

# FRAC SAND

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# OUTLINE

1. Introduction
2. What is Frac Sand? What is “fracking?”
3. Why has interest in frac sand increased?
4. How might Tribes be affected by this increase in interest?
5. Summary





**WHAT IS “FRAC” SAND?**

**WHAT IS “FRACKING?”**



# Definition

- “Frac Sand,” properly termed “Proppant Sand,” is sand that is used in the oil and gas industry to “prop” open rock fissures and increase the flow rate of natural gas or oil.
- The sand is typically composed of well-rounded particles of quartz and is processed to fall within a specific size range.
- The sand proppant increases hydrocarbon production by propping open fractures, increasing the permeability and porosity of the host rocks.





Roughly 200 tanker trucks deliver water for the fracturing process.

A pumper truck injects a mix of sand, water and chemicals into the well.

Natural gas flows out of well.

Recovered water is stored in open pits, then taken to a treatment plant.

Storage tanks

Natural gas is piped to market.

0 Feet

Water table

Well

1,000

### Hydraulic Fracturing

Hydraulic fracturing, or "fracing," involves the injection of more than a million gallons of water, sand and chemicals at high pressure down and across into horizontally drilled wells as far as 10,000 feet below the surface. The pressurized mixture causes the rock layer, in this case the Marcellus Shale, to crack. These fissures are held open by the sand particles so that natural gas from the shale can flow up the well.

2,000

3,000

4,000

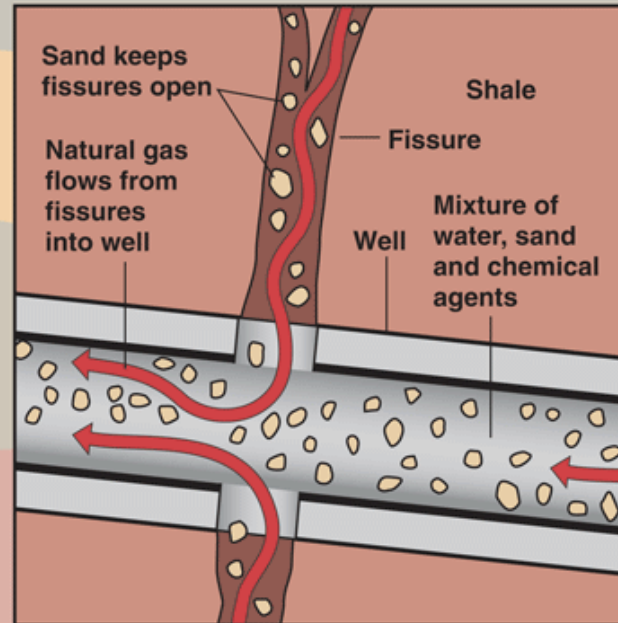
5,000

6,000

7,000

Well turns horizontal

Marcellus Shale



Fissures

The shale is fractured by the pressure inside the well.

Frac sand is used in the oil and gas industry.



# Frac sand must meet specific physical and chemical requirements.

Frac sands are categorized by:

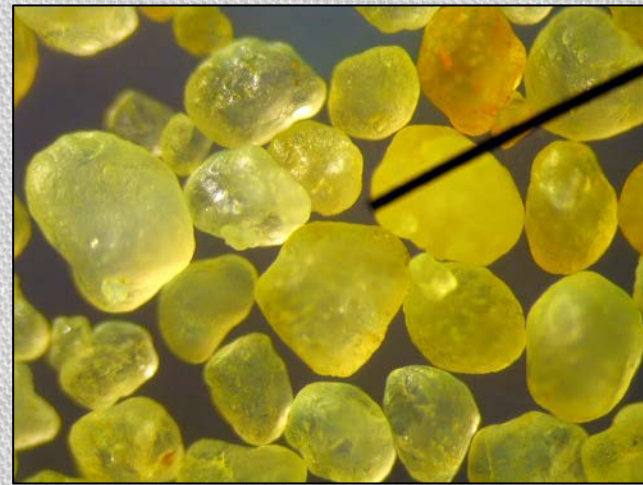
Geology (mineral composition)  
Grain size  
Crush resistance

Solubility  
Sphericity and Roundness  
Turbidity (cleanliness)

The highest value sands are clean, relatively dust-free, chemically inert, and round. Frac sands can be nonmodified or surface-modified (resin coated).



