withdrawals**
- **Conduct site visit and cumulative analysis of all withdrawals**
- **Eliminate withdrawal exemptions**

13 PERMITTED WELLS IN KALKASKA & CRAWFORD COUNTIES

Proposed Water Use Per Fracked Well

Permitted Wells	Proposed Water Use (mg)	Location
Excelsior 1-11, 1-12, 1-14, 2-12, 2-14	115,500,000	Kalkaska Pad A
Excelsior 3-13, 4-13, 5-13	69,300,000	Kalkaska Pad B
Excelsior 4-25, 5-25, 1-13, 2-13, 3-13	195,300,000	Kalkaska Pad C
Roscommon 1-7	16,800,000	
Totals	396,900,000	---

Pending Applications
Pioneer 3-4 = 25,200,000 mg
BRCA 1-9 = 35,280,000 mg
BRCA 6-9 = 35,280,000 mg
Totals 95,760,000

FLOW'S PROGRAM: LEGAL STRATEGIES FOR LOCAL COMMUNITIES

WHO REGULATES?

1. Exempt from Federal Environmental Laws – **Clean Water Act, Air Act, RCRA, and Safe Drinking Water Act**
2. Oil & Gas Act, Part 615, NREPA
3. Exempt from State Water Statute & Water Withdrawal Assessment Tool – **but subject to Supervisor's Instruction**

1. ZONING ORDINANCES
2. TOWNSHIP POLICE POWER
3. HOME RULE
4. LOCAL CONSENT FOR ROADS & FRANCHISE AGREEMENTS
5. WATER LAW & PUBLIC TRUST
6. MEPA
7. MORATORIA & BANS

ZONING ENABLING ACT (2006)

Local units of government are expressly prohibited from regulating or controlling the "location, drilling, completion, or operation of oil and gas wells or other wells drilled for oil or gas exploration purposes."

ZONING ENABLING ACT

Other than zoning of wells, townships/counties can regulate ancillary activities. *Note*: Cities and Villages can regulate wells.

Zoning can protect future land uses and natural resources and preserve rural character

Special Use Permits (SUP) in certain Land Use Districts can protect against a risk of unacceptable harm to health, safety & welfare.

ANCILLARY USES, STRUCTURES & FACILITIES

Oil and gas wells are exempt from zoning

But not ancillary uses:

water sources, pumps, treatment, storage & disposal of hazardous water mixture, flow lines, gathering lines, roads and other facilities

Addison Township v Gout, 435 Mich 809 (1990)

ANCILLARY OPERATIONS

Water sources, uses, transfers & diversions, flow lines, gathering lines, sweetening facilities

Water & chemical mixing stations, treatment & production facilities, waste treatment, reuse or disposal

Air emission equipment (flares, scrubbers) truck transfer & hauling, access roads, wetland impacts

TOWNSHIP ORDINANCE ACT (1945)

Health, safety & welfare

***No oil & gas well exemption*.**

Police powers regulate activities & harms, but not the land use.

Examples include: Hours of operation, noise, odors, air emissions, pollution, high capacity water wells, chemical disclosure

UTILITY FRANCHISES & USE OF ROADS

Requires the consent of the county, township, city or village for the use of roadways and public places for utility facilities, including wires, pipes, tracks, etc.

MICHIGAN CONSTITUTION ARTICLE 7, SECTION 29; PUBLIC UTILITY FRANCHISE ACT, 460.601 et seq.

CONSTITUTIONAL AUTHORITY FOR COUNTIES & TOWNSHIPS

1963 Constitution
Article 7 Section 34

Powers can only be taken away if in direct conflict with state law.

“liberally construed in their favor”

CONSTITUTIONAL HOME RULE FOR CITIES AND VILLAGES

Granted by 1963 Constitution
Article 7 Section 22 (cities)
Article 7, Section 34 (villages)

Effect: general grant of authority for local autonomy

PUBLIC NUISANCE

“It is difficult to imagine a right more common to the public than the right to a safe and healthy environment.”

Examples include: air emissions, noise, dust, storage of dangerous chemicals

DEQ v Waterous Co., 279 Mich App 346 (2008)

PUBLIC TRUST PRINCIPLES

Oil & gas leasing in state parks, recreation & game areas may violate the public trust

Public trust requires consideration of impacts on public use *before* state transfers special public lands

LOCAL REGULATION OF STATE LANDS

Township of Burt Lake v Department of Natural Resources

Michigan Supreme Court, 1998

In the absence of express exemption under state law governing the DNR or DEQ, zoning may be applied to public lands.

MEPA

Part 17, NREPA, 324.1701 et seq.

