

# Petition for a Strategic Analysis of Frac Sand Mining



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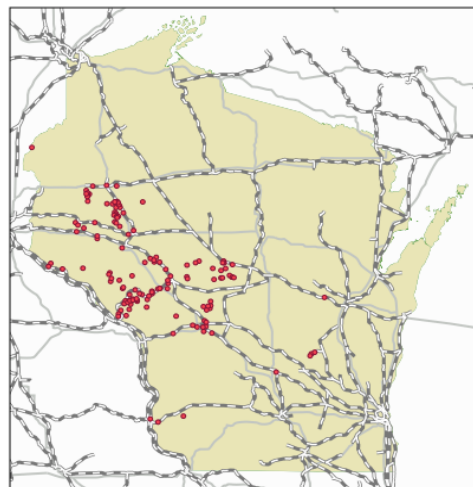
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Rapid growth in the hydraulic fracturing industry has placed a high price on Wisconsin's pure, round silica sand. This has resulted in a boom in frac sand mining and processing—another name for industrial sand mining and processing that produces sand for hydraulic fracturing—which has brought big changes to rural life and scenic landscapes in Wisconsin. Frac sand mines are turning quiet agricultural lands and into industrial sites. Rural and small-town residents are disturbed by blasting and drilling, truck and train traffic, and constant light pollution from mines that operate 24 hours a day. Extraction, transport, and wind releases silica dust into the air, obscuring views with haze and coating houses with sand. Frac sand companies are withdrawing huge amounts of water from aquifers, and stormwater and wastewater discharges threaten the safety of drinking water and alter fragile ecosystems.

Unfortunately, research and regulation have not kept up with this industry. Frac sand mining is changing Wisconsin's environment, but our environmental protection agency—the Wisconsin Department of Natural Resources (DNR)—has neither evaluated the full scope of impacts, nor adapted its regulations to address the new hazards. As the industry continues to expand, Wisconsin is falling behind its neighbors in studying and adequately regulating the public health and environmental impacts of frac sand mining.

The DNR's only examination of the frac sand industry was a 2012 report on industrial silica sand mining in Wisconsin. In that report, the DNR concluded that “as the number of sand mines and processing facilities increase, especially if clusters of these facilities begin to occur, the department may consider examining cumulative environmental impacts.” The time has come for the DNR to conduct a comprehensive analysis of the cumulative impacts of this industry. The number of active mines and processing facilities has nearly doubled since 2012. Moreover, mines and processing facilities have already begun to cluster in areas near existing transportation infrastructure.

### Frac sand and railroads



Mines, processing plants and rail load-outs as of May 2014, from WisconsinWatch.org reporting. Map: Kate Golden.

Further, none of the state permits required for frac sand mines and processing facilities require the DNR to prepare an Environmental Impact Statement (EIS) or an Environmental Assessment (EA). The DNR’s piecemeal approvals of over a hundred such facilities over the past few years have put exponential growth of this industry ahead of environmental and public health protection.

Citizens need the DNR to conduct a strategic analysis of the environmental, public health, economic and quality of life impacts of the of frac sand mining industry and to develop alternatives to current management strategies. A strategic analysis would provide invaluable information to citizens concerned about the health of their families and to local, state and federal decision makers who are also responsible for regulating this industry. **The undersigned citizens of the State of Wisconsin therefore request that the Wisconsin Natural Resources Board (NRB) direct the DNR to conduct a strategic analysis of frac sand mining and processing.**

This petition begins by outlining the strategic analysis process and the authority of the Natural Resources Board (NRB) to direct the DNR to conduct such an analysis. Next it provides the potential impacts of frac sand mining of which the DNR was aware when it last examined the frac sand industry in 2012. We will explain that a strategic analysis is necessary due to explosive growth of this industry and new information about water and air impacts, as well as efforts in other states to better regulate and study frac sand mining. Finally, we set forth our view of the purpose of a strategic analysis of frac sand mining and provide an initial framework for the scope of that analysis.

## **I. The Strategic Analysis Process**

A strategic analysis is a new process for environmental studies created by the overhaul of Wis. Admin. Code NR 150—DNR’s implementation of the Wisconsin Environmental Policy Act—that went into effect in April 2014. It is an environmental and alternatives analysis of any policy which involves unresolved conflicts concerning alternative uses of available resources.<sup>1</sup> The purpose of the strategic analysis “is to inform decision makers and the public of alternative courses of action and the anticipated effects of those alternatives on the quality of the human environment.”<sup>2</sup>

The DNR has discretion to conduct a strategic analysis of (1) a complicated or complex issue, (2) an issue that is new to the state, (3) an issue or policy that will likely lead to future department actions that will require an EIS, (4) issues for which there is a high potential for legislation or new department policy, (5) planning and development of controversial resource-

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<sup>1</sup> Wis. Admin. Code § NR 150.03(25) (2014).

<sup>2</sup> Wis. Admin. Code § NR 150.10(3)(a).

oriented projects, or (6) any other issue or policy that involves unresolved conflicts concerning uses of available resources.<sup>3</sup>

The NRB has the authority to require the DNR to conduct a strategic analysis. The April 2014 version of NR 150 contained a provision explicitly requiring the DNR to conduct a strategic analysis of an issue or policy if such a request by a Wisconsin citizen was approved by the NRB.<sup>4</sup> Shortly after that rule went into effect, the DNR eliminated this provision as part of its “housekeeping” emergency rulemaking that went into effect in August of 2014. In defense of its “housekeeping” changes, the DNR indicated that it was unnecessary to include the provision in the regulations because, independent of NR 150, the NRB has the authority to require the DNR to conduct a strategic analysis of controversial resource-oriented issues and policies.

As this is a fairly new process, little information exists regarding appropriate subjects of a strategic analysis or the appropriate scope of such an analysis. However, the DNR’s regulations—NR 150—do make it clear that the DNR must develop and utilize a public scoping process for a strategic analysis.<sup>5</sup> The DNR may determine how it will develop an effective public scoping process using “comment periods, meetings, hearings, workshops, surveys, questionnaires, interagency committees, or other appropriate methods or activities.”<sup>6</sup> Whatever form it takes, the DNR must give the public an opportunity for adequate input during scoping, and the opportunity to comment on a draft document.<sup>7</sup>

Since creating this process in April 2014, the DNR has begun one strategic analysis, which may serve to inform how a strategic analysis of frac sand mining could be conducted. The DNR is undertaking a strategic analysis to evaluate “environmental concerns associated with declining surface water levels and increasing groundwater withdrawals” in the central sands area of Wisconsin.<sup>8</sup> The DNR stated that its “aim with the strategic analysis is to provide important information to help decision makers create policies that would allow sustainable use of groundwater to support farms, industries, municipalities and private well users while protecting lakes, streams and wetlands.”<sup>9</sup> Similar to the need for a strategic analysis in the central sands to examine increasing groundwater withdrawals, a strategic analysis of the frac sand industry in Wisconsin is necessary to inform decision making in regard to this new and booming industry, and to address citizen concerns about environmental impacts.

## **II. The Potential Environmental, Public Health, Economic and Quality of Life Impacts of Frac Sand Mining in Wisconsin are Widespread and Varied**

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<sup>3</sup> Wis. Admin. Code § NR 150.10(1m)(c).

<sup>4</sup> Wis. Admin. Code § NR 150.10(1m)(b)6. (Apr. 2014).

<sup>5</sup> Wis. Admin. Code § NR 150.10(2)(c).

<sup>6</sup> Wis. Admin. Code § NR 150.10(2)(c).

<sup>7</sup> Wis. Admin. Code § NR 150.10(2), (4).

<sup>8</sup> Wisconsin Department of Natural Resources, Central Sands Strategic Analysis, available at <http://dnr.wi.gov/topic/EIA/CSSA.html>.

<sup>9</sup> Wisconsin Department of Natural Resources, Central Sands Strategic Analysis, available at <http://dnr.wi.gov/topic/EIA/CSSA.html>.

Though Wisconsin has long had small-scale sand and gravel quarries, industrial frac sand mining at its current scale is new to the state. Frac sand gets its name from its role in the hydraulic fracturing process (also known as hydrofracking or fracking). In the fracking process, the bedrock is blasted apart and sand is injected to prop open fractures in the rock to allow the natural gas or petroleum to escape. To be used in the hydrofracking process, sand must have a spherical shape, contain a high quartz content, have a high compressive strength, and be of uniform particle shape and size.

West central Wisconsin has an abundance of sand that is ideal for use in hydrofracking. Because many of Wisconsin's frac sand deposits are near the surface, making it easier and less expensive to mine, Wisconsin has emerged as the nation's top producer of frac sand. Over the last four years, the number of industrial sand mines and processing facilities in Wisconsin has increased exponentially, jumping from around 10 in May of 2010 to 135 active and 94 inactive frac sand mines, processing and rail facilities as of May 2014.<sup>10</sup> Wisconsin's estimated output of frac sand has more than doubled in just the last two years to an estimated 26 million tons per year.<sup>11</sup>

Frac sand mines can cover anywhere from 100 to 1,500 acres, and many are larger than a typical sand and gravel quarry. But beyond just the scale of the mines, several other characteristics set frac sand mining apart from small-scale sand and gravel quarries. While small-scale sand and gravel quarries tend to operate only periodically, frac sand mines are high-intensity, long-term operations. Many frac sand mines and processing facilities operate 24 hours a day. Additionally, most frac sand processing facilities add flocculants such as polyacrylamide to their washing process to help settle out the solid debris, and these chemicals end up in the stormwater ponds and any surface water and groundwater discharges from the facilities. Industrial-scale frac sand mines also conduct more frequent blasting than smaller-scale sand and gravel operations.

Even though Wisconsin is at the forefront of the frac sand mining boom, our government has done little to evaluate this industry's impacts on our environment and way of life. In 2012, the DNR released a report summarizing some of the available information about the frac sand mining industry in Wisconsin. That report noted several information gaps and did not fully evaluate the environmental, social, cultural and economic impacts of this resource use. The following subsections summarize what was known about the potential environmental and public health impacts of frac sand mining at the time of the DNR's 2012 study.

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<sup>10</sup> Compare Wisconsin Department of Natural Resources, Locations of industrial sand mines and processing plants in Wisconsin, available at <http://dnr.wi.gov/topic/Mines/ISMMap.html>; with Lynn Peeples, *Does Frac Sand Mining Rush In Wisconsin Threaten Public Health?*, Huff Post GREEN, available at, [http://www.huffingtonpost.com/2012/12/07/frac-sand-mining-wisconsin-health\\_n\\_2256753.html](http://www.huffingtonpost.com/2012/12/07/frac-sand-mining-wisconsin-health_n_2256753.html) (citing Thomas Woletz, DNR, as a source).