Nonmodified quartz frac sand

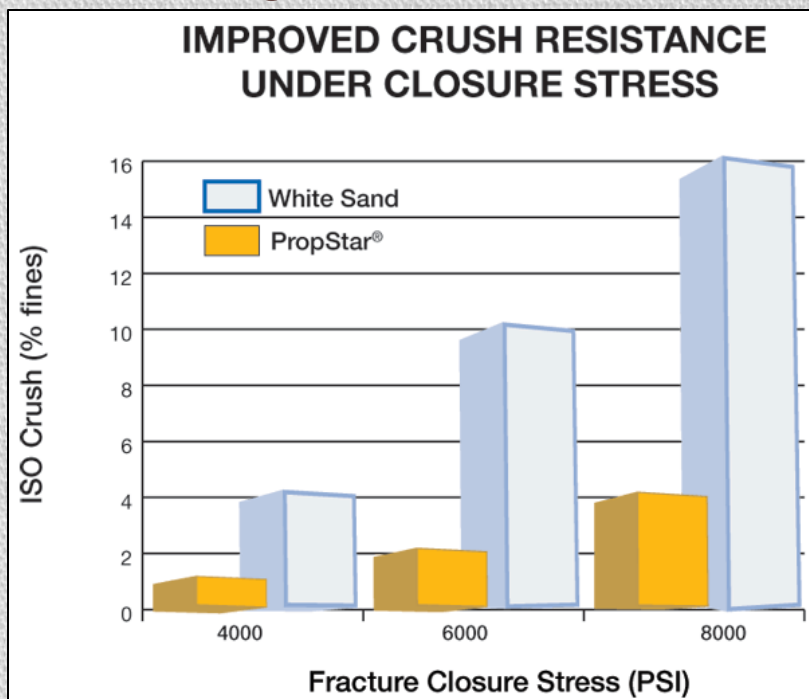


Resin-coated quartz frac sand



# Frac sand is sold as products

- All frac sand must be at least 99% silica, must be composed of rounded or nearly rounded grains and grains which are nearly spheres.
- Products are typically designated by screen size – “20/40” or 30/50.” The numbers indicate the screens, also called sieves, that at least 90% of the grains fall between. Sieve sizes are called #10, #20, etc. The larger the sieve number, the smaller the opening.



**Figure 1. Some recognized size classes for proppant sand (adopted from Hoagberg & Koerner-Moore)**

Mesh	Micron	8-12	10-20	20-40	30-50	40-70	70-140
		<5%					
8	2360		<5%				
10	2000	90%					
12	1700						
14	1400						
16	1180	<5%	90%				
18	1000			<5%			
20	850						
25	710				<5%		
30	600		<5%	90%			
35	500						
40	425				90%		
45	355						
50	300			<5%		90%	
60	250						<5%
70	212				<5%		
80	180						
100	150					<5%	90%
120	125						
140	106						
170	90						
200	75						<5%



Frac sand is mined similarly to sand and gravel, but with additional processing.






# Frac sand can be transported by truck, rail, or water.



Three Nebraska Central Railroad locomotives headed to Preferred Sands' Genoa plant to pull the unit train.  
Photo courtesy Preferred Sands



