

Silica Sand Mining in the Central Midcontinent

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[Wisconsin's diamonds: 'Frac sand' – Milwaukee Journal Sentinel Online](#)

[Natural gas, oil boom spurs sand mining in Midwest](#)

[Fracking boom spurs sand mining in Midwest – US](#)

[SE Minnesota residents not digging the 'sand rush'](#)
minnesota.publicradio.org/

[Caught between the devil and the deep blue sea | The
hometownargus.com/](#)

[No fracking way: Wabasha County places temporary moratorium on ...](#)
www.bluestemprairie.com/

[Frac sand mining erupts in Winona County | StarTribune.com](#)

[Goodhue County officials vote to ban silica sand mining for a year ...](#)
minnesota.publicradio

[Southeastern Minnesota citizens struggle with fracking sand mining ...](#)
www.bluestemprairie.com

Topics:

What is “silica sand”?

Why the mining “boom”?

Why here?

What’s the “boom” look like?

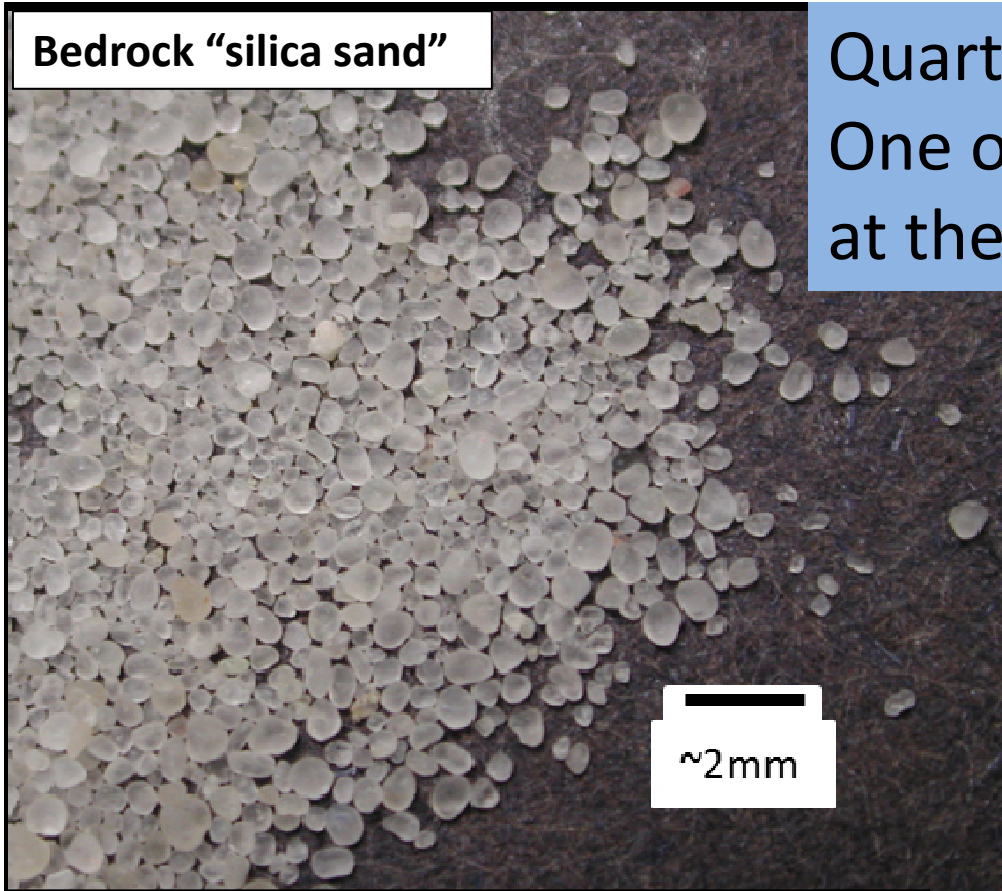
Mining practices

Concerns



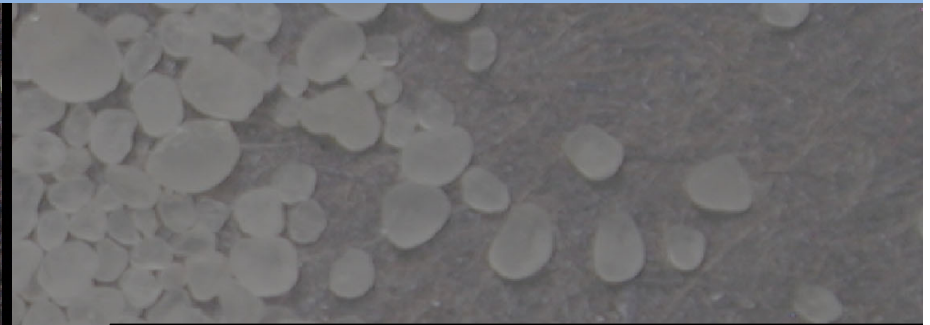
Bedrock "silica sand"

Quartz: Silicon and Oxygen (SiO_2)
One of the most common minerals
at the Earth's surface



~2mm

**Greater than 95 percent grains of the
mineral quartz; rounded grains**



Typical "glacial" sand on top of bedrock



**Quartz abundant, but other minerals also admixed
Many angular grains**



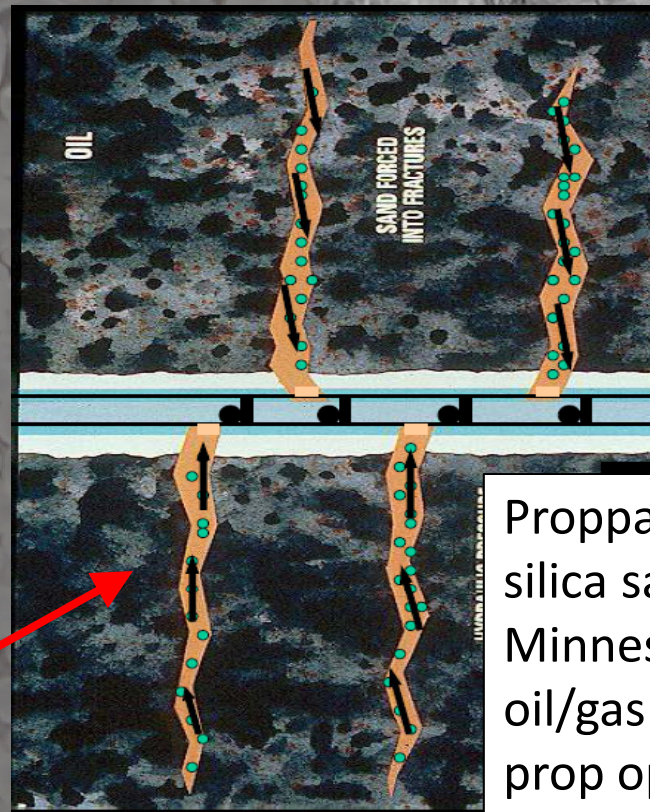


Silica sand has been mined in the midcontinent over 100 years

Some Purposes:

- Tunneling for storage
- Storm sewer system
- Glass making
- Foundry sand
- Abrasives
- Cattle bedding
- General fill
- Underground buildings