<sup>11</sup> Taylor Chase, *As rail moves frac sand across Wisconsin landscape, new conflicts emerge*, Wisconsin Center for Investigative Journalism, available at, <http://wisconsinwatch.org/2014/07/as-rail-moves-frac-sand-across-wisconsin-landscape-new-conflicts-emerge/>.

### a. Air and Human Health Impacts

Frac sand mines and processing facilities emit several pollutants that can cause serious health problems. The primary pollutants of concern are nitrogen oxides and particulate matter (including PM10, PM2.5, and crystalline silica dust, which may be a component of PM10 and PM2.5). The frac sand mining process produces particulate matter of various sizes. Fine particles are emitted from blasting, excavation, transport, storage, and drying of the material. Frac sand mining can also generate high concentrations of crystalline silica dust.<sup>12</sup> Explosive blasting techniques—which are used in frac sand mining to remove dirt and other material above the targeted sandstone and to break up sandstone for processing—generate nitrogen dioxide emissions.<sup>13</sup>

Particulate matter smaller than 10 microns in diameter (PM10), and especially that smaller than 2.5 microns in diameter (PM2.5) can travel deep into the lungs and cause a wide-range of health complications, including:

- premature death in people with heart or lung disease,
- nonfatal heart attacks,
- irregular heartbeat,
- aggravated asthma,
- decreased lung function, and
- respiratory symptoms such as irritation of the airways, coughing, and difficulty breathing.<sup>14</sup>

Exposure to crystalline silica is known to cause silicosis.<sup>15</sup> Silicosis is an incurable and sometimes fatal respiratory disease that can cause inflammation and scarring of the lungs, difficulty breathing, increased susceptibility to tuberculosis, and respiratory failure.<sup>16</sup> Silicosis

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<sup>12</sup> Minn. Envtl. Quality Bd., *Report on Silica Sand*, 21 (Mar. 20, 2013), available at <http://www.eqb.state.mn.us/documents/23.%20March%20Final%20Silica%20Sand%20report.pdf>.

<sup>13</sup> Joseph E. Chilton, Robert J. Timko & Edward J. Chuhta, Nat'l Inst. for Occupational Safety & Health, U.S. Dep't of Health & Human Services, IC 9482, *Nitrogen Dioxide Calibration Standards for Portable Monitors*, 1 (Dec. 2005), available at <http://www.cdc.gov/niosh/mining/UserFiles/works/pdfs/2006-104.pdf>.

<sup>14</sup> Environmental Protection Agency, *Particulate Matter (PM)*, EPA (last updated Mar. 18, 2013), available at <http://www.epa.gov/airquality/particulatematter/>.

<sup>15</sup> Workplace Safety & Health Topics: Silica, Centers for Disease Control and Prevention, available at <http://www.cdc.gov/niosh/topics/silica/>; see also Wis. Dep't of Natural Res., *Report to the Natural Resources Board: Silica Study*, 8-10 (Aug. 2011), available at <http://dnr.wi.gov/files/pdf/pubs/am/am407.pdf>. (noting that the U.S. Environmental Protection Agency and some state agencies have identified silicosis as the critical non-cancer health effect of concern for ambient air crystalline silica exposure). Additionally, the World Health Organization's International Agency for Research on Cancer and the National Toxicology Program Eleventh Report on Carcinogens recognize crystalline silica inhaled from occupational sources as a known human carcinogen.

<sup>16</sup> Centers for Disease Control & Prevention, U.S. Dep't of Health and Human Services, *Health Effects of Occupational Exposure to Respirable Crystalline Silica*, NIOSH Hazard Review (Nov. 2002), available at <http://www.cdc.gov/niosh/docs/2002-129/>; *Silicosis*, Occupational Safety & Health Admin., <https://www.osha.gov/Publications/silicosis.html>.

can develop within one year of high exposure, but symptoms usually first begin to appear after ten to fifteen years of exposure.<sup>17</sup> In addition to silicosis, exposure to crystalline silica has been linked to other lung diseases, including:

- tuberculosis,
- reduced lung function,
- Chronic Obstructive Pulmonary Disease,
- emphysema,
- bronchitis,
- enlargement of the heart,
- interference with the immune system (scleroderma, rheumatoid arthritis, systemic lupus, Sjogren's syndrome, glomerular renal disease), and
- kidney damage.<sup>18</sup>

Inhaling high levels of nitrogen dioxide can cause severe coughing, choking, headache, nausea, abdominal pain, shortness of breath, and difficulty breathing.<sup>19</sup> Long-term exposure to nitrogen dioxide is linked to respiratory problems including airway inflammation and increased respiratory symptoms in people with asthma. Additionally, nitrogen oxides react with ammonia, moisture, and other compounds in the air to form even more of the fine particles that cause respiratory disease and aggravate existing heart disease.<sup>20</sup>

#### **b. Water Quantity**

The frac sand mining process uses a large quantity of water for dust control and for cleaning and sorting sand. To meet water needs, facilities construct high-capacity wells which, when pumped, may create a cone of depression and lower groundwater levels affecting water levels in public water sources and private wells.<sup>21</sup> The amount of water required varies, but the DNR has estimated that for closed-loop processing systems, which recycle process water, expected average water use is 292 to 1380 gallons per minute.<sup>22</sup> Open-loop systems, which do not recycle process water, typically use 2000 to 3700 gallons of water per minute.<sup>23</sup> For example, the DNR approved one well for Preferred Sands in Trempealeau County in 2011 for “normal pumpage” of

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<sup>17</sup> Nat'l Library of Medicine, U.S. Dep't of Health & Human Services, *Silicosis*, MedlinePlus, available at <http://www.nlm.nih.gov/medlineplus/ency/article/000134.htm>.

<sup>18</sup> Wis. Dep't of Natural Res., *Report to the Natural Resources Board: Silica Study 8-10* (Aug. 2011), available at <http://dnr.wi.gov/files/pdf/pubs/am/am407.pdf>.

<sup>19</sup> Wis. Dep't of Health Services, *Nitrogen Dioxide* (last revised Aug. 2, 2013), available at <http://www.dhs.wisconsin.gov/eh/air/fs/NtrDioxide.htm>.

<sup>20</sup> Wis. Dep't of Health Services, *Nitrogen Dioxide* (last revised Aug. 2, 2013), available at <http://www.dhs.wisconsin.gov/eh/air/fs/NtrDioxide.htm>.

<sup>21</sup> Wis. Dep't of Natural Res., *Silica Sand Mining in Wisconsin 25* (Jan. 2012), available at <http://dnr.wi.gov/topic/Mines/documents/SilicaSandMiningFinal.pdf>.

<sup>22</sup> *Id.*

<sup>23</sup> *Id.*

540,000 gallons per day and “maximum pumpage” of 1,080,000 gallons per day.<sup>24</sup> An Alpine Sands well, also in Trempealeau County, was approved in 2012 for a normal rate of 672,000 gallons per day and a maximum of 1,080,000 gallons per day.<sup>25</sup>

Based on responses to a voluntary statewide survey of water use, frac sand mines in Trempealeau County used nearly 70 million gallons of water in 2013. That dwarfs the 540,000 gallons used for domestic purposes in Trempealeau County and approaches the amount of water used for agriculture—an industry known to consume a huge quantity of water resources. The county with the highest estimated groundwater use for frac sand mining and processing in 2013 was Jackson, with over 394 million gallons used for this industry, over 400 times greater than domestic water use in that county.

Additionally, some sand mines operate below the water table and require groundwater pumping to “dewater” the area, lowering the water table around the mine to prevent mine pit flooding and to stabilize mine walls.<sup>26</sup> Dewatering can alter groundwater flow direction and can affect water levels in nearby wells and surface waters.<sup>27</sup> This alteration of groundwater flow could interfere with the natural discharge of groundwater and storm water into surface waters or wetlands, which may lead to flooding.<sup>28</sup>

### **c. Water Quality**

Frac sand mining can pollute surface water and groundwater through direct surface water discharges and through infiltration. As indicated above, frac sand mining uses a lot of water for mining and processing. Some of the primary water uses include the sand washing process to remove fine material and spraying exposed dirt to prevent dirt, sand and other particles from blowing off of the site. Stormwater runoff, dewatering, and accidental releases from wastewater storage ponds can lead to surface water contamination with sediment, chemicals used in the sand washing process, or other pollutants present in the water.<sup>29</sup> When groundwater is removed to allow sand excavation below the water table, relocating the water creates another potential source of contamination. When water pumped from the ground is discharged into surface water it can cause thermal, sediment and ammonia pollution, as well as decreased oxygen

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<sup>24</sup> Wisconsin DNR Drinking Water Data, available at [http://prodoasext.dnr.wi.gov/inter1/hicap\\$ws\\_hicap\\_web\\_v.QueryViewByKey?P\\_HICAP\\_SEQ\\_NO2=161896&Z\\_CHK=33344](http://prodoasext.dnr.wi.gov/inter1/hicap$ws_hicap_web_v.QueryViewByKey?P_HICAP_SEQ_NO2=161896&Z_CHK=33344).

<sup>25</sup> Wisconsin DNR Drinking Water Data, available at [http://prodoasext.dnr.wi.gov/inter1/hicap\\$ws\\_hicap\\_web\\_v.QueryViewByKey?P\\_HICAP\\_SEQ\\_NO2=169677&Z\\_CHK=34373](http://prodoasext.dnr.wi.gov/inter1/hicap$ws_hicap_web_v.QueryViewByKey?P_HICAP_SEQ_NO2=169677&Z_CHK=34373).

<sup>26</sup> Minn. Env'tl. Quality Bd., *Report on Silica Sand* 33-34 (Mar. 20, 2013), available at <http://www.eqb.state.mn.us/documents/23.%20March%20Final%20Silica%20Sand%20report.pdf>.

<sup>27</sup> *Id.* at 34.

<sup>28</sup> *Id.*

<sup>29</sup> *Id.*



concentrations.<sup>30</sup> Sediment, thermal changes, decreased oxygen and other pollutants in water discharged from frac sand mines will harm aquatic life, and heightens concerns for waters that are already harmed by other pollution and for highly valued waters such as trout streams.

