BACKGROUND

Frac sand is silica sand (silicon dioxide primarily quartz). Wisconsin frac sand is unique due to its size, uniform roundness and hardness. Frac sand is used in a process called hydraulic fracturing which involves pumping water, frac sand and chemicals into shale rock formations creating fractures and a permeable pathway for natural gas and oil to flow to the well head where it is collected for sale. Most of the natural gas shale rock wells are located in Texas, Oklahoma, Mississippi, Arkansas, New York, New Jersey North Dakota and Pennsylvania. Wisconsin has no natural gas or oil wells or known deposits of oil or gas under consideration for development.

Hydraulic fracturing has been around for over 60 years but recent developments in directional boring and other technologies in combination with hydraulic fracturing now allow for the extraction of natural gas and oil that was previously not reachable. Some of the natural gas wells using hydraulic fracturing reach more than a mile under the earth’s surface.

Wisconsin’s frac sand is predominantly found in West Central Wisconsin (Barron, Buffalo, Burnett, Chippewa, Clark, Dunn, Eau Claire, Jackson, Lacrosse, Monroe, Pepin, Pierce, Rusk, St Croix, Trempealeau, Polk, Taylor and Wood Counties). The sand was formed by four different rock formations—the Jordan, Wonewoc, Tunnel City and St. Peter formations, which were created about 500 million years ago. In addition to its physical qualities Wisconsin’s frac sand is often located near the surface where it is economical to mine.

Frac sand mining and processing activities include removal of the raw sand by hydraulic or mechanical means, crushing, washing, sizing, drying and transporting the sand to the sites where it is ultimately used. Depending upon the geological formations blasting may be used to make the sand more amenable to removal and crushing may be conducted to assist in the washing and sizing process. Some processing facilities also have a secondary operation which coats the frac sand with a resin in order to increase its crush strength.

Wisconsin has approximately 60 mining operations of various sizes involved in extraction of frac sand and approximately 32 processing facilities operating or under construction. These operations are primarily located in West Central Wisconsin but there are also facilities in Green Lake and Waupaca Counties and a proposed mine in Winnebago County. This does not include the smaller operations that are likely to be operating as well as the frac sand being removed and sold as a result of excavations associated with cranberry culture. A conservative estimate of frac sand mining capacity based on existing and under construction mines and processing plants would be in excess of 12 million tons per year. Currently there are also approximately 20 new mining operations being proposed and the impacted counties report considerable interest and many mine proposals are under consideration.
REGULATORY AUTHORITY:

The Wisconsin Department of Natural Resources (DNR) has potential regulatory responsibilities over mines and processing plants in the areas set forth below.

- **Air**
  - *Permits.* Both mines and processing plants require air permits. The mines are likely to be covered under a General Operating Permit, a Registration Operating Permit or potentially the same individual specific air permit covering the processing facility they are supporting. The processing facilities are likely covered under a specific individual air permit.
  - *Silica.* Exposure to free silica is a concern with the public.
  - *Fugitive Dust.* The DNR is also in the process of sending information to mine operators regarding control of fugitive dust from the mining operations as this has been a continuing source of citizen complaints.

- **Water**
  - *Stormwater Permits.* All mines require a Wisconsin Pollutant Discharge Elimination (WPDES) General Stormwater Permit per NR 216.
  - *High Capacity Wells.* If a well or wells with a combined capacity in excess of 70 gallons per minute are to be constructed a high capacity well permit issued by the DNR is required under NR 812.
  - *Wetlands/ Surface Waters.* If the mine or processing site is located adjacent to wetlands or surface waters DNR water regulation and zoning requirements may come into play under Chapter 30 of the state statutes or NR 103 for wetlands.

- **Local Regulation**
  - *Zoning.* Zoning is likely the most direct mechanism by which local governments may exert control over mining operations. Many of the mines have been sited, however, in towns that do not have zoning. Where zoning has been in effect, local governments have imposed regulations on issues such as hours of operation, truck routes, truck speeds, covering of truck beds, depth of the mine and potential liabilities for road repair.
  - *Reclamation.* All mines will be required to comply with NR 135 which is the nonmetallic mining reclamation rule. That rule is administered directly by the counties with oversight from the DNR.
Frac Sand and the Karner Blue Butterfly Connection (WDNR 11/2011)

KARNER BLUE BUTTERFLY
The Karner blue butterfly (*Lycaeides melissa samuelis Nabakov*) is a Federally Endangered Species. Listed in 1992, the Karner blue butterfly (Kbb) is relatively common in Wisconsin for an Endangered Species. The Karner caterpillar feeds only on wild lupine (*Lupinus perennis*). Areas without wild lupine nearby generally do not support Karner populations. Lupine is a sun-loving plant that grows in well-drained sandy soils of the Central and Northwest Sands in Wisconsin.

FRAC SAND AND KARNER BLUE HABITAT
It is no coincidence that the Karner range almost perfectly overlaps with the frac-sand range in Wisconsin. Essentially, Karner blues may occur wherever there is frac sand and suitable habitat (wild lupine).

PROJECT PLANNING
Frac sand mining companies need to be aware of the potential for Karners early in their planning process due to the limited survey window for wild lupine and adult Karners. If the project is within one of the 19 counties listed below, refer to the detailed Karner blue High Potential Range (HPR) maps found at [http://dnr.wi.gov/forestry/karner/](http://dnr.wi.gov/forestry/karner/).

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If the project is within the High Potential Range, work with qualified personnel to determine if wild lupine is present. Wild lupine surveys can only be conducted from green up April/May through July 31st.

If wild lupine is present, determine if Karners are present. Surveys for adult Karners can only be conducted from June - early August by trained and certified personnel. Contact [Jennifer.Bardeen@Wisconsin.gov](mailto:Jennifer.Bardeen@Wisconsin.gov) of the DNR’s Karner blue Habitat Conservation Plan for a list of certified agents.

If the project may affect Karners, consider joining the Karner blue Habitat Conservation Plan described below.

KARNER BLUE HABITAT CONSERVATION PLAN
The DNR and the U.S. Fish and Wildlife Service (USFWS) developed the Karner blue Habitat Conservation Plan (HCP) with partners in the forest industry, utility industry, agricultural and conservation community and municipalities in 1999. Under the Plan, FWS issued an incidental take permit that allows the WDNR to administer the permit, which authorizes land management in areas where the Karner blue may be at risk of harm. This allows the Forty-one current HCP Partners to work in areas where Karner blues are present. Inclusion in the DNR’s HCP is more streamlined than applying directly to the USFWS for a separate permit.

CONTACT
For additional guidance or to join the WI Statewide Karner Blue Butterfly Habitat Conservation Plan (HCP), please contact the HCP Program [David.Lentz@Wisconsin.gov](mailto:David.Lentz@Wisconsin.gov) (608) 261-6451 (desk), (608) 220-1112 (mobile); or [Jennifer.Bardeen@Wisconsin.gov](mailto:Jennifer.Bardeen@Wisconsin.gov) (608) 267-0794.