Hydrofracking



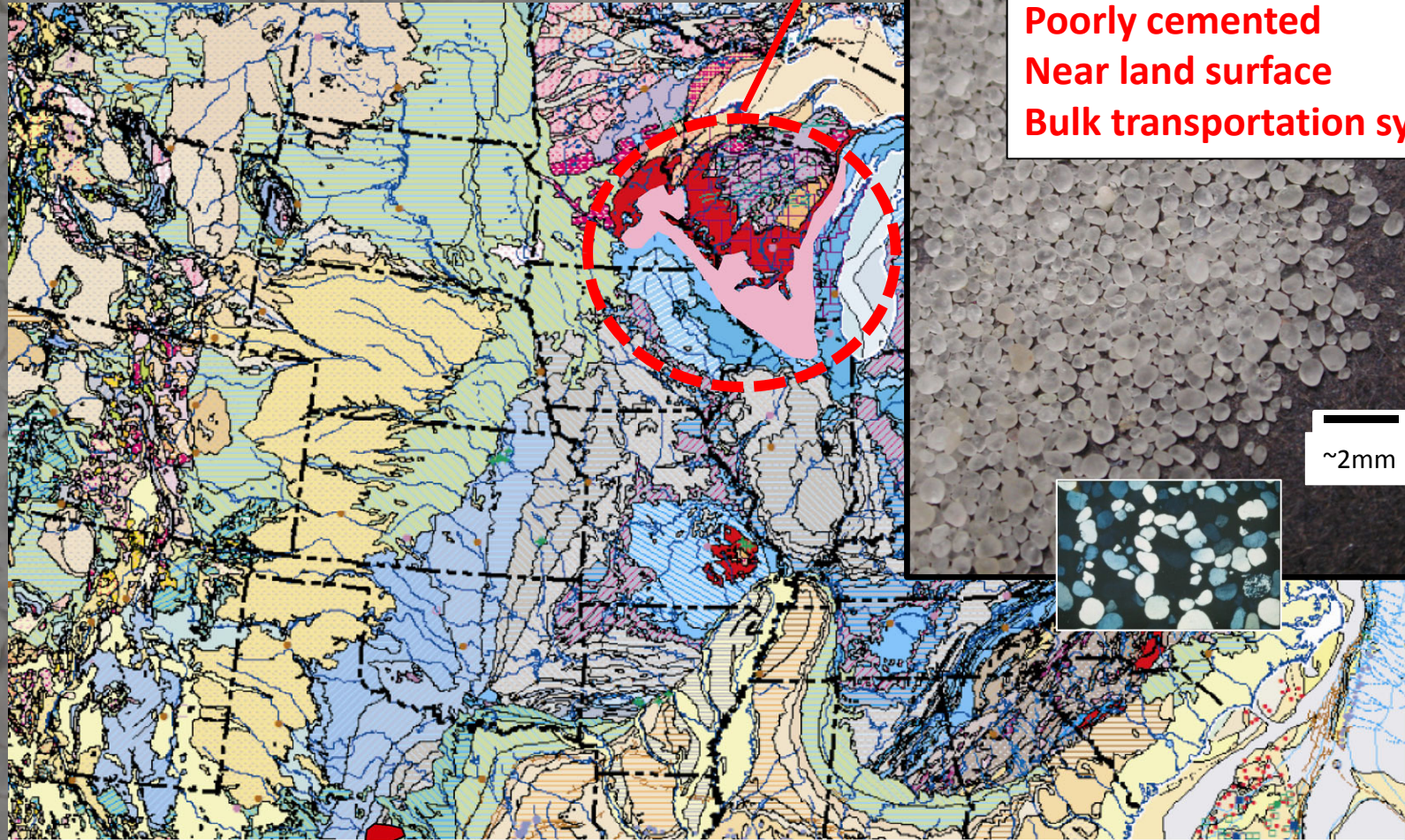
Proppants, such as silica sand from Minnesota, are used in oil/gas fields elsewhere, to prop open fractures deep underground, allowing oil and gas to escape



Why here?