The sand cleaning process also leaves removed minerals and chemicals in wastewater which may contaminate groundwater or surface water. Frac sand mining and processing facilities commonly use polyacrylamides as flocculants to remove minerals and other materials from the sand. Polyacrylamides contain residual amounts of acrylamide, and the use of polyacrylamides by industry is a known source of acrylamide pollution.<sup>31</sup> Acrylamide in drinking water could cause health problems related to the nervous system and blood, and may increase cancer risk.<sup>32</sup> Wisconsin has no groundwater standards for acrylamide.<sup>33</sup> The United States Environmental Protection Agency has set a Maximum Contaminant Level Goal of zero for acrylamide in public drinking water, but it is difficult to test for acrylamide at very low levels.<sup>34</sup>

#### **d. Destruction of Habitat for Threatened and Endangered Species**

Several threatened or endangered species may be affected or killed as a result of frac sand mining. The primary species of concern given its prevalence in areas used for frac sand mining is the Karner blue butterfly (*Lycaeides Melissa samuelis*), a federally listed endangered species.<sup>35</sup> Karner blue caterpillars feed only on wild lupine (*Lupinus perennis*), a plant that grows in the sandy soils of the Central and Northwest Sands in Wisconsin.<sup>36</sup> Because the Karner blue depends on wild lupine, its habitat closely overlaps with Wisconsin's frac sand mining regions.<sup>37</sup> The map on the left below overlays the Karner blue butterfly high potential range (in blue) over the location of sandstone suitable for frac sand mining (in gold) and includes the locations of frac sand mines and processing facilities that were present in 2012. The map on the right below was captured from a 2013 Wisconsin Center for Investigative Journalism interactive map of frac sand mines and processing facilities, overlaying the location of sandstone suitable for frac sand mining (in gold).

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<sup>30</sup> Wis. Dep't of Natural Res., *Silica Sand Mining in Wisconsin* 25 (Jan. 2012), available at <http://dnr.wi.gov/topic/Mines/documents/SilicaSandMiningFinal.pdf>.

<sup>31</sup> U.S. Environmental Protection Agency, *Basic Information About Acrylamide in Drinking Water* (last updated Sept. 16, 2013), <http://water.epa.gov/drink/contaminants/basicinformation/acrylamide.cfm>.

<sup>32</sup> Wis. Dep't of Natural Res., *Silica Sand Mining in Wisconsin* 25 (Jan. 2012), available at <http://dnr.wi.gov/topic/Mines/documents/SilicaSandMiningFinal.pdf>.

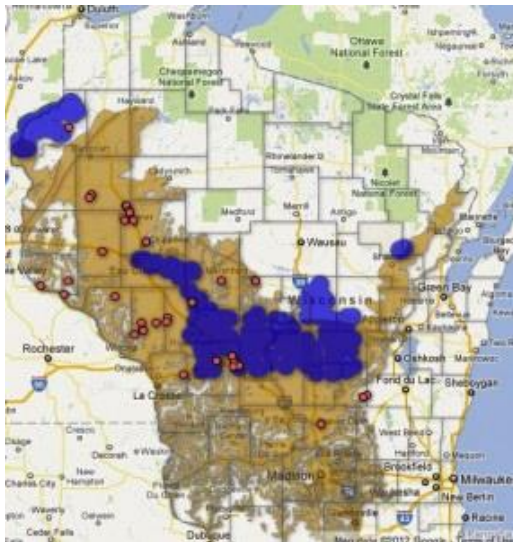
<sup>33</sup> *Id.* at 23.

<sup>34</sup> *Id.*

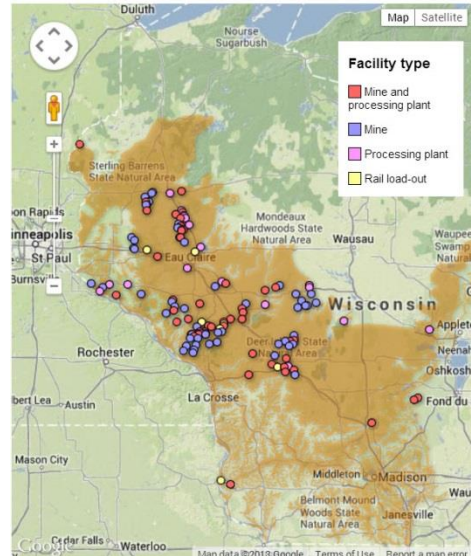
<sup>35</sup> U.S. Fish & Wildlife Service, *Karner Blue Butterfly Fact Sheet* (last revised Jan. 2008), available at [http://www.fws.gov/midwest/endangered/insects/kbb/kbb\\_fact.html](http://www.fws.gov/midwest/endangered/insects/kbb/kbb_fact.html).

<sup>36</sup> Wis. Dep't of Natural Res., *Frac Sand and the Karner Blue Connection*, available at <http://dnr.wi.gov/topic/Mines/documents/FracSandKbbFlyer.pdf>.

<sup>37</sup> *Id.*



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### e. Destruction of Wetlands

Frac sand companies have targeted sandstone formations in western and central Wisconsin, where significant portions of the land consist of wetlands. Wetlands play a critical role in the environment and are under threat. Wetlands provide flood protection by acting as a sponge to absorb excess water. They also filter pollutants and provide critical habitat for a variety of species. Wetlands are valued by hunters and anglers alike for the valuable role they play in the life cycle of numerous species.

Direct impacts of frac sand operations on wetlands may include filling or removal of material for extracting sand deposits within wetlands and for infrastructure development associated with the production and transport of sand. Changes to groundwater levels and surface drainage for pit dewatering could leave wetlands with inadequate water levels to support wetland plants and animals.<sup>40</sup> Removal of sand below the water table alters groundwater flow paths, which may cause groundwater that would otherwise discharge into a wetland to begin discharging into sand mine pits instead.<sup>41</sup> Many wetlands are connected with other bodies of

<sup>38</sup> Kate Golden, *Are frac sand miners failing to check for rare butterfly?*, Wisconsin Center for Investigative Journalism, available at <http://wisconsinwatch.org/2012/01/frac-sand-miners-failing-to-check-for-rare-butterfly/>.

<sup>39</sup> Marcia Bjornerud, Union of Concerned Scientists, *A Change We Didn't See Coming: Hydraulic Fracturing and Sand Mining in Wisconsin*, The Equation: a blog on independent science + practical solutions (Aug. 27, 2013), available at <http://blog.ucsusa.org/a-change-we-didnt-see-coming-hydraulic-fracturing-and-sand-mining-in-wisconsin-221>.

<sup>40</sup> Wis. Dep't of Natural Res., *Silica Sand Mining in Wisconsin* 26 (Jan. 2012), available at <http://dnr.wi.gov/topic/Mines/documents/SilicaSandMiningFinal.pdf>.

<sup>41</sup> Minn. Env'tl. Quality Bd., *Report on Silica Sand* 41 (Mar. 20, 2013), available at <http://www.eqb.state.mn.us/documents/23.%20March%20Final%20Silica%20Sand%20report.pdf>.

water, so mines in these areas might have impacts on wide networks of waterways through local wetlands.<sup>42</sup>

#### **f. Reclamation and Long-Term Land Use**

The reclamation process is intended to convert or restore post-mining sites for future use or at least stabilize and revegetate the land.<sup>43</sup> However, it is unclear how successful reclamation has been or will be and what land uses a former mining site can support. Restoring the land to its pre-mining use often will not be feasible because mining changes soil depth, soil profile, topography, and water table levels.<sup>44</sup> Where mining destroys habitat and displaces animals, reclamation may not be able to recover previous levels of biodiversity and animal population sizes. Often, “overburden” or topsoil is removed and stored prior to mining and then replaced at the mine site for reclamation after the mine has shut down.<sup>45</sup> It can take time to reestablish the productivity of these soils after removal and storage.<sup>46</sup>

Even if former mine sites can be successfully converted to other productive land uses, mining may have lasting effects on natural resources. Reclamation sometimes involves returning unsold “waste sand” to the mine site.<sup>47</sup> It is likely that waste sand may have come into contact with chemical flocculants and may contain other pollutants, so its use in reclamation could contaminate groundwater.<sup>48</sup>

#### **g. Threats to Tribal Nations**

Tribal nations that are impacted by frac sand mining also have a special interest in protecting their land and their people from this booming industry. Citing the rapid growth of frac sand mining in Wisconsin and the state government’s failure to adapt its regulations to this industry, the Ho-Chunk Nation passed a resolution in opposition to frac sand mining on December 4, 2012.<sup>49</sup> The DNR’s 2012 silica study did not address any uniquely tribal concerns.

#### **h. Economic Impacts**

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<sup>42</sup> Wis. Dep’t of Natural Res., *Silica Sand Mining in Wisconsin* 26 (Jan. 2012), available at <http://dnr.wi.gov/topic/Mines/documents/SilicaSandMiningFinal.pdf>.

<sup>43</sup> *Id.* at 33.

<sup>44</sup> *Id.* at 31.

<sup>45</sup> *Id.* at 33.

<sup>46</sup> Thomas Michael Power, *Benefits and Costs of Frac-Sand Mining in West Central Wisconsin: Phase One of Study – General Economic & Community Overview* 23 (May 2013), available at [http://www.iatp.org/files/2013\\_05\\_30\\_FracSandMining\\_f.pdf](http://www.iatp.org/files/2013_05_30_FracSandMining_f.pdf).

<sup>47</sup> Minn. Env’tl. Quality Bd., *Report on Silica Sand* 28 (Mar. 20, 2013), available at <http://www.eqb.state.mn.us/documents/23.%20March%20Final%20Silica%20Sand%20report.pdf>.

<sup>48</sup> *Id.*

<sup>49</sup> Ho-Chunk Nation Legislature, *Resolution in Opposition to Frac Sand Mining*, Resolution 12-04-12J, available at <http://lwr.state.wi.us/docview.asp?docid=24040>.

As a rapidly growing industry, frac sand mining is often defended for its ability to create jobs and benefit local economies, which was reiterated in the DNR's 2012 study.<sup>50</sup> But given that mining can only be done until the resources at a site are exhausted, it may not create long-term jobs or provide a long-term benefit to local economies. Further, negative impacts of frac sand mining may hurt neighboring property values and businesses that benefit from Wisconsin's scenic beauty and natural resources.

Frac sand mining removes a large amount of sandstone and may change the landscape. This is especially significant in western Wisconsin, which is known for its bluffs and rolling hills. Tourism—from bikers, hikers, paddlers, hunters and fishers—is a big industry in this area of the state. Many sand mines are located near cold water resources or in the floodplains of rivers and may therefore impact fisheries, leading to a decline in tourism and revenue associated with recreational fishing.<sup>51</sup> Runoff from mine sites may carry sand and other pollutants into streams, increasing turbidity and sedimentation, which may impede trout reproduction by covering eggs.<sup>52</sup> High-capacity well withdrawals may decrease water levels in streams, which could affect temperatures and disturb sensitive fish species, especially in trout streams.<sup>53</sup>

#### **i. Quality of Life Impacts**

Many of the aspects of frac sand mining that create the potential for negative economic impacts will also affect quality of life for people who live near frac sand facilities. Frac sand mining can transform scenic rural areas into hazy, unattractive landscapes marked by large pits in the ground, sand piles, heavy industrial machinery and frequent truck traffic. Large numbers of trucks frequently transporting sand through small towns may damage the “main street character”<sup>54</sup> and rural character of communities.<sup>55</sup>

Frac sand facilities may operate 24 hours per day,<sup>56</sup> meaning nearby residents could face constant disturbances in the form of noise, vibration, dust, and light pollution.<sup>57</sup> To harvest sand from the sandstone, frac sand mining often uses blasting. Blasting typically involves drilling deep holes into the sandstone and then detonating an explosive underground.<sup>58</sup> This technique

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<sup>50</sup> Wis. Dep't of Natural Res., *Silica Sand Mining in Wisconsin* 33 (Jan. 2012), available at <http://dnr.wi.gov/topic/Mines/documents/SilicaSandMiningFinal.pdf>.

