

WISCONSIN TOWNS ASSOCIATION MEETING

FRAC SAND MINING AND
PROCESSING

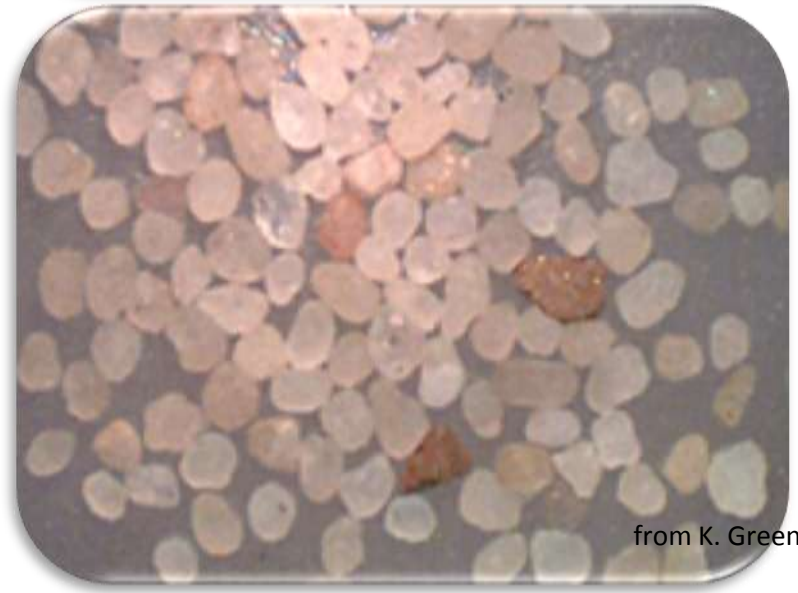
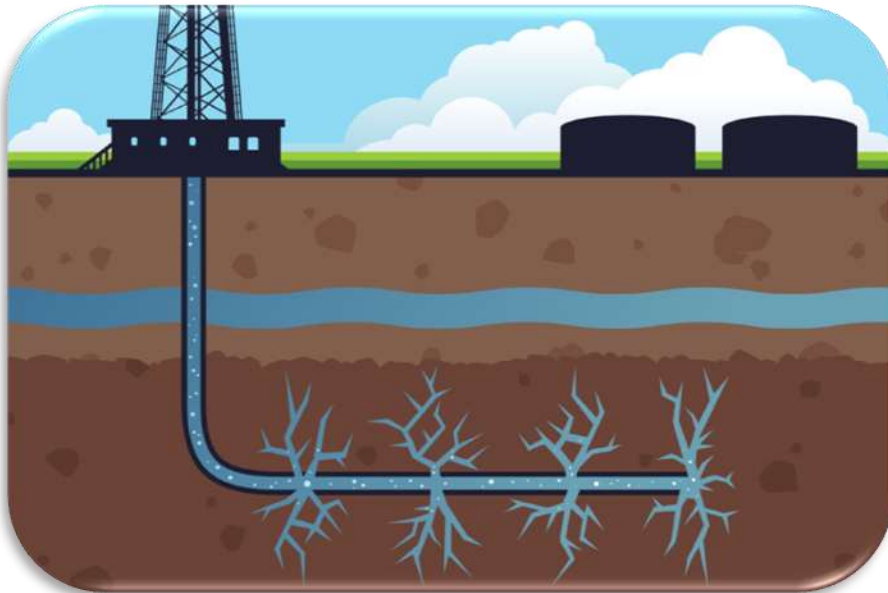
WHY? WHERE?

December 1, 2011

January 12, 2011

Old Methods – New Applications: Directional Drilling & Hydrofracking a well

Horizontal drilling combined with hydrofracking increases well yield. Fluid pressure fractures the rock, sand grains keep the fractures open



What is Frac Sand?



- Quartz sand
- Highly rounded
- High compressive strength

Most desirable if:

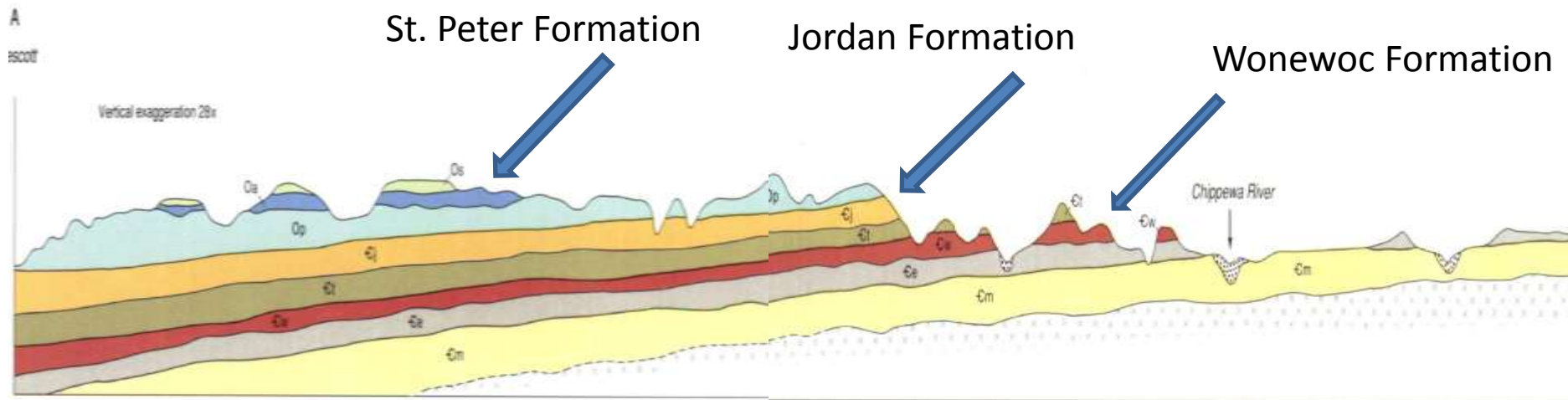
- Easily recoverable
- Minimal processing steps (costs), quartzite cement?
- Ability to get from mine to oil/gas drilling sites easily (close to transportation routes- i.e. train)

WHY WESTERN WISCONSIN?

It's the Geology

West

East



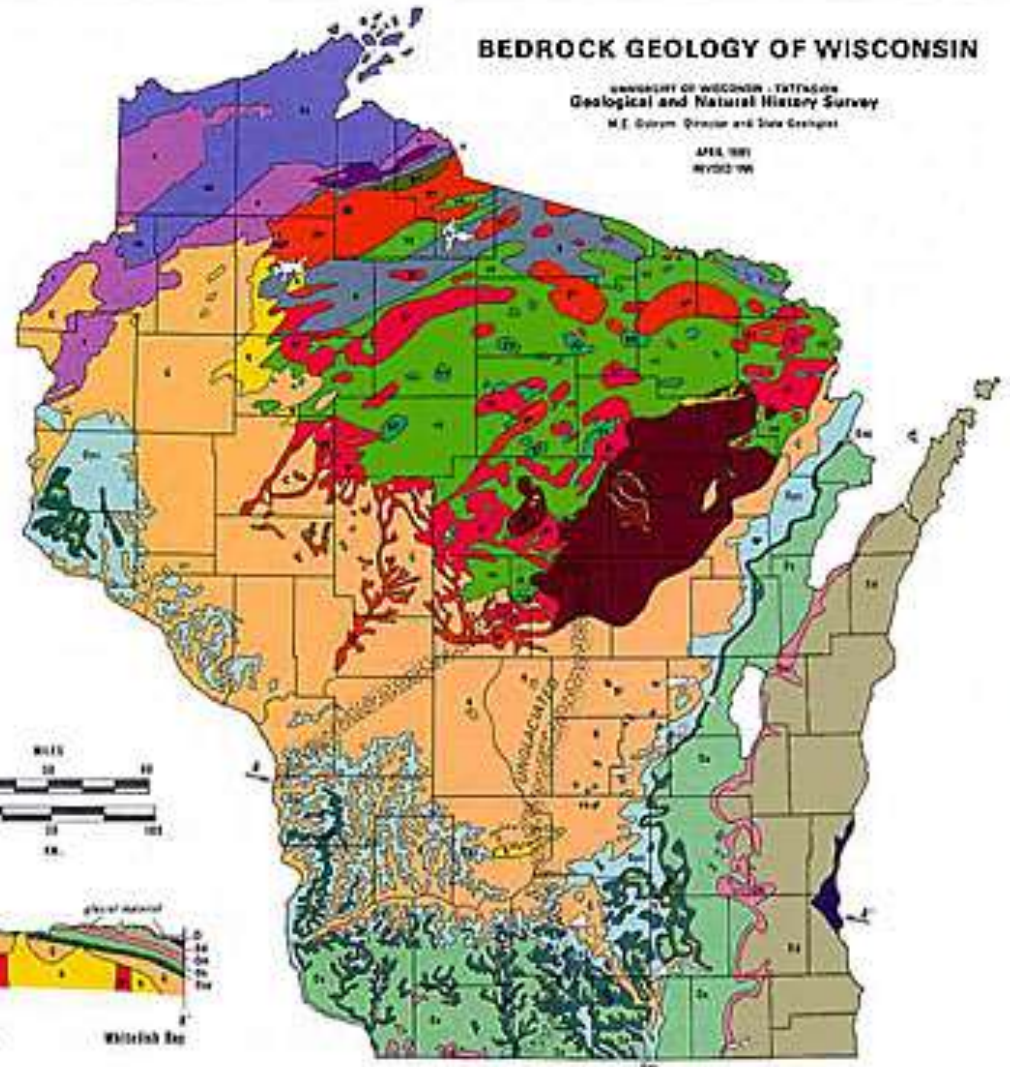
High Quartz Content Sandstone Formations