“Best” accessible frac sand deposits

CAMBRIAN AND ORDOVICIAN SANDSTONE



Layers with v. high % quartz
Monocrystalline
High sphericity
V. well rounded

Relatively coarse-grained!
Poorly cemented
Near land surface
Bulk transportation system

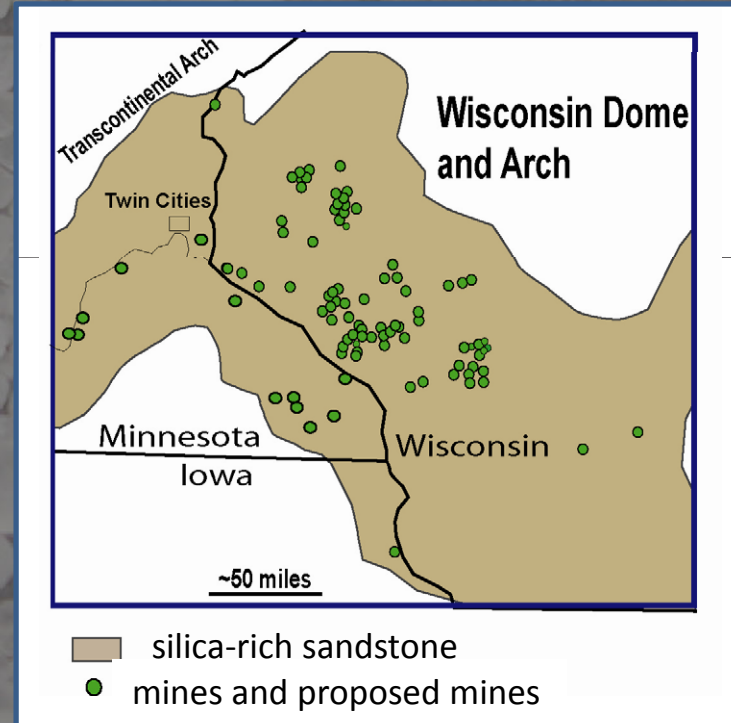
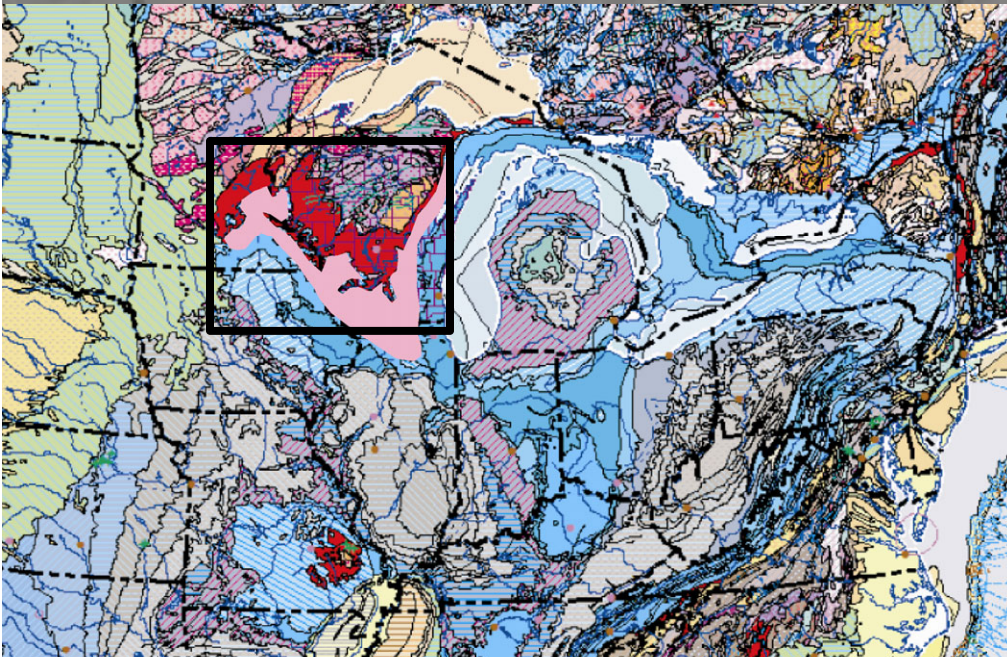


Modified from Bruce Brown, Wisconsin Geological and Natural History Survey

Increased hydrofracking + relative scarcity of “best” sand has led to:

