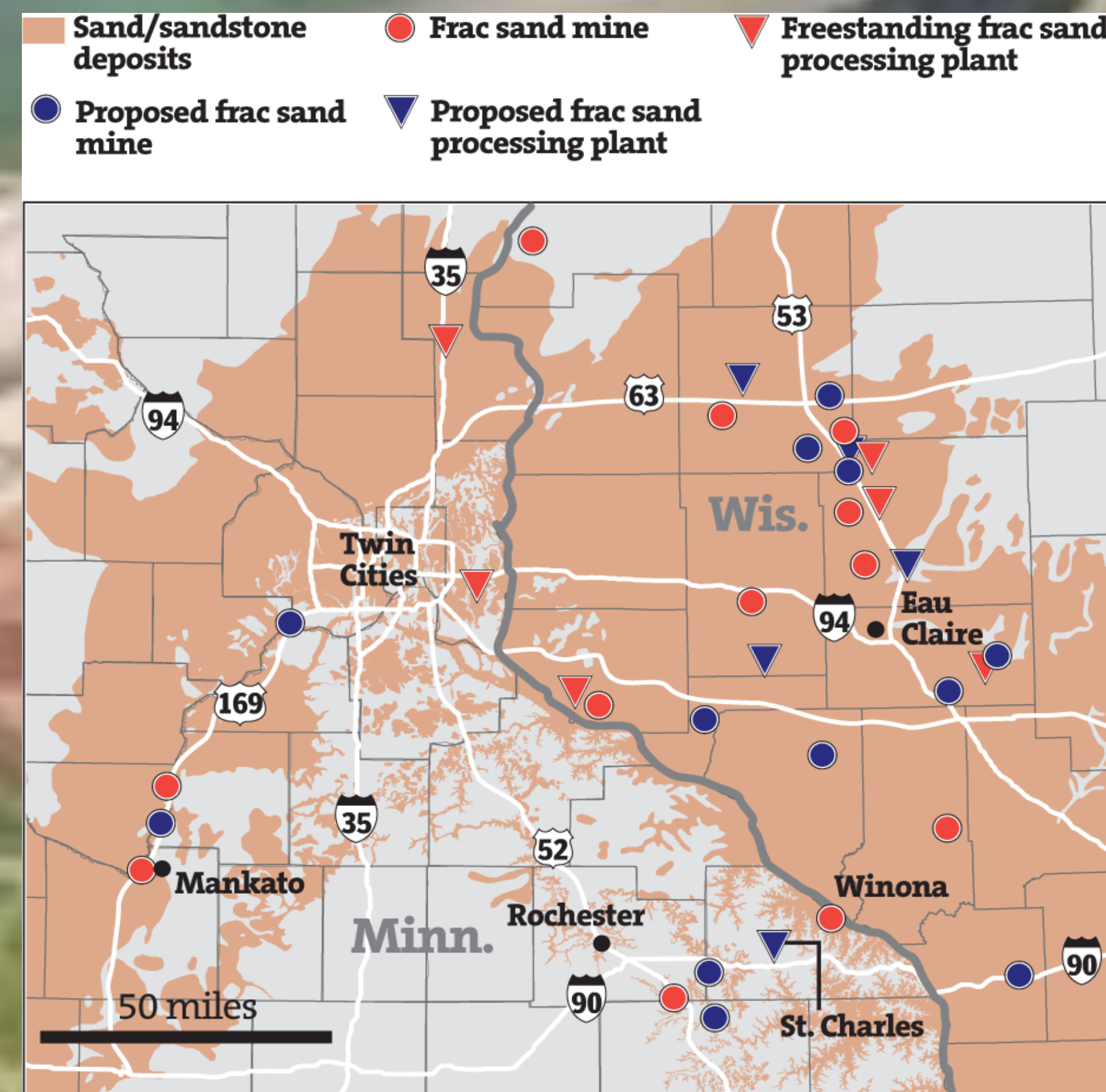


Sand County Revisited: Impacts and Responses to the Frac Sand Boom

Emmett Doyle*, Dr. Jean Lavigne, and Dr. Derek Larson

Abstract– The sand range of western Wisconsin and southeast Minnesota has, since 2008-09, been the site of a dramatic expansion of silica sand mining, driven by the demand for the sand as proppant in the national boom in hydraulic fracturing. In Wisconsin alone, where there were ten mines or processing facilities in 2010, there are now approximately 90 in operation or construction. This thesis aims to analyze the environmental and social-economic impacts of the frac sand boom in order to equip local residents and governments the necessary tools to respond to the boom in the best interests of their communities.