LEGEND

- BOUNDARIES**
 - State boundaries
- PROTEROZOIC**
- NEOVISIAN FORMATIONS**
 - **W** - granite and gneiss
- ILLINOIS FORMATIONS**
 - **M** - granite
- ORDOVICIAN FORMATIONS**
 - **Or** - Muskegon Formation - shale and dolomite
 - **Or** - Genesee Group - dolomite with some limestone and shale
 - **Or** - Port Hope Formation - limestone with some limestone shale and conglomerate
 - **Or** - Plover de Chene Group - dolomite with some limestone and shale
- CAMBRIAN FORMATIONS**
 - **C** - limestone with some dolomite and shale
- MIDDLE PROTEROZOIC ROCKS**
 - **W** - Wisconsin Block - gneiss, granite, quartzite, amphibolite, mica schist, and quartzite
 - **W** - Superior to Michigan Lake Falls - gneiss, quartzite and granite schist
 - **W** - West Bear Block - gneiss, granite and quartzite, amphibolite and quartzite
- LOWER PROTEROZOIC ROCKS**
 - **L** - quartzite
 - **L** - gneiss, granite and quartzite
 - **L** - quartzite, schistose, quartzite, gneissite, and iron formation
 - **L** - gneissite, schistose, quartzite, gneissite, and iron formation
 - **L** - mica gneiss and hornblende schist
- LOWER PROTEROZOIC OR UPPER ARCHEAN ROCKS**
 - **A** - amphibolite schist
 - **A** - gneiss, granite and amphibolite

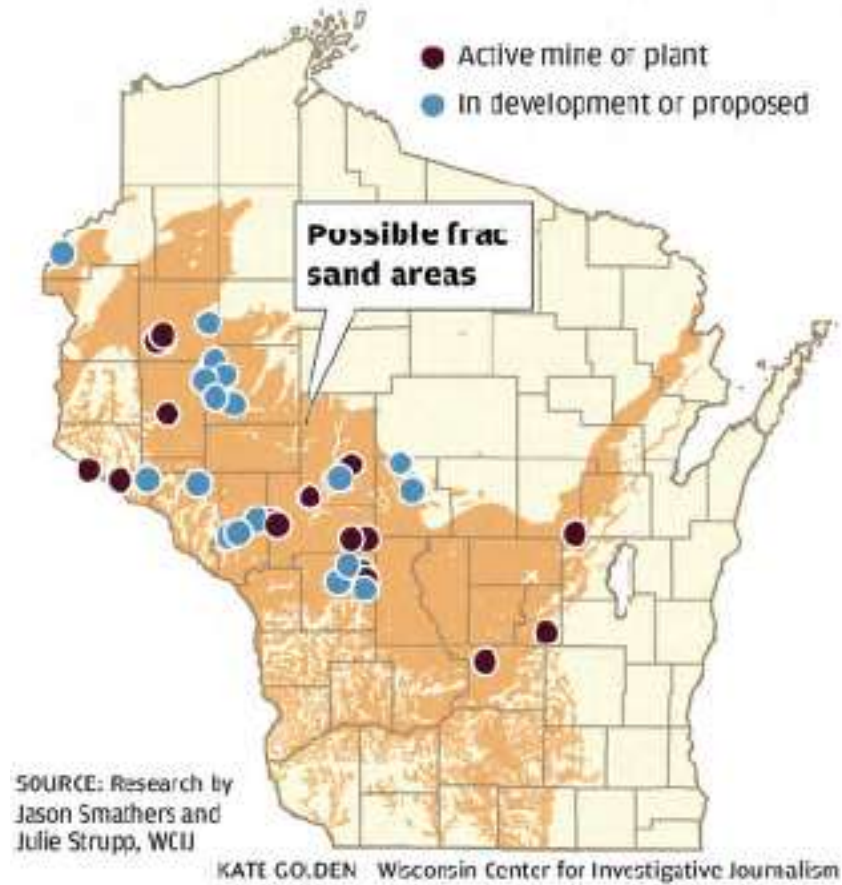
BEDROCK GEOLOGY OF WISCONSIN

UNIVERSITY OF WISCONSIN - EXTENSION
 Geological and Natural History Survey
 M.E. Gilroy, Director and Dale Grotzinger
 APRIL 1991
 NG002-99