<sup>51</sup> *Id.* at 28-29.

<sup>52</sup> *Id.*

<sup>53</sup> *Id.* at 29.

<sup>54</sup> Minn. Env'tl. Quality Bd., *Report on Silica Sand* 45 (Mar. 20, 2013), available at <http://www.eqb.state.mn.us/documents/23.%20March%20Final%20Silica%20Sand%20report.pdf>.

<sup>55</sup> *Id.* at 47.

<sup>56</sup> *Id.* at 22.

<sup>57</sup> *Id.* at 44.

<sup>58</sup> Wis. Dep't of Natural Res., *Silica Sand Mining in Wisconsin* 8 (Jan. 2012), available at <http://dnr.wi.gov/topic/Mines/documents/SilicaSandMiningFinal.pdf>.

generates noise, vibration, and fugitive dust emissions, and may be conducted every day.<sup>59</sup> This activity will disturb residents of otherwise quiet, peaceful rural areas.

Frac sand mining in Chippewa County could generate a 120-carload unit train each day.<sup>60</sup> An increase in train traffic increases safety concerns about conflicts between trains and other vehicles.<sup>61</sup> More trains also cause traffic delay and congestion when other vehicles have to wait at intersections for trains to pass.<sup>62</sup> Trains can be loud, and whistle blowing at crossings for safety makes them even more disruptive to residents.<sup>63</sup> Frac sand transport generates an increase in truck traffic, which may accelerate deteriorating road conditions.<sup>64</sup> This increase in truck traffic may create public safety concerns and contribute to traffic congestion and delay. The increase in engine exhaust emissions as a result of frac sand transportation raises nuisance issues as well as public health concerns.<sup>65</sup>

### **III. A Strategic Analysis is Necessary to Ensure that Wisconsin is Adequately Protecting Public Health and the Environment**

Since the DNR analyzed the frac sand mining industry in 2012, the industry has continued to expand, and new information about the impacts of frac sand mining has raised more questions than answers. Citizens have serious concerns about whether air and water impacts are being adequately regulated and about the DNR's failure to conduct an in-depth environmental analysis of this booming, resource-intensive industry. A strategic analysis would provide answers for citizens and decision makers. A strategic analysis would also consider new information regarding potential environmental impacts and evaluate the efficacy of existing laws, given several years of experience permitting these facilities during this industry's growth.

#### **a. A Strategic Analysis Will Answer Remaining Questions Regarding Exposure to Harmful Air Pollutants and the Extent of Water Contamination, Among Other Environmental and Economic Impacts**

In 2011 and 2012, the DNR published reports on crystalline silica, and more generally, the silica sand mining industry. Those studies gathered some useful information regarding the impacts of the industry—much of which is summarized above—but failed to address numerous concerns and is out-of-date given significant new developments. A strategic analysis would

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<sup>59</sup> *Id.* at 7.

<sup>60</sup> Maria V. Hart, Teresa Adams, & Andrew Schwartz, *Transportation Impacts of Frac Sand Mining in the MAFC Region: Chippewa County Case Study* 32 (2013), available at <http://midamericafreight.org/wp-content/uploads/FracSandWhitePaperDRAFT.pdf>.

<sup>61</sup> *Id.*

<sup>62</sup> *Id.*

<sup>63</sup> *Id.*

<sup>64</sup> Wis. Dep't of Natural Res., *Silica Sand Mining in Wisconsin* 33 (Jan. 2012), available at <http://dnr.wi.gov/topic/Mines/documents/SilicaSandMiningFinal.pdf>.

<sup>65</sup> Minn. Env'tl. Quality Bd., *Report on Silica Sand* 22 (Mar. 20, 2013), available at <http://www.eqb.state.mn.us/documents/23.%20March%20Final%20Silica%20Sand%20report.pdf>.

provide answers for citizens and decision makers who are charged with determining how to apply current regulations and whether those laws are adequate.

For example, the 2011 silica study repeatedly stated that more information is needed to determine the severity of the threat that crystalline silica emissions from frac sand mines pose to Wisconsin citizens:

- Page 2 “Currently, WDNR has no crystalline silica monitoring data. . . This lack of data means it is not currently possible to determine conclusively whether or to what extent the quantity, duration or types of silica emissions in the state may be a public health concern.”
- Page 2 “In circumstances where people live near a source of crystalline silica, data from other air pollution control agencies shows that silica ambient air concentrations could be above a level of concern.”
- Page 16 “It is currently unknown whether emissions from large sources in Wisconsin are high enough and people are close enough to have significant exposures.”
- Page 17 “Individual situations should be evaluated because process-stream activities and natural conditions may lead to locally higher concentrations.”
- Page 17 “More research is needed in Wisconsin in order to ascertain the range of ambient air exposures likely to occur, both near sources of silica emissions as well as from background levels of exposure.”

Shortly after the 2011 silica study was released, the DNR denied a request for further regulation of silica emissions in the state, again deferring to the lack of information about silica emissions. In November of 2011, ten citizens petitioned the DNR to list respirable crystalline silica as a hazardous air contaminant and to develop an ambient air standard protective of public health.<sup>66</sup> The DNR denied the petition on the grounds that the agency did not have authority to list respirable crystalline silica because it lacked written documentation addressing the following four areas:

1. A public health risk assessment that characterizes the types of stationary sources in this state that are known to emit the hazardous air contaminant and the population groups that are potentially at risk from the emissions.
2. An analysis showing that members of population groups are subjected to levels of the hazardous air contaminant that are above recognized environmental health standards or will be subjected to those levels if the department fails to promulgate the proposed emission standard for the hazardous air contaminant.
3. An evaluation of options for managing the risks caused by the hazardous air contaminant considering risks, costs, economic impacts, feasibility, energy, safety, and other relevant factors, and a finding that the chosen compliance alternative reduces risks in the most cost-effective manner practicable.

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<sup>66</sup> Before the State of Wisconsin Department of Natural Resources, Petition by Citizens for the Promulgation of Rules to Govern Respirable Crystalline Silica Emissions, *available at* <http://www.wisctowns.com/uploads/ckfiles/files/Rules%20Petition-Crystalline%20Silica.pdf>.

4. A comparison of the emission standards for hazardous air contaminants in this state to hazardous air contaminant standards in Illinois, Indiana, Michigan, Minnesota, and Ohio.<sup>67</sup>

The DNR reiterated in its response to the petition that “more research is needed in Wisconsin in order to ascertain the range of ambient air exposures likely to occur, both near sources of silica emissions as well as from background levels of exposure.”<sup>68</sup>

Yet, less than a year later, the DNR denied a request from the Wisconsin Association of Local Health Departments and Boards (WALHDAB) asking the DNR to “determine the public health consequences of living near a frac sand mine or frac sand processing facility and the potential for exposure to crystalline silica and other human health hazards.”<sup>69</sup> Noting that “no research on crystalline silica exposure has been completed in Wisconsin,” WALHDAB suggested, among other things, that the DNR develop a task force to determine the health hazards associated with the frac sand industry, conduct public health risk assessments, and conduct monitoring of crystalline silica.<sup>70</sup>

In its denial of WALDHAB’s request, the DNR surprisingly asserted that further study was unwarranted. In part, the DNR claimed that the results of ambient air monitoring did not reveal problems that the DNR thought were “likely to lead to unsafe exposures for nearby residents.”<sup>71</sup> The problem with the DNR’s conclusion is that at that time no facility in Wisconsin had conducted monitoring for particles sizes smaller than PM10. Neither the more dangerous fine particulates—PM2.5—which have much lower NAAQS than PM10, nor crystalline silica content in PM10 or PM2.5 sampled have been measured.

In fact, while often referencing the lack of information to either support or refute assertions that silica sand emissions are a threat to public health, the DNR has done very little to address the informational gaps related to crystalline silica and other fine particulate matter. To date, *the DNR has never required a facility to conduct ambient air monitoring for PM4 or PM2.5, nor has the DNR conducted any silica monitoring of its own.* This leaves citizens wondering about the potential impact this is having on their health and that of their families. Farmers, particularly organic farmers, are also questioning whether air emissions from frac sand facilities might be affecting livestock. So far we have not gotten any answers from our state environmental agency.

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<sup>67</sup> Wisconsin Department of Natural Resources, Report to the Natural Resources Board: Silica Study, AM-407 2011, 1-2 (Aug. 2011), available at <http://dnr.wi.gov/files/PDF/pubs/am/AM407.pdf>.

<sup>68</sup> *Id.* at 17.

<sup>69</sup> Wisconsin Association of Local Health Departments and Boards, Letter to Department of Natural Resources regarding frac sand mining's health hazards 1 (June 25, 2012), available at <http://www.walhdab.org/documents/FracSandMiningLetter.pdf>.

<sup>70</sup> *Id.*

<sup>71</sup> Aaron Kline & David Osterberg, The Iowa Policy Project, *Digging Deeper on Frac Sand Mining: Industry Presents Water, Tourism Issues in Northeast Iowa* 15 (Jan. 2014), available at <http://www.walhdab.org/documents/FracSandMiningLetter.pdf>.

While the DNR has not acted to collect information about this potential public health threat, other entities have collected information that sheds further light on the potential extent of air quality impacts and highlights the need for further study. Several air quality studies have been conducted since the DNR's 2011 and 2012 reports—such as an air quality study in Ontario Canada,<sup>72</sup> ambient air monitoring for respirable crystalline silica near frac sand mines in Minnesota,<sup>73</sup> and an OSHA study on silica concentrations at fracking facilities where frac sand is used.<sup>74</sup>

The Ontario study found elevated levels of PM10 and PM2.5 approaching or exceeding levels of concern near sand mining and processing sites and concluded that the operations were having adverse effects on air quality. The OSHA study measured respirable silica at hydraulic fracturing sites and found airborne concentrations exceeding occupational exposure limits by factors of 10, 20, or more. The DNR acknowledged in its August 2011 silica study that “industries where occupational exposures to crystalline silica have been high are also potential sources of crystalline silica emissions to the ambient air.”<sup>75</sup> While the OSHA study was conducted at fracking sites rather than frac sand mines, OSHA indicated the source of silica dust was from the transport and handling of silica sand at fracking sites, activities which also go on regularly at frac sand mines. The OSHA study only heightens concern about silica exposure from frac sand facilities in Wisconsin because frac sand was previously thought to be free of fine respirable silica dust.