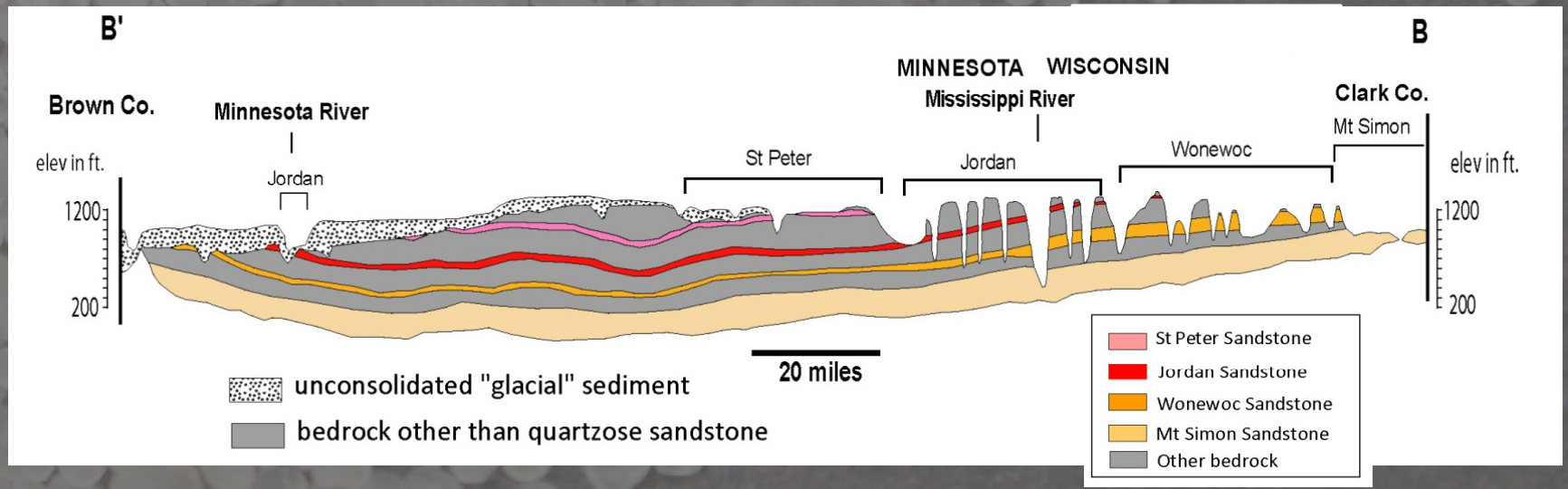
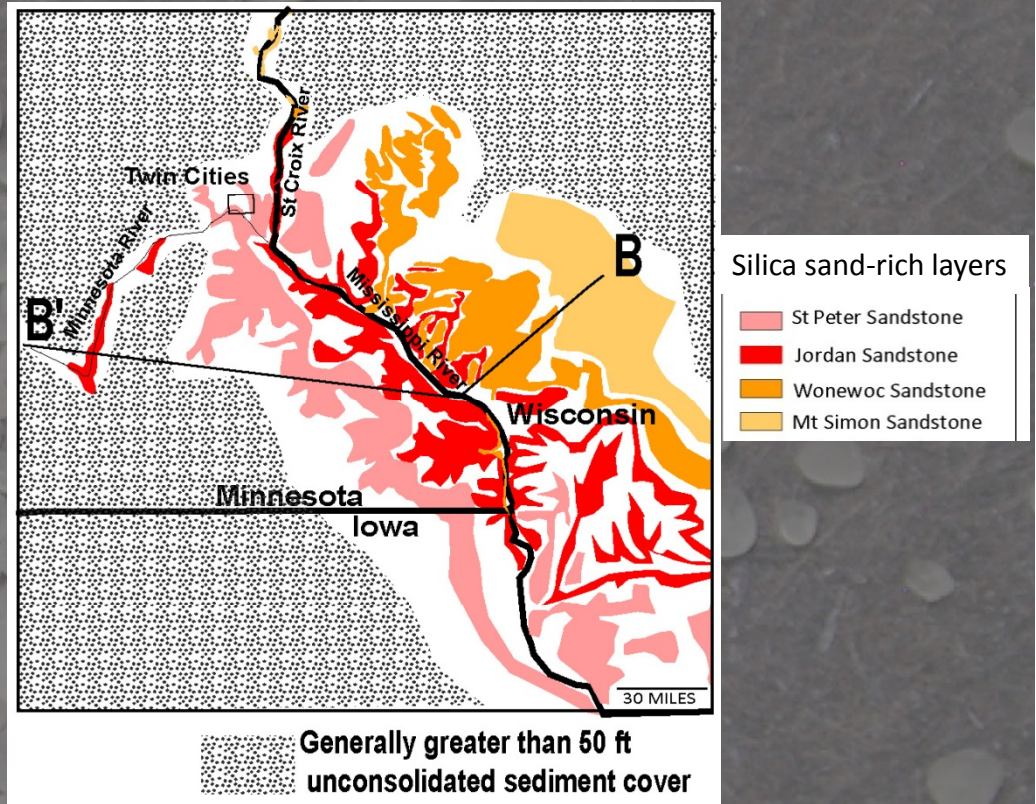