Protects air, water, & natural resources and the public trust in these resources

Mandatory duty for all to minimize degradation – unless there is no feasible & prudent alternative

Environmental impact & alternatives analysis

Ray v Mason County Drain Comm'r, 393 Mich 294 (1977).
Vanderkloot v Highways Dept., 392 Mich 159 (1974).

MEPA

MICHIGAN CONSTITUTION

Article 4, Section 52

Natural resource conservation and development are of public concern pursuant to health, safety, and general welfare of the people.

The legislature shall protect them from pollution, impairment and destruction.

MEPA STRATEGIES

1. **Township can amend Zoning Ordinance to incorporate MEPA standards and require Environmental Impact & Review**
2. **Citizen Intervention in permit proceedings**
3. **Citizen Action to require government consideration of environmental impact**

BAN ORDINANCE STRATEGIES

ADVANTAGES

- Stops fracking immediately
- Provides opportunity for scientific inquiry

DISADVANTAGES

- Subject to more judicial scrutiny
- Zoning Enabling Act – heavier burden of proof

ENACTED BANS & MORATORIA

- New York
- Delaware River Basin
- Some local gov’ts in US States
- France
- Bulgaria
- Province of Quebec, Canada

MORATORIUM ORDINANCES

1. Limit ordinance to a finite period of time (one year maximum)
2. Conduct a study on the impacts of fracking on land use, environment & health
3. Enact the Ordinance

FLOW's PROGRAM

- **2-part Workshop Series**
  (1) Educational Presentation
  (2) Deliberative Priority Workshop
- **Protective Ordinance Package**
  Review of Master Plan, Zoning & Police Power Ordinances and Workshops
- **Cannon and Gun Plain Twps**

ACTIVE LOCAL ORDINANCES IN MI

Cannon Township (moratorium)

Courtland Township (moratorium)

Filer Township (hydrogen sulfide)

Howell Township (pipelines)

Mayfield Township (injection wells)

Orangeville Township (roads)

West Bloomfield Township (moratorium)

Twp Ordinance Suggestions
Our Rights & Priorities

- **Protection of residents health, safety, welfare and quality of life**
- **Protection and Conservation of Conway Township's land, water, air, and natural resources**
- **Cannot drill within 1 mile of Township residents homes**

Ordinance Suggestions

Before Exploratory Drilling Begins:

- Pre notification of permit to the township board before approval
- **Public Notice** of permitted wells in Township
- Notice to Township residents to have **baseline water testing** completed before exploratory drilling begins.
- **Water testing** provided by oil/gas company for residents within 2 mile of sites-paid for by the oil company
- Require **emergency preparedness plan** before drilling. Mock Disaster training provided by third party safety company, funded by the oil company
- **Road bond** for future road repairs
- Comprehensive **evacuation plan** in case of a hazmat accident
- Coordinate a **special Community Advisory Group** to help the Board regarding this issue

Ordinance Suggestions

During Exploratory Drilling Operations:

- **Transparency** from the MDEQ. Reporting of operations timeline.
- **On site H2S monitoring** and alarm system for residents
- No campers on site property
- No residing on site property
- No lights on during the night
- Work hours limited to 7 am – 6 pm
- Attractive nuisance
- Additional paved stopping and turn lanes at the entrances of site
- Proper **road signage** and flags at site entrance, e.g. "Trucks Entering"

Ordinance Suggestions

When Hydraulic Fracturing Commences:

- **Disclosure of chemicals** used in the fracking process
- **Air Quality monitor for BTEX** (benzene, toluene, ethylbenzene, xlyenes)
- Require **road routes disclosure**
- Immediate **notification of spills** to the township board
- **Tire washing stations** for all the trucks (no run off allowed)
- Periodic **water testing** after hydraulic fracturing process commences. **Every 3 months** and funded by the oil and gas company and utilizing a third party water consulting company.
- Transportation of fracking chemicals ban
- Open to periodic MIOSHA inspections
- **Disclosure of injection well sites and routes** taken by the tanker trucks

Ordinance Suggestions

When Hydraulic Fracturing Commences (cont'd):

- Require enclosure (**fencing**) around site for safety
- Monitoring of **home values**
- No more than 1 active well site within township
- **Non-use of brine or flowback waste water on roads** and not allowed to be used to put out fires by local fire department
- **Tanker inspections** for corrosion or leaking
- Transparency from the MDEQ. Reporting of a timeline of operations.
- **On site H2S monitoring-alarms** for residents
- No campers on site property; No residing on site property; No lights on during the night; hours limited to 7 am – 6 pm
- Attractive nuisance
- Additional paved stopping and turn lanes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