The adequacy of the DNR's water quality regulations and policies has also been called into question. In addition to numerous storm water runoff events that have polluted nearby properties and water bodies, we now know more about the potential for industrial sand mines to cause acid mine drainage, which is a serious environmental and public health concern. Acid mine drainage—characterized by low pH and high concentrations of heavy metals in water that comes into contact with mining sites—is typically associated with metallic mining.<sup>76</sup> However, there

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<sup>72</sup> Michael Ladouceur, Ministry of the Environment, *Air Quality Impacts of Unimin Ltd. On Kashiabog Lake near the Town of Havelock, Ontario* (February 15, 2013), available at [http://www.pcchu.ca/wp-content/uploads/2013/04/Unimin\\_Report-of-a-PO-Original-Signed-byMEL.pdf](http://www.pcchu.ca/wp-content/uploads/2013/04/Unimin_Report-of-a-PO-Original-Signed-byMEL.pdf). The Ontario study found elevated levels of PM10, PM2.5, and PM1.0 approaching or exceeding levels of concern near sand mining and processing sites and concluded that the operations were having adverse effects on air quality. The OSHA study measured respirable silica at hydraulic fracturing sites and found airborne concentrations exceeding occupational exposure limits by factors of 10, 20, or more, and concluded that exposure to respirable crystalline silica is an occupational exposure hazard for workers at hydraulic fracturing sites.

<sup>73</sup> *Air Monitoring at Minnesota Silica Sand Facilities*, Minn. Pollution Control Agency (last modified July 1, 2014, 1:12 PM), <http://www.pca.state.mn.us/index.php/air/air-quality-and-pollutants/air-pollutants/silica-sand-mining/air-monitoring-data-at-minnesota-silica-sand-facilities.html#jordan-sands>.

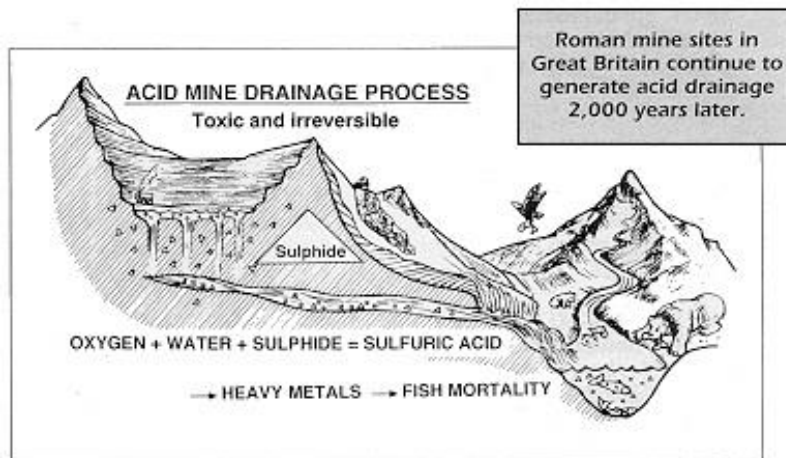
<sup>74</sup> Eric J. Esswein, Michael Breitenstein, John Snawder, Max Kiefer, & W. Karl Sieber, *Occupational Exposures to Respirable Crystalline Silica During Hydraulic Fracturing*, 10 J. of Occupational and Environmental Hygiene 347, (2013), available at <http://www.tandfonline.com/doi/pdf/10.1080/15459624.2013.788352>.

<sup>75</sup> Wis. Dep't of Natural Res., *Report to the Natural Resources Board: Silica Study 4* (Aug. 2011), available at <http://dnr.wi.gov/files/pdf/pubs/am/am407.pdf>.

<sup>76</sup> Ata Akcil & Soner Koldas, Acid Mine Drainage (AMD): Causes, Treatment and Case Studies, *Journal of Cleaner Production* 14, 1139, 1139 (2006).



have been reports that silica sand mines have made nearby groundwater more acidic, and possibly contaminated drinking water supplies with heavy metals as a result of mining activities.<sup>77</sup>



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All mineral extraction activities—both metallic and non-metallic mining—may cause acid mine drainage by exposing large surface areas of sulfide rock to air and water.<sup>79</sup> The Cambrian Jordan and Wonewoc sandstone formations are primary targets for frac sand mining,<sup>80</sup> and the Tunnel City formation is located between those formations.<sup>81</sup> The Tunnel City formation contains a significant amount of sulfide mineralization.<sup>82</sup> Tunnel City sandstone is unsuitable for frac sand use because it is too fine grained and it contains impurities such as feldspar.<sup>83</sup> However, given its location between the target formations, the Tunnel City formation may be disturbed in mining the Jordan and Wonewoc formations. Further, if frac sand mines have used or plan to use material in the Tunnel City formation for revegetation in the reclamation process,

<sup>77</sup> Minn. Environmental Quality Board, *Report on Silica Sand* 28 (Mar. 20, 2013), available at <http://www.eqb.state.mn.us/documents/23.%20March%20Final%20Silica%20Sand%20report.pdf>.

<sup>78</sup> Mining Watch Canada, EMCBC Mining and the Environment Primer: Acid Mine Drainage, available at <http://www.miningwatch.ca/emcbc-mining-and-environment-primer-acid-mine-drainage>.

<sup>79</sup> EPA, Office of Solid Waste, EPA 530-R-94-036, *Acid Mine Drainage Prediction* 4 (Dec. 1994), available at <http://water.epa.gov/polwaste/nps/upload/amd.pdf>.

<sup>80</sup> Wis. Dep't of Natural Res., *Silica Sand Mining in Wisconsin* 4 (Jan. 2012), available at <http://dnr.wi.gov/topic/Mines/documents/SilicaSandMiningFinal.pdf>.

<sup>81</sup> Wis. Geological & Natural History Survey, *Bedrock Stratigraphic Units in Wisconsin* 2 (2011), available at [http://wcvrpc.org/Frac\\_Sand/Geology/Bedrock\\_Stratigraphic\\_Units\\_in\\_WI\\_1-12-12.pdf](http://wcvrpc.org/Frac_Sand/Geology/Bedrock_Stratigraphic_Units_in_WI_1-12-12.pdf).

<sup>82</sup> Allen V. Heyl, Jr., Erwin J. Lyons, & Allen F. Agnew, *Exploratory Drilling in the Prairie du Chien Group of the Wisconsin Zinc-Lead District by the U.S. Geological Survey in 1949-1950*, at 5-6 (Nov. 1951), available at <http://pubs.usgs.gov/circ/1951/0131/report.pdf>. (“Sphalerite, pyrite, and marcasite were found in the Franconia sandstone... The sulfides in these shaly sandstone beds occur between the quartz sand grains.”) The Franconian formation includes Tunnel City Group. Jennifer D. Eoff, *Sequence Stratigraphy of the Upper Cambrian Tunnel City Group, Upper Mississippi Valley*, 302 *Sedimentary Geology* 87, 88 (2014). See also Lee Clayton and John W. Attig, Wis. Geological and Natural History Survey, Information Circular 67, *Geology of Sauk County* 20 (1990), available at <http://www.koubadrilling.com/well-drilling/docs/sauk-county-geological-report.pdf>.

<sup>83</sup> Wis. Dep't of Natural Res., *Silica Sand Mining in Wisconsin* 4 (Jan. 2012), available at <http://dnr.wi.gov/topic/Mines/documents/SilicaSandMiningFinal.pdf>.

this could raise the potential for acid mine drainage to continue after reclamation. Additionally, certain types of land use following reclamation may increase the risk of continued acid mine drainage, particularly uses such as agriculture that involve applying nutrients to the land. Nutrient application may encourage acid generation by introducing bacteria that can catalyze the oxidation reaction that leads to acid mine drainage.<sup>84</sup>

Concerns about acid mine drainage from frac sand mines are only further heightened by recent storm water pond sampling results obtained from the DNR.<sup>85</sup> Results from the DNR's stormwater pond sampling at fourteen frac sand facilities in Wisconsin in 2013 indicated high levels of metals at many sites. Aluminum was consistently high, and several ponds had levels of arsenic, copper, lead, and manganese that were higher than Wisconsin or EPA ambient water quality standards. Some had pH below 6.5, which is considered outside of the normal range in the U.S. Environmental Protection Agency's National Recommended Water Quality Criteria.<sup>86</sup> Further, Midwest Environmental Advocates' review of select groundwater sampling results from private wells sampled between 2005 and 2011 indicates that some wells have low pH and a high metals content. The 10 well sampling results that Midwest Environmental Advocates reviewed were located in La Crosse, Pierce and Monroe counties.<sup>87</sup>

Citizens have also raised concerns with the DNR about numerous stormwater runoff events contaminating nearby water bodies. In April 2012, a sand mine and processing facility near Grantsburg, Wisconsin spilled sand and water into a wetland, a creek, and the federally protected St. Croix River.<sup>88</sup> In May 2012, a facility in Trempealeau County discharged stormwater runoff which carried sand 2000 feet downhill onto neighboring properties, even reaching inside a house. While these two incidents received the most attention from media and the public, the problem is much more widespread. Between November 2012 and August 2013, the DNR initiated 20 enforcement actions against 19 different companies for violations related to stormwater runoff. One DNR staffer estimated that over that same time period 80-90% of the

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<sup>84</sup> EPA, Office of Solid Waste, EPA 530-R-94-036, *Acid Mine Drainage Prediction 6* (Dec. 1994), available at <http://water.epa.gov/polwaste/nps/upload/amd.pdf>.

<sup>85</sup> In response to Midwest Environmental Advocates' request, the DNR provided results of sampling from storm water ponds at fourteen frac sand facilities in Wisconsin. A summary of that data, along with a reference table with Wisconsin's surface and groundwater quality standards and EPA's national recommended water quality criteria, is available on Midwest Environmental Advocates' website.

<sup>86</sup> EPA, National Recommended Water Quality Criteria, Aquatic Life Criteria Table, available at <http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>. Wisconsin's water quality criteria for fish and aquatic life provide that "pH shall be within the range of 6.0 to 9.0, with no change greater than 0.5 units outside the estimated natural seasonal maximum and minimum." Wis. Admin. Code § NR 102.04(4)(d).

<sup>87</sup> The results of private well samples are available on the DNR's Well Inventory database, available at [http://prodoasext.dnr.wi.gov/inter1/spinvent\\$.startup](http://prodoasext.dnr.wi.gov/inter1/spinvent$.startup). Midwest Environmental Advocates reviewed the results of sampling at 10 different wells in La Crosse, Pierce and Monroe counties. These well results were reviewed because Midwest Environmental Advocates was advised that they contained low pH and a high metals content. It is noteworthy that several of these well samples were obtained before the frac sand mining boom, but the results reflect conditions present in an area where frac sand mining is now common.