ACTIVE AND PROPOSED MINE SITES

'Frac sand' deposits in Wisconsin



Frac Sand Mining in Wisconsin Barron, Dunn, Rusk and Chippewa Counties

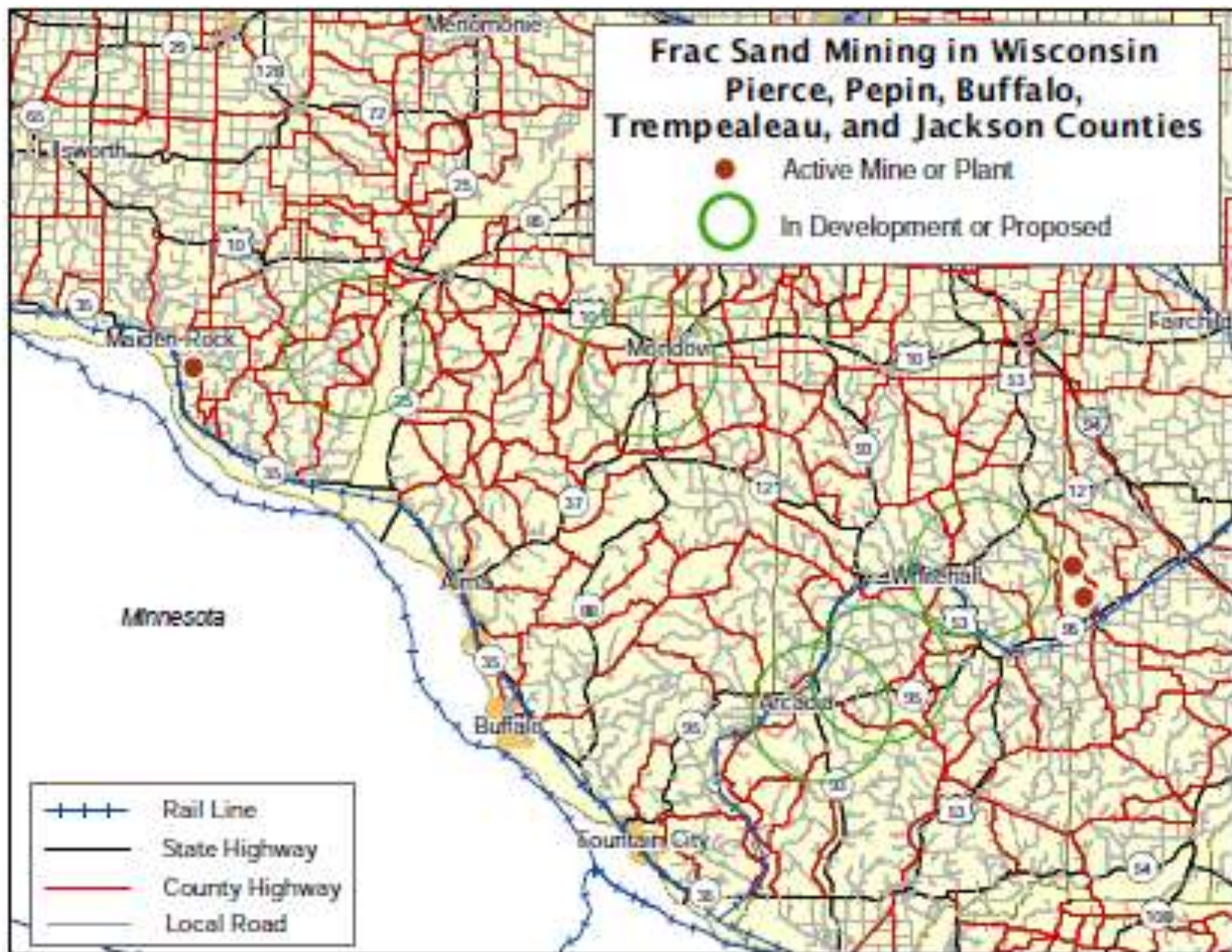
- Active Mine or Plant
- In Development or Proposed



- +++ Rail Line
- State Highway
- County Highway
- Local Road

Frac Sand Mining in Wisconsin Pierce, Pepin, Buffalo, Trempealeau, and Jackson Counties

- Active Mine or Plant
- In Development or Proposed



Frac Sand Mining in Wisconsin Jackson and Monroe Counties

- Active Mine or Plant
- In Development or Proposed