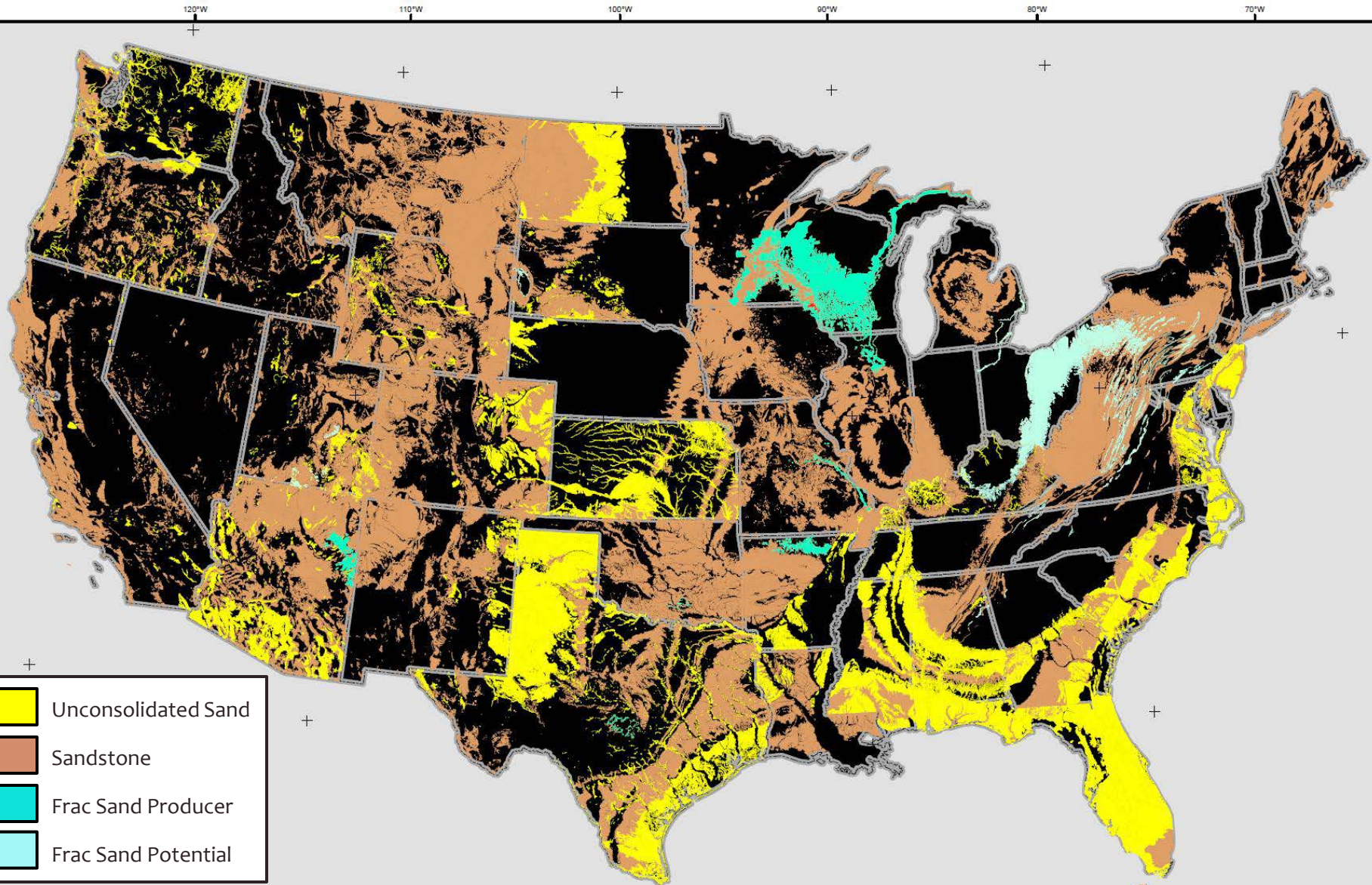
A stylized, monochromatic illustration of a plant with several large, pointed leaves and a cluster of small, round buds or flowers, rendered in a dark brown color against a lighter brown background.

WHY HAS INTEREST IN  
FRAC SAND  
INCREASED?