<sup>88</sup> Josephine Marcotty, *Wis. Sand-Mine Spills Cause Call for Penalties Against Minn. Firms*, Star Trib. (June 12, 2012), available at <http://www.startribune.com/local/158518655.html>.

facilities he inspected were not in compliance with their permits. On September 8, 2014, the Wisconsin Department of Justice announced a \$60,000 judgment against a frac sand mine in Trempealeau County, Wisconsin for polluting a nearby stream with washed sand and soil when a poorly constructed berm collapsed in 2013.<sup>89</sup>

The extent of non-compliance and pollution at these facilities is simply unacceptable. A strategic analysis will allow the DNR and others to evaluate the adequacy of existing laws and policies and will guide regulatory policy going forward.

Further, a strategic analysis can evaluate and take into account new economic research regarding the costs and benefits of frac sand mining. This research indicates that, rather than sustaining long-term economic growth, mining tends to create “boom and bust” effects and mining communities often face economic depression or collapse as a result of mining.<sup>90</sup> A 2013 economic study of Wisconsin frac sand mining identified seven reasons for mining’s failure to produce sustained prosperity:

1. Fluctuations in supply and demand create uncertainty about mining jobs, which depresses local economies;
2. New labor-saving technologies are constantly reducing the number of mining jobs;
3. Mines eventually deplete their deposits and close;
4. Miners recognize employment uncertainty and choose to live away from mines and commute to work, moving mining income out of the local community;
5. Mining funds leak out of local economies because the typically rural communities often cannot provide mining equipment, supplies, and permanent households;
6. Environmental degradation associated with mining makes mining communities unattractive locations for homes and businesses;
7. High wages and livability impacts of mining can discourage or displace other economic activities.<sup>91</sup>

While frac sand mining may temporarily increase property values of land used for mining, it may also decrease the value of neighboring residential properties that are not sold for industrial uses.<sup>92</sup> Some homeowners near frac sand facilities fear that their property values will decrease or they will be unable to sell their homes because of air and water pollution as well as nuisances associated with mining, such as dust, noise, traffic, and aesthetically displeasing mine

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<sup>89</sup> Steven Verberg, *Frac sand miners fined \$60,000 for stormwater spill in creek*, Wisconsin State Journal (Sept. 9, 2014), available at [http://host.madison.com/news/local/environment/frac-sand-miners-fined-for-stormwater-spill-in-creek/article\\_49ceb1e1-87eb-5177-887d-4d03b75b4c88.html](http://host.madison.com/news/local/environment/frac-sand-miners-fined-for-stormwater-spill-in-creek/article_49ceb1e1-87eb-5177-887d-4d03b75b4c88.html).

<sup>90</sup> Thomas Michael Power, *Benefits and Costs of Frac-Sand Mining in West Central Wisconsin: Phase One of Study – General Economic & Community Overview 4* (May 2013), available at [http://www.iatp.org/files/2013\\_05\\_30\\_FracSandMining\\_f.pdf](http://www.iatp.org/files/2013_05_30_FracSandMining_f.pdf).

<sup>91</sup> *Id.* at 18.

<sup>92</sup> For an analysis of potential impacts of the frac sand industry on property values and tourism in Pepin County, Wisconsin, see Dominic Parker & Daniel Phaneuf, *The Potential Impacts of Frac Sand Transport and Mining on Tourism and Property Values in Lake Pepin Communities* (May 14, 2013), available at <http://www.sandpointtimes.com/pdf/Frac-Sand-Impact-Tourism-Property-Values.pdf>.

pits, sand piles, and equipment.<sup>93</sup> University of Wisconsin-Madison agricultural and applied economics professors completed a study in May of 2013 on the potential impacts of the frac sand industry on Lake Pepin communities.<sup>94</sup> The study concluded that property values usually decrease by three to eight percent due to diminished air quality and increases in traffic congestion and noise.<sup>95</sup>

Frac sand mining could also discourage tourism, resulting in losses to local economies. The above-referenced study of the Lake Pepin communities of Pepin and Stockholm concluded that communities endowed with scenic and natural amenities generally have recreation and tourism based economies and draw in residents based on a desirable quality of life. Destruction of bluffs and scenic areas may reduce the aesthetic appeal of those areas and diminish their value to tourists and potential new residents.<sup>96</sup> The dust, noise, and traffic that accompany sand mining and processing may lead people to perceive areas of western and northern Wisconsin as less pleasant to visit. Degraded water quality would seriously impact the recreational and tourism uses that rely on Wisconsin's many lakes and rivers. The Lake Pepin economic study concluded that the impacts of mining on the landscape may affect outdoor recreational activities, thereby reducing tourist activity and hurting local economies.<sup>97</sup>

A case study on the transportation impacts of frac sand mining in Chippewa County noted that five million to over seven million tons of sand could be transported out of Chippewa County by truck and rail.<sup>98</sup> This corresponds to up to 280,000 truck trips out of the county and 700 trains per year.<sup>99</sup> The frac sand industry could lead to increased transportation infrastructure costs that may affect taxpayers, and state and local budgets. The complex economic reality of the frac sand mining industry—perhaps pitting profits for sand mining companies against property values and income to local economies from tourism and other land uses that are not compatible with frac sand mining—warrants a strategic analysis.

#### **b. A Strategic Analysis Will Allow the DNR to Evaluate Whether its Regulations and Policies Adequately Protect Public Health and the Environment**

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<sup>93</sup> Don Greenwood & Melody Moore, Lower Wisconsin State Riverway Board, *Frac Sand Mining in the Lower Wisconsin Riverway* (Dec. 6, 2012), available at <http://lwr.state.wi.us/docview.asp?docid=24055>.

<sup>94</sup> Dominic Parker & Daniel Phaneuf, *The Potential Impacts of Frac Sand Transport and Mining on Tourism and Property Values in Lake Pepin Communities 2* (May 14, 2013), available at <http://www.sandpointtimes.com/pdf/Frac-Sand-Impact-Tourism-Property-Values.pdf>.

<sup>95</sup> *Id.* at 2.

<sup>96</sup> Minn. Env'tl. Quality Bd., *Report on Silica Sand 45* (Mar. 20, 2013), available at <http://www.eqb.state.mn.us/documents/23.%20March%20Final%20Silica%20Sand%20report.pdf>.

<sup>97</sup> Dominic Parker and Daniel Phaneuf, *The Potential Impacts of Frac Sand Transport and Mining on Tourism and Property Values in Lake Pepin Communities 13* (May 14, 2013), available at <http://www.sandpointtimes.com/pdf/Frac-Sand-Impact-Tourism-Property-Values.pdf>.

<sup>98</sup> Maria V. Hart, Teresa Adams, & Andrew Schwartz, *Transportation Impacts of Frac Sand Mining in the MAFC Region: Chippewa County Case Study 31* (2013), available at <http://midamericafreight.org/wp-content/uploads/FracSandWhitePaperDRAFT.pdf>.

<sup>99</sup> *Id.*

Almost all of the DNR's regulations and policies that currently apply to the non-metallic mining industry were adopted prior to the rapid growth of the frac sand mining industry in Wisconsin. While the DNR concluded in its 2012 report on silica sand mining that its regulations were sufficient to protect public health and the environment, a number of developments since that time have cast doubt on the DNR's conclusions. The DNR has yet to adopt federally-required standards for air pollutants of concern emitted by industrial sand mines, and has fallen behind other states in efforts to regulate crystalline silica emissions. The adequacy of the DNR's air permitting procedures is the subject of litigation. There are also new concerns about the potential for industrial sand mines to contaminate surface water and groundwater. Further, there is serious doubt as to whether the agency's current policies adequately protect endangered species. A strategic analysis will shed light on the impacts that industrial sand mining has already and will continue to have on Wisconsin's environment, and will allow the DNR and state lawmakers to assess whether new regulations or policies are needed.

Perhaps most concerning in terms of agency inaction is the DNR's failure to adopt federally-required air standards for two of the pollutants of concern emitted by silica sand mines—NO<sub>2</sub> and PM<sub>2.5</sub>. In 2010 and 2012, the EPA in consultation with the Clean Air Scientific Advisory Committee<sup>100</sup> strengthened the National Ambient Air Quality Standards (NAAQS) for NO<sub>2</sub> and PM<sub>2.5</sub> emissions. Specifically, the EPA adopted a new 1-hour NO<sub>2</sub> NAAQS and strengthened the annual PM<sub>2.5</sub> NAAQS. The EPA determined that, based on the best available research, it was necessary to strengthen the NO<sub>2</sub> and PM<sub>2.5</sub> NAAQS to protect public health with a reasonable margin of safety.

The state has now been under an obligation to adopt the EPA's revised NO<sub>2</sub> and PM<sub>2.5</sub> NAAQs for over 4 and 2 years, respectively. The DNR, however, has yet to do so. Instead, the DNR continues to issue permits to industrial sand mines and processing facilities, as well as other industries, without evaluating whether their emissions will cause an exceedance of these more stringent federal standards. The DNR's failure to adopt these standards places the public at risk of exposure to harmful levels of contaminants.

Similarly, Wisconsin's regulation of crystalline silica has fallen behind that of other states. Despite being the leading producer of silica sand in the country, Wisconsin does not have any standards limiting exposure to silica dust in the ambient air. Thus, outside of the workplace, Wisconsin has not placed limits on the amount of silica that can be in the air, nor does the DNR analyze frac sand silica emissions for their impact on the ambient air.

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<sup>100</sup> The Clean Air Scientific Advisory Committee is an independent scientific and technical advisory committee created under the Clean Air Act Amendments of 1977, *See* 42 U.S.C. § 7409(d)(2), comprised of experts in fields relevant to air pollution and air quality issues from the National Academy of Sciences, the nation's leading universities, state air pollution control agencies, and the private sector. In part, the committee is charged with recommending new national ambient air quality standards and revisions of existing criteria and standards as may be appropriate.

In contrast, California, Michigan, New Jersey, New York, Texas, and Vermont regulate crystalline silica as an air pollutant or contaminant.<sup>101</sup> Additionally, The Minnesota Department of Health (MDH) has established a respirable crystalline silica health benchmark, which designates a concentration below which harm to human health is unlikely to occur in sensitive populations with continuous exposure over a lifetime.<sup>102</sup> The Minnesota Pollution Control Agency uses this long-term exposure value for the purpose of risk assessment and has asked the MDH to develop a short-term exposure limit as well.<sup>103</sup>

In addition to the DNR's failure to adopt needed air standards, the DNR's current policies and procedures for issuing air permits to frac sand mines may not adequately ensure that air quality is protected. The DNR's permitting procedures are the subject of two administrative challenges to air permits issued to frac sand mines and processing facilities.<sup>104</sup> In both cases, several citizens living amidst numerous frac sand mines engaged an independent air pollution control engineer to review permits issued to new mines and processing facilities. The citizens hired an independent engineer because they were concerned about the adequacy of the DNR's air permits to protect their health and that of their families. The engineer determined that the DNR did not appropriately consider fugitive sources of emissions when setting permit limits and determining that the facility would comply with air standards, that the permits lacked adequate monitoring and assurances that the facility would comply with requirements, and that the DNR failed to evaluate the cumulative impact of surrounding mines and the mines at issue on ambient air standards. Given the number of concerns revealed by the engineer's independent review, the families challenged the air permits and both challenges are currently in ongoing litigation.