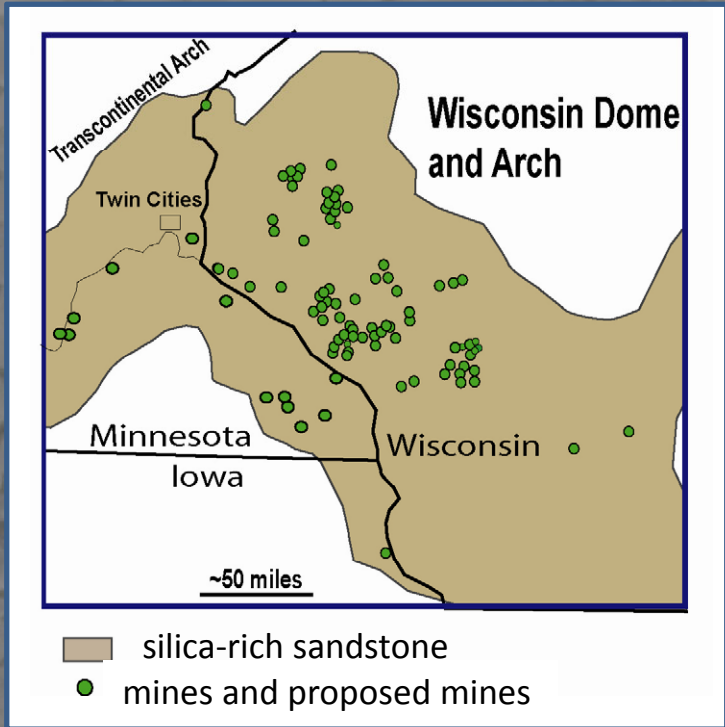
The result