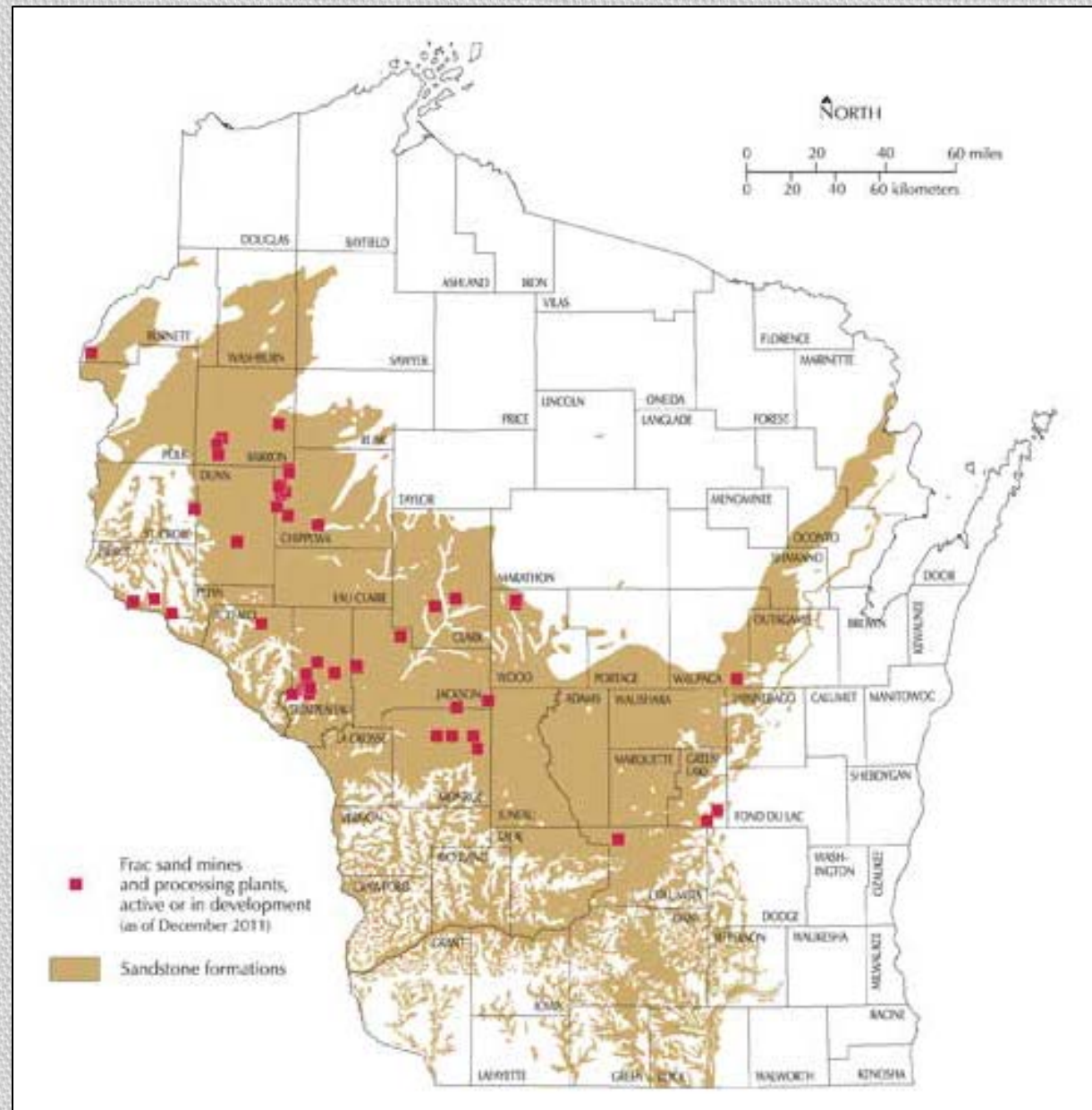
# Good frac sand is very hard to find

There is limited availability of good quality, naturally occurring frac sand.