Methods– To provide a useful tool for local residents and governments, I sought to research several key areas: the environmental impacts of sand mining, the social and economic impacts, the relevant stakeholders and political climate at the state level, existing regulations at the state and federal level, and local regulatory options. I gathered information about these primarily through reviewing state, industrial, and conservationist documents on the issue, as well as journalistic sources. I supplemented these sources with original interviews, and with a personal week-long immersion in the west Wisconsin sand range. Finally, I analyzed and ordered this information into an accessible review.



Sources: Minnesota Geological Survey; Wisconsin Center for Investigative Journalism, U.S. Geological Survey

MN-WI frac sand mining as of September 2012

Conclusion– This thesis concludes that, at the state level in both Minnesota and Wisconsin, it would be appropriate to institute a one-year moratorium in order to perform a state-wide assessment of environmental impacts, and to allow local communities time to deliberate on their interests. Further, this thesis strongly urges the adoption in each state of a state-wide air quality standards for crystalline silica pollution. On a local level, this thesis urges communities to assess the known costs and benefits in the context of their own community's conditions and needs, and to adopt protective regulations as needed.

Environmental Impacts

Air Quality

- Silica dust is known to cause silicosis and other lung diseases.
- No regulation in MN or WI currently addresses silica dust specifically.
- Concentrations around mines are likely to be higher than the 3 micrograms per cubic meter suggested by the MN MPCA as a limit.

Groundwater

- Use of water to process sand could result in overdrawing of water tables.
- Carcinogenic acrylamides could escape holding ponds.

Surface Water

- Sand spills from holding ponds have been recorded.
- Spills are non-toxic but can temporarily disrupt aquatic ecosystems.

Biosphere

- Streams and wetlands may be impacted by groundwater and surface water damage.
- The Karner blue butterfly may be impacted.

Aesthetic Impacts

- Parts of the frac sand range, such as the Driftless Area, are known for their aesthetic qualities.



Socio-Economic Impacts

Job Creation

- Each frac sand mine, in operation, can provide on average 10 jobs, according to the Wisconsin Economic Development Corporation.
- A sand processing plant can provide 50-80 jobs.
- Ripple effects stimulate the local economy, creating more jobs.
- Jobs may be at risk, as mining industries are historically unstable.

Road Damage

- Towns may see roads degrade by a factor of 10 from truck traffic– a 20-year road would require repair in 2 years.
- Townships have used fees to help cover costs.

Boomtown Effects

- Influx of labor, particularly young men, can lead to housing shortages, imbalanced sex ratios, increases in property crime and violent crime, and increased sexual harassment and assault.
- These trends are not universal and are dependent in part of the degree to which hiring is local.

Other

- Tax revenues
- Historical and cultural sites
- Tourism
- Amish objections

Image sources:

Boswell, Mark. "Where Frac Sand Mining Has Taken off." Star Tribune. September 29, 2012. Accessed April 22, 2013. <http://www.startribune.com/newsgraphics/171928181.html>.

King, Hobart. "What Is Frac Sand?" A Durable Sand for Hydraulic Fracturing. Accessed April 22, 2013. <http://geology.com/articles/frac-sand/>.

Seitz, Greg. "Proposal Rejected to Expand Frac Sand Mine next to River | St. Croix 360." St Croix 360 RSS. October 11, 2012. Accessed April 22, 2013. <http://www.stcroix360.com/2012/10/proposal-rejected-to-expand-frac-sand-mine-next-to-river/>.