- From fewer than a dozen to potentially over 90 mines
- Properties from a few tens to ~1000 acres
- Potentially soon (already?) exceeding 20-30 million tons/year



Wisconsin Mine sites compiled in July 2012 by Wisconsin Center for Investigative Journalism.





Mining

Removal of overburden
Excavation (backhoe, ripping, blasting)
Dewatering of pit (some sites)
(truck transport to processing facility)



Jordan Ss Mine, near Ottawa, Minnesota



St Peter Ss Mine, near Chatfield, Minnesota



Underground mining near Maiden Rock, Wisconsin

PROCESSING

(transport to processing facility)
Crushing
Washing/separating sizes
Drying
Transport to rail (some barge)



WisconsinWatch.org



Wisconsin DNR



Associated Press

OPPOSITION TO EXPANSION OF SILICA SAND MINING

Concerns:

- Noise
- Truck transport (traffic, road degradation, noise, safety, dust)
- Dust (silicosis??)
- Surface and groundwater water impacts
aquifer drawdown (pit dewatering)
groundwater contamination (polyacrylamide)
- Landscape alterations...reclamation plans
- Opposition to end use (hydrofracking) of sand

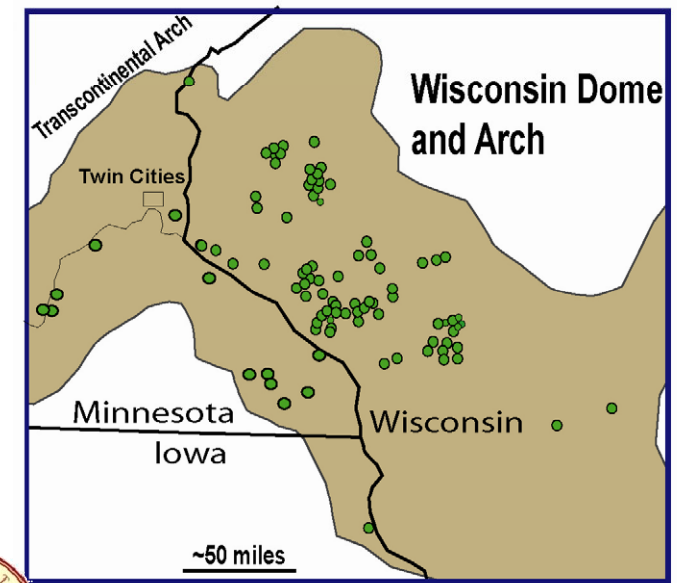
Most are currently regulated to varying degrees by MPCA, MDNR, and via County level ordinances.

A key question....how does it differ from aggregate mining that has been practiced and regulated for decades?

**Critical to all of the above, is.....
magnitude of the expansion.... Where is this going?
e.g. 200 acres mining/year for region acceptable?**