Moreover, while the DNR cited its authority to require ambient air monitoring in its denials of the citizen petition to list crystalline silica as a hazardous air pollutant and WALDHAB's request to conduct public health assessments, the Wisconsin Center for Investigative Journalism reports that among the frac sand mining companies not exempt from air

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<sup>101</sup> *Id.* at 24-25. These states' regulations are based on health benchmarks or reference exposure levels that represent ambient air concentrations above which exposure increases health risks, particularly silicosis. The California Environmental Protection Agency's Office of Environmental Health Hazard Assessment uses three micrograms per cubic meter as the reference exposure limit for respirable crystalline silica in ambient air. Texas has one of the most comprehensive silica regulatory systems of any state. The Texas Commission on Environmental Quality (TCEQ) established a chronic health benchmark of two micrograms per cubic meter for exposures to PM4 particles for up to one year of exposure, based on silicosis risk. TCEQ has also established an acute exposure health benchmark level of 47 micrograms per cubic meter of PM10 particles for exposures of up to one hour based on the risk of lung inflammation. TCEQ is the only state agency that has designated a cancer-based health benchmark, listing annual ambient air exposures of 0.27 micrograms per cubic meter of PM4 sized particles as corresponding to a lifetime lung cancer risk of one in 100,000.

<sup>102</sup> *MDH Health Based Guidance – Crystalline Silica*, Minn. Dep't of Health, available at <http://www.health.state.mn.us/divs/eh/hazardous/topics/silica/silicaguidance.html>.

<sup>103</sup> Minn. Env't'l Quality Bd., *Report on Silica Sand* 21 (Mar. 20, 2013), available at <http://www.eqb.state.mn.us/documents/23.%20March%20Final%20Silica%20Sand%20report.pdf>.

<sup>104</sup> Midwest Environmental Advocates represented several Trempealeau County citizens in challenges to air pollution control permits issued to one operating and one proposed frac sand mine and processing facility in Trempealeau County. Visit [midwestadvocates.org](http://midwestadvocates.org) for more information.

permits, most request and receive variances to bypass any air monitoring requirements.<sup>105</sup> Even the mines that monitor air quality are not required to monitor PM2.5, the smaller particles that are associated with more serious health problems.<sup>106</sup>

While many of the stormwater runoff events causing pollution are due to non-compliance with permit requirements, at least some are discharges that are permitted under the DNR's current stormwater regulations and permits. For example, in May of 2014, a sand mine near New Auburn, Wisconsin discharged an unknown quantity of stormwater from its stormwater pond into nearby wetlands and a dry run 100 yards from Beaver Creek. A concerned citizen sent pictures to Midwest Environmental Advocates showing that a normally dry run was clearly flooded by water that had a high concentration of sediment. The DNR investigated the discharge and determined that it was legally allowed by the permit. Events like this illustrate the need for the DNR to reevaluate whether its storm water policies and permitting procedures are adequately protecting the environment.

Lastly, citizens have raised concerns about whether the rules regulating the destruction of endangered species are adequate. As the DNR indicated in a publication on frac sand mining and Karner blue butterflies, the Karner blue habitat nearly perfectly overlaps with the location of sandstone suitable for frac sand mining.<sup>107</sup> Comparing the DNR's map of Karner Blue Butterfly High Potential Range with a map of frac sand mines, *see above*, it is clear many more are potentially affecting Karner blues than have applied for the habitat conservation plan (HCP) program.<sup>108</sup>

It is a federal offense to kill a Karner blue butterfly without a permit, but it appears that frac sand companies are not taking appropriate actions to determine whether wild lupine and Karner blue butterflies are present and to minimize incidental takings, which is basically killing Karner blues by destroying habitat. In 2012, David Lentz, a former coordinator of the DNR's Karner blue butterfly HCP program, expressed concern that only one frac sand company had applied to join the HCP to be able to legally destroy Karner blue butterflies, even though many more facilities were probably operating in Karner blue habitat.<sup>109</sup> Jennifer Bardeen, the specialist in the DNR's Karner blue butterfly HCP program as of 2014, confirmed to Midwest Environmental Advocates that as of July 29, 2014, there was still only one sand industry

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<sup>105</sup> Jason Smathers, *Sand Mining Surges in Wisconsin*, Wisconsin Center for Investigative Journalism (July 31, 2011), available at <http://www.wisconsinwatch.org/2011/07/31/sand-mining-surges-in-wisconsin/>.

<sup>106</sup> *Id.*

<sup>107</sup> Wisconsin Department of Natural Resources, *Frac Sand and the Karner blue Connection*, available at <http://dnr.wi.gov/topic/Mines/documents/FracSandKbbFlyer.pdf>.

<sup>108</sup> *Compare* Wisconsin Department of Natural Resources, *Frac Sand and the Karner blue Connection*, available at <http://dnr.wi.gov/topic/Mines/documents/FracSandKbbFlyer.pdf>, with Wisconsin Department of Natural Resources, *Locations of industrial sand mines and processing plants in Wisconsin*, available at <http://dnr.wi.gov/topic/Mines/ISMMap.html>.

<sup>109</sup> Kate Golden, Wis. Ctr. for Investigative Journalism, *Are Frac Sand Miners Failing to Check for Rare Butterfly?* (Jan. 31, 2012), available at <http://www.wisconsinwatch.org/2012/01/31/frac-sand-miners-failing-to-check-for-rare-butterfly/>.

company that had joined or applied to join the HCP. Given the number of frac sand mines and processing facilities located in the Karner blue high potential range, it is unlikely that only one has the potential to harm Karner blues.

Further, it seems that the DNR has not been able to keep up with the rapid expansion of this industry. While the legislature recently authorized funding for two new frac sand staff, that falls far short of the 10.2 full time equivalent positions the Legislative Fiscal Bureau estimated the DNR needed at a time when there were only 54 known sites in Wisconsin. The Legislative Fiscal Bureau memo indicated that the "combination of the rapid growth of the industrial sand mine industry and the DNR's limited resources has resulted in some frac sand mines not receiving inspections, or only being inspected if the DNR receives complaints about the operation."<sup>110</sup> This is consistent with DNR statements to the press and citizen accounts of interactions with DNR staff.

In light of the regulatory deficiencies identified and new information in regard to frac sand's impacts, it is time for the DNR to study frac sand mining and provide guidance to decision makers to inform the best path forward for Wisconsin.

### **c. A Strategic Analysis Will Inform State Legislators and Local Governments About the Appropriate Level of Regulation**

A strategic analysis will provide state legislators and local governments with much needed information about the impacts of industrial sand mining. Over the last four years, the appropriate level of regulation has been a constant source of controversy at both the state and local level. Local and state action has been met with fierce opposition from both industry and concerned citizens, in some cases leading to litigation. While local governments have been successful in enacting new regulations, efforts at the state level have stalled. In contrast, the Minnesota Legislature has enacted several statutes in the last two years to better protect the public and the environment from the potential harms of industrial sand mining.

At the local level, counties, cities, villages and towns in Wisconsin have adopted non-metallic mining ordinances, updated their zoning ordinances and established moratoria. The following is just a representative example of a few local government actions to address frac sand mining. Howard and Cooks Valley, two unzoned towns in Chippewa County, were two of the first jurisdictions to pass non-metallic mining ordinances aimed at addressing the impacts of silica sand mining and since then many more have followed suit.<sup>111</sup> Pepin County passed an ordinance prohibiting frac sand mining along Lake Pepin because of fears that frac sand mining

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<sup>110</sup> Lee Bergquist, Sand mines in Wisconsin unearth environmental problems, Milwaukee Journal Sentinel (Aug. 4, 2013), available at <http://www.jsonline.com/news/wisconsin/sand-mines-in-wisconsin-unearth-environmental-problems-b9966691z1-218315291.html>.

<sup>111</sup> Jason Smathers, Wis. Ctr. For Investigative Journalism, *Sand Mining Surges in Wisconsin*, (July 31, 2011), available at <http://wisconsinwatch.org/2011/07/sand-mining-surges-in-wisconsin/>; Town of Cooks Valley Non-metallic Mining Ordinance, Ch. 19 (Amended Feb. 11, 2013), available at <http://cv1927.bloomertel.net/>.



would negatively impact property values and tourism.<sup>112</sup> In August of 2013, Trempealeau County officials imposed a one-year moratorium on new frac sand facilities and the expansion of the twenty-six already approved mines so the county could assess health impacts to guide future regulation.<sup>113</sup> During this period, the Health Impact Study – Moratorium Committee—charged with evaluating the impact of frac sand mining on Trempealeau County and the adequacy of existing regulations—developed a detailed report providing recommendations for policymakers at the local level in Trempealeau County.<sup>114</sup>

Industry and citizens interested in engaging in non-metallic mining on their land have employed a number of tactics to both challenge and avoid these new local regulations. For example, residents of Cooks Valley sued the town over the validity of the town’s ordinance regulating frac sand mining. After lengthy litigation, the Wisconsin Supreme Court upheld the ordinance as valid use of the town’s police power. More recently, mine operators have sought annexation of land that they would like to mine into jurisdictions with more relaxed regulations. To provide just a few examples, one mine that was in the Town of Arcadia circumvented county rules limiting hours of operation by persuading the City of Arcadia to annex the land.<sup>115</sup> Another mining operation was able to move forward after a county rejected the company’s permit application by having the City of Glenwood annex the proposed site from the Town of Glenwood.<sup>116</sup> Similarly, annexations by the cities of Whitehall and Independence allowed a company to begin constructing two new sand operations occupying 1000 acres in Trempealeau County, despite the county’s moratorium on new frac sand projects.<sup>117</sup> This system leaves some local governments with little or no actual control over where and how sand mining occurs adjacent to the property of their residents.

At the state level, the legislature has not enacted any new laws to address frac sand mining. A number of proposals with varied aims have been introduced into the legislature, but none have passed. Bills that would provide more local control and regulation have not been given hearings, and bills that would limit local control of the frac sand industry have been defeated due to public opposition.

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<sup>112</sup> Associated Press, *Pepin County Bans Frac Sand Mining Along Scenic Stretch*, Winona Daily News (June 21, 2013), available at [http://www.winonadailynews.com/news/pepin-county-bans-frac-sand-mining-along-scenic-stretch/article\\_cbd8e3c4-da21-11e2-a277-001a4bcf887a.html](http://www.winonadailynews.com/news/pepin-county-bans-frac-sand-mining-along-scenic-stretch/article_cbd8e3c4-da21-11e2-a277-001a4bcf887a.html).