# Wisconsin frac sand sets the standard - literally





# Wisconsin frac sand is close to many of the unconventional gas plays in the US and Canada.

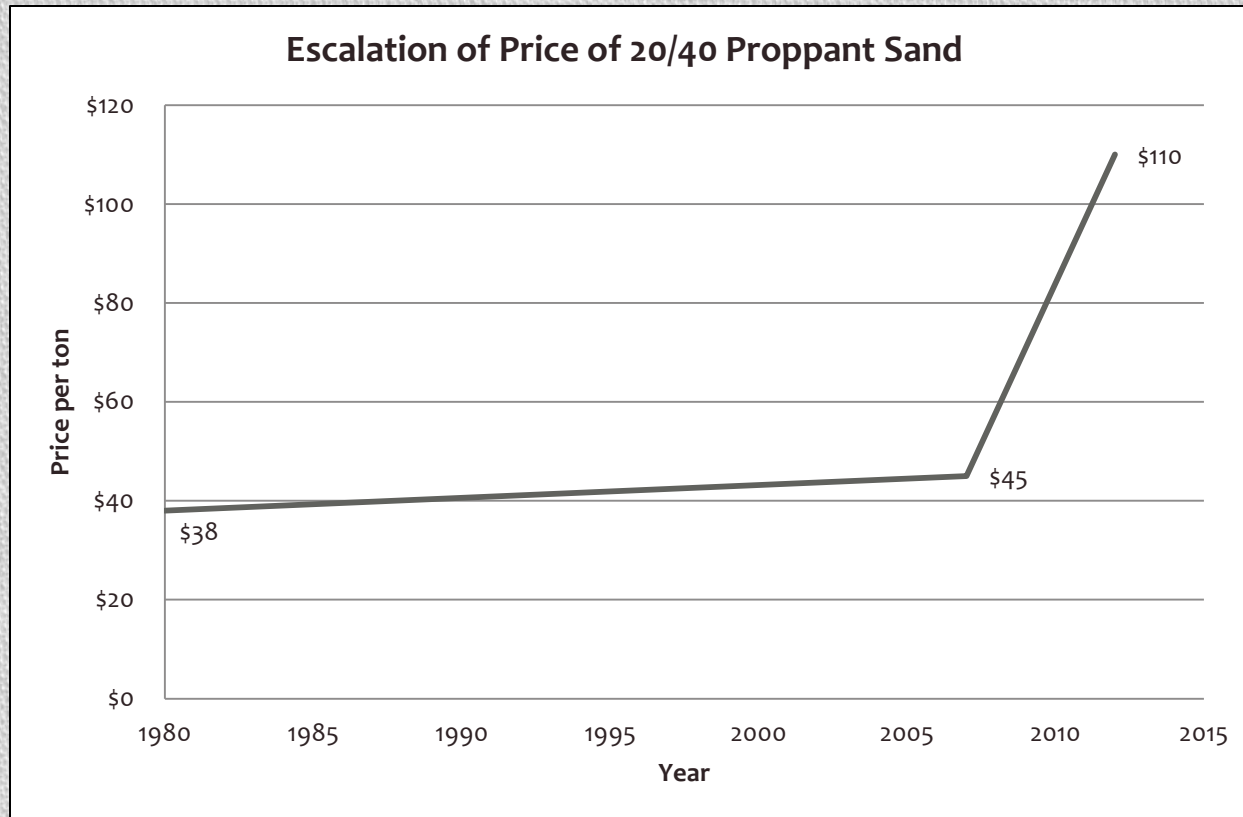
**Lower 48 states shale plays**





# The price for frac sand has increased dramatically.

Prices for frac sands have increased substantially over the last 5 years.



20/40 is the most desirable size, other size fractions are sold at a much lower price than 20/40.



A stylized, monochromatic illustration of a plant with several large, pointed leaves and a cluster of small, round buds or flowers, rendered in a dark brown color against a lighter brown background.

# HOW ARE TRIBES AFFECTED BY FRAC SAND MINING?



# Some Tribes have potential for frac sand production.

Especially:

Oneida

Ho Chunk Nation

Prairie Island Community

Hannahville

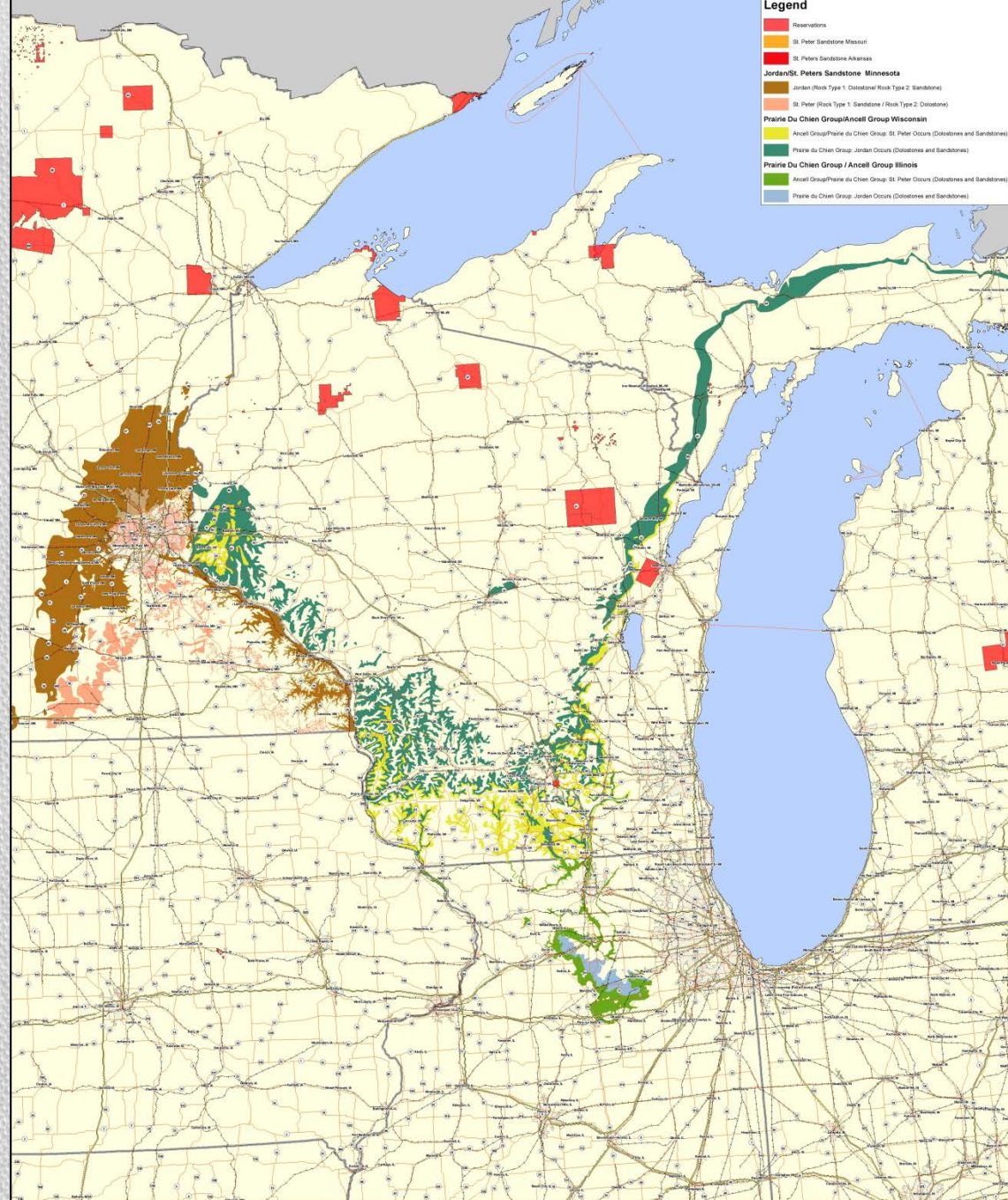
Possibly:

Bay Mills Reservation

Shakopee Community

Lower Sioux

North of the outcrops shown on the map the formations have been eroded, so Reservations north of the outcrop belt have little to no potential for frac sand.



Jordan and St. Peters Sandstone Occurrences

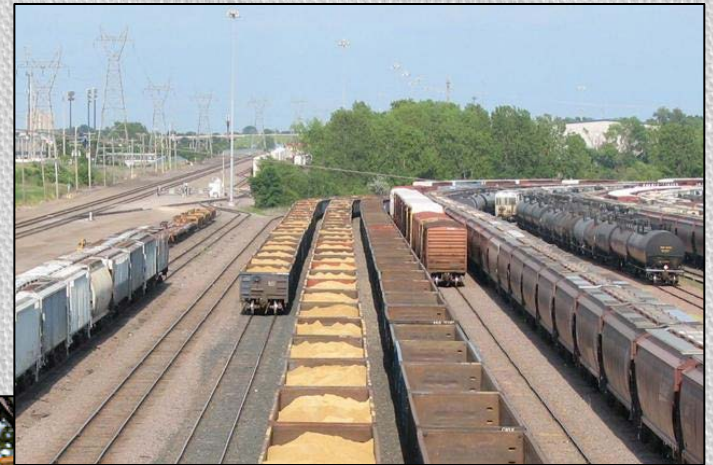
0 7.5 15 30 45 Miles





# Potential impacts of frac sand mining:

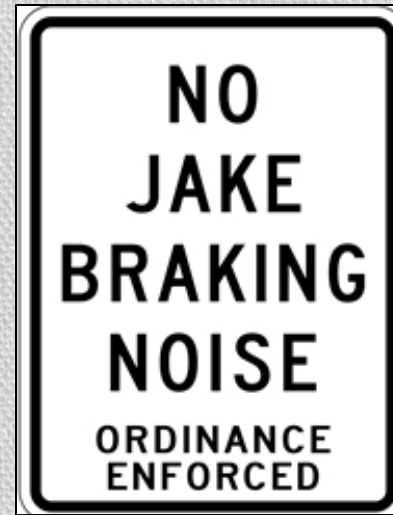
- Jobs
- Income
- Re-opening of old rail-lines (or development of new rail lines)
- Income to surface / mineral owners
- Income (tax) to local jurisdictions





# Potential impacts of frac sand mining:

- Noise
- Traffic
- Aesthetics
- Increased road maintenance
- Potential pollution





# Confidential Potential Violation Reporting

## Wisconsin

Tips from residents have alerted the Department of Natural Resources to several frac sand mining environmental violations.

The DNR encourages people to report suspected environmental, wildlife, or recreational violations. You can make a confidential report by:

1. calling                      1-800-TIP-WDNR (1-800-847-9367)
2. emailing                    [le.hotline@wisconsin.gov](mailto:le.hotline@wisconsin.gov)





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