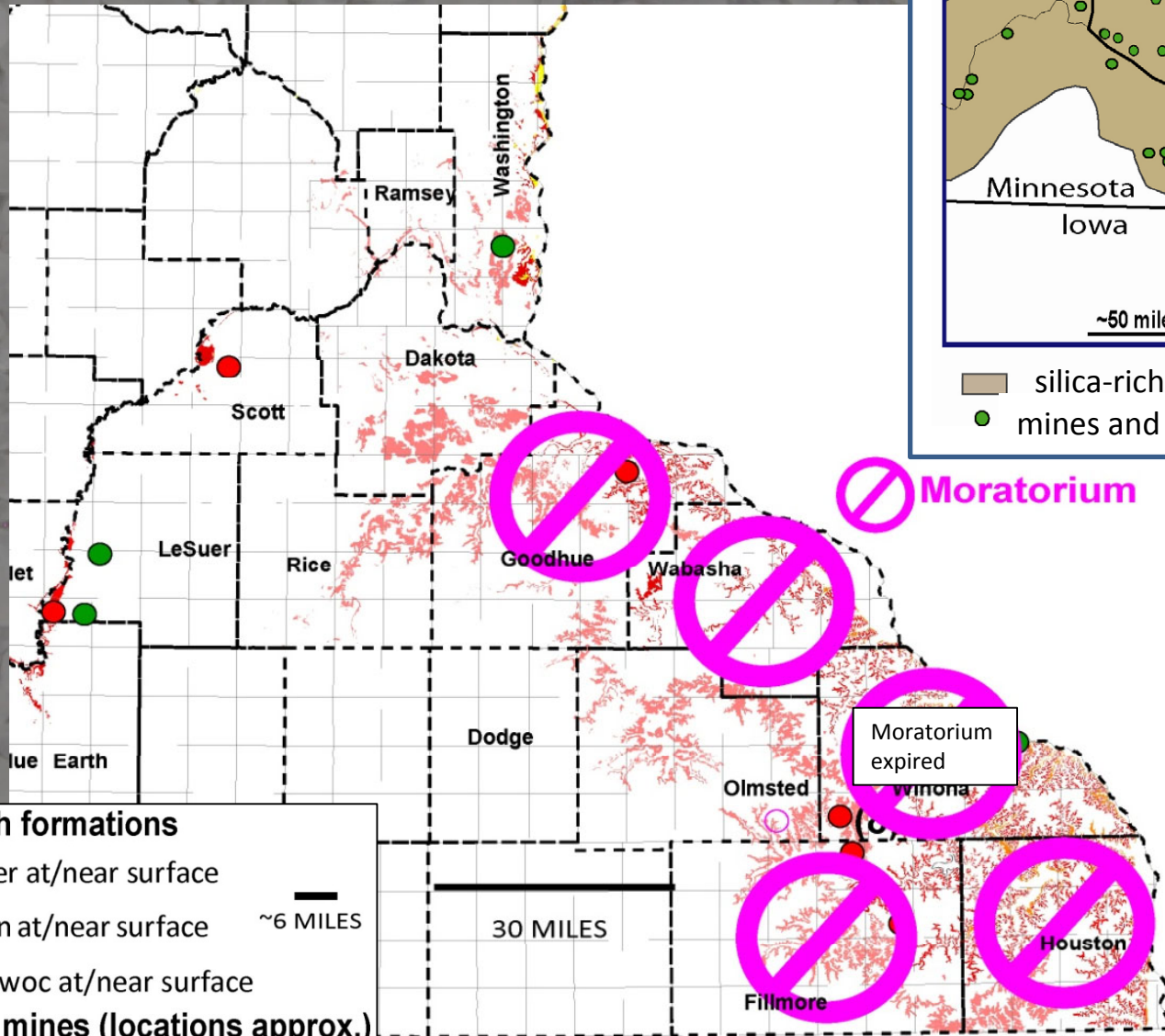


Bruce Brown, WGNHS



- silica-rich sandstone
- mines and proposed mines

Moratoriums



Quartz-rich formations

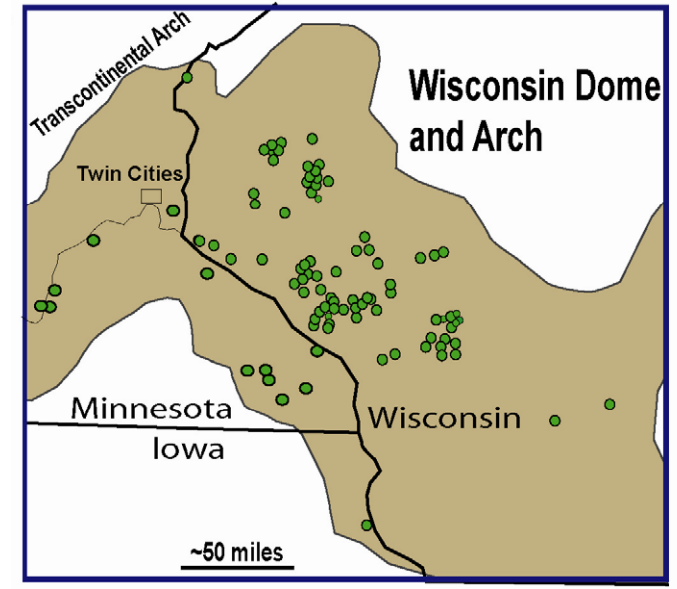
- St Peter at/near surface
- Jordan at/near surface
- Wonewoc at/near surface

Silica sand mines (locations approx.)

- Active
- "Proposed" (formally or informally)

~6 MILES

30 MILES



- silica-rich sandstone
- mines and proposed mines

⊘ **Moratorium**

Moratorium expired