<sup>113</sup> Rich Kremer, *Trempealeau County Board Votes For One Year Frac Sand Moratorium*, Wis. Pub. Radio (Aug. 20, 2013), <http://www.wpr.org/trempealeau-county-board-votes-one-year-frac-sand-moratorium>.

<sup>114</sup> Miller et. al, *Final Report on the Public Health Impacts of Non-Metallic Industrial Sand Mining in Trempealeau County* 7-10 (Sept. 8, 2014), available at <http://www.trempealeaucounty.com/landmanagement/nmm/documents/PublicHealthImpactsofNMISMinTrempealeauCounty.pdf>.

<sup>115</sup> Rich Kremer, *Trempealeau County Board Votes For One Year Frac Sand Moratorium*, Wis. Pub. Radio (Aug. 20, 2013), <http://www.wpr.org/trempealeau-county-board-votes-one-year-frac-sand-moratorium>.

<sup>116</sup> Andy Rathbun, *Glenwood City, Wis., Approves Mining Operation*, Pioneer Press (May 14, 2014), available at [http://www.twincities.com/localnews/ci\\_25754473/glenwood-city-wis-approves-mining-operation](http://www.twincities.com/localnews/ci_25754473/glenwood-city-wis-approves-mining-operation).

<sup>117</sup> Chuck Rupnow, *Wisconsin Council Approves Annexations for Sand Mining Plans*, Pioneer Press (Nov. 5, 2013), available at [http://www.twincities.com/localnews/ci\\_24465785/wisconsin-council-approves-annexations-sand-mining-plans](http://www.twincities.com/localnews/ci_24465785/wisconsin-council-approves-annexations-sand-mining-plans).

The most notable legislative proposals were 2013 Senate Bills 349 and 632, and 2013 Assembly Bill 816. All three bills sought to limit the authority of local governments to regulate non-metallic mining by eliminating local governments' ability to use its police powers to enact non-metallic mining ordinances. The bills generated significant controversy and public opposition, and ultimately did not pass.<sup>118</sup> State Senator Kathleen Vinehout also proposed a number of bills that were never taken up by the Senate Committee on Workforce Development, Forestry, Mining and Revenue. The proposals would have, among other things, created buffer zones around residences and residential areas, and required local governments to publish at least two notices of a proposed mine in a newspaper at least 30 days before taking action on a sand mine application.

While Wisconsin's legislature has taken little action, the state of Minnesota has enacted several laws to allow the state to better address the wide range of impacts of industrial sand mining. These laws require various state agencies to commence studies and adopt new and revised regulations, standards and criteria specific to the silica sand mine industry. Among other things, Minnesota's new laws:

- Require environmental reviews for all silica sand projects;
- Direct the DNR to do extensive water studies of any frac sand mine located near a trout stream;
- Require a silica sand mining trout stream setback permit for excavation or mining operations in Minnesota's driftless area;
- Instruct the Minnesota Pollution Control Agency to develop rules specific to the silica sand industry for the control of particulate matter emissions;
- Instruct the Environmental Quality Board (EQB) to assemble a silica sand technical assistance team and, in consultation with local units of governments, develop model standards and criteria for mining, processing, and transporting silica sand that local governments may use when developing local ordinances. The new law required the MEQB to consider the unique landscape characteristics of different parts of the state and develop, among other things, recommended setbacks or buffers from bluffs, designated trout streams, and public natural resource easements.

Wisconsin's statutes and regulations lack many of these same protections, leaving our state's natural resources and public health at risk. None of the DNR's permitting processes applicable to industrial sand mining require an environmental impact study. Industrial sand mines need only apply for a permit if they plan to mine immediately adjacent to navigable waters, and there is no established setback requirement.<sup>119</sup> Further, the DNR's fugitive dust

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<sup>118</sup> Senate Bill 349, 2013-2014 Wisconsin Legislature, <https://docs.legis.wisconsin.gov/2013/proposals/sb349>; Senate Bill 632, 2013-2014 Wisconsin Legislature, <https://docs.legis.wisconsin.gov/2013/proposals/sb632>; Assembly Bill 816, 2013-2014 Wisconsin Legislature, <https://docs.legis.wisconsin.gov/2013/proposals/ab816>.

<sup>119</sup> Wis. Dep't of Natural Res., *Silica Sand Mining in Wisconsin* 4, 25 (Jan. 2012), available at <http://dnr.wi.gov/topic/Mines/documents/SilicaSandMiningFinal.pdf>.

control requirements—rules intended to minimize fugitive emissions of dust, including PM10, PM4 and PM2.5—were adopted well before the expansion of the industrial sand mining industry in Wisconsin. In fact, they were developed at a time when there was no ambient air standard for PM2.5. The DNR has not conducted any studies to determine whether these requirements adequately protect the public from harmful fugitive dust emissions at frac sand mining facilities.

**d. Short of a Strategic Analysis, There Is No Mechanism for the DNR to Conduct a Comprehensive Environmental Review of the Frac Sand Mining Industry**

While the industrial sand mining industry continues to expand in Wisconsin, and undoubtedly continues to leave lasting impacts on Wisconsin's environment, it largely escapes environmental review. None of the permits that frac sand mines are required to obtain from the DNR require the preparation of an environmental impact statement. Thus, the DNR has not conducted a comprehensive environmental review of a single mining or processing facility, nor has it undertaken a review of the cumulative impacts of the now over 100 active mines and processing facilities in the state.

Without conducting a strategic analysis it is impossible for the DNR to obtain an adequate understanding of the scope of frac sand mining's impacts on communities and the environment. The DNR has not fully ascertained the degree to which the public is exposed to harmful air pollutants, nor has it determined the extent of the harm caused by the both legal and, all too often, illegal discharge of stormwater contaminated with heavy metals and pollutants. It has not evaluated the impact of the industry's withdrawal of potentially hundreds of millions of gallons of groundwater on a daily basis, or the impact to the region of the destruction of wetlands for frac sand mines, processing facilities, and associated transportation infrastructure. Nor has it evaluated the impacts to endangered species and other wildlife, or the many socio-economic impacts that the DNR would otherwise be required to consider as part of an EIS.

Citizens and local governments have attempted to fill the gap left open by the DNR's lack of environmental review by initiating their own studies; however, there is a continuing need for the DNR to exercise its authority to conduct further environmental review. For example, Chippewa County recently initiated two separate five-year studies examining the impact of industrial sand mining on groundwater and on the effectiveness of reclaiming former non-metallic mining sites.<sup>120</sup> The groundwater study will examine the cumulative impacts of mining and irrigation on groundwater in Chippewa County, the relationship between groundwater and surface water, and the effects of mining-induced changes to the landscape on groundwater recharge from precipitation.<sup>121</sup> The reclamation study will investigate soil health and the viability

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<sup>120</sup> Alison Dirr, Wis. Ctr. for Investigative Journalism, *With Frac Sand Boom in Full Swing, Study to Guide Mine Reclamation*, (Feb. 5, 2014), available at <http://wisconsinwatch.org/2014/02/with-frac-sand-boom-in-full-swing-study-to-guide-mine-reclamation/>.

<sup>121</sup> *Id.*

of growing vegetation on former mine sites.<sup>122</sup> The careful study developed by Trempealeau County is another example of local governments filling the information void.<sup>123</sup>

The information gathered in these studies will inform the public, but the DNR is the only entity that has the resources and the expertise to adequately evaluate the frac sand industry and appropriately guide future regulation for the entire state.

#### **IV. The Purpose and Scope of a Strategic Analysis of Frac Sand Mining**

A strategic analysis of frac sand mining should identify alternative regulatory strategies and evaluate the capacity of different regulations to address impacts of the silica sand industry. Specifically, the DNR must use “available ecological and other scientific information” to “consider the alternatives and environmental effects in a dispassionate manner and may not advocate a particular position about alternatives.”<sup>124</sup>

In preparing the strategic analysis, the DNR should analyze the important issues identified above, including impacts on water quantity, water quality, air quality, wildlife habitat, local economies, quality of life, and long-term land use. The purpose of the strategic analysis should be to inform policy makers, private actors, and the public of the potential impacts of frac sand mining and of alternative regulations and policies that will balance public health and environmental protection with this industry’s consumption of our natural resources. Information provided in the strategic analysis should help decision makers consider all significant impacts to natural resources and to the public before they make decisions related to frac sand mining.

Other than outlining known and likely impacts from this facility and gaps in existing regulation, this petition will not attempt to set forth the appropriate scope of a strategic analysis. That should be developed through the required public scoping process, as mandated in the DNR’s regulations.<sup>125</sup> The DNR has discretion to determine how it will develop an effective public scoping process using “comment periods, meetings, hearings, workshops, surveys, questionnaires, interagency committees, or other appropriate methods or activities.”<sup>126</sup> Given great public concern, interest and knowledge about frac sand mining, we request that the DNR provide ample public meetings, hearings and workshops around the state, as well as opportunities for public comment in the scoping process so that the DNR has an opportunity to hear and learn from citizens.

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<sup>122</sup> *Id.*

<sup>123</sup> Miller et. al, *Final Report on the Public Health Impacts of Non-Metallic Industrial Sand Mining in Trempealeau County* 7-10 (Sept. 8, 2014), available at <http://www.trempealeaucounty.gov/landmanagement/nmm/documents/PublicHealthImpactsofNMISMinTrempealeauCounty.pdf>.

<sup>124</sup> Wis. Admin. Code § NR 150.10(3)(b).

<sup>125</sup> Wis. Admin. Code § NR 150.10(2)(c).

<sup>126</sup> Wis. Admin. Code § NR 150.10(2)(c).

Based on what we know about frac sand mining and using the DNR's outline for the central sands strategic analysis as a guide,<sup>127</sup> a frac sand mining and processing strategic analysis must address the following, at a minimum:

- A description of the resource targeted by the frac sand mining industry—the sandstone formations of western Wisconsin;
- A catalog of existing land uses that may or may not conflict with frac sand mining, including agriculture, recreation, tourism and the rural way of life;
- A thorough analysis of cumulative, short-term and long-term environmental, economic, social, cultural and public health impacts of the frac sand mining industry;
- The legal framework and regulatory authorities; and
- Management and regulatory alternatives that could better evaluate and control frac sand mining's impacts.

## **V. Conclusion**

For the foregoing reasons, the undersigned citizens of Wisconsin request that the Natural Resources Board direct the DNR to exercise its discretion under NR 150.10 of the Wisconsin Administrative Code to conduct a strategic analysis of frac sand mining. A strategic analysis should analyze the environmental, public health, economic, and quality of life impacts of frac sand mining and the effectiveness of current regulation, along with alternatives to the current regulatory approach.

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<sup>127</sup> Wisconsin Department of Natural Resources, Central Sands Strategic Analysis, *available at* <http://dnr.wi.gov/topic/EIA/CSSA.html>.