Adverse Impacts to Water Quality

Adverse hydrological impacts may occur at each phase of the frac sand mining process (Figure 1). At some sites dredging occurs and sand is removed below the groundwater table. Dredging is especially harmful from the standpoint of shallow groundwater contamination (Parsen, 2012).

According to the WI DNR, the concentration of the polyacrylamides used in the frac sand washing process is often unknown or may vary substantially. Polyacrylamide levels must be continuously monitored, because although polyacrylamide is itself nontoxic, unpolymerized acrylamide is a known neurotoxin and can occur in low concentrations within sand washing solutions (Daughton, 1988). The Environmental Protection Agency (EPA) has a Maximum Contaminant Level Goal (MCLG) of zero for acrylamide in public drinking water sources. According to the WI DNR, "people who drink water containing high levels of acrylamide over a long period of time could have problems with their nervous system or blood, and may have an increased risk of getting cancer (Wisconsin Dept of Natural Resources, January 2012)." The issue of acrylamides becomes particularly significant when considering wastewater discharge and recharge practices occurring on site. As piles of processed sand dry, acrylamide-laden water can percolate down into the groundwater (Wisconsin Dept of Natural Resources, January 2012) (Parsen, 2012).

Surface and groundwater may also be negatively impacted by land use changes related to increased road networks (Wisconsin Dept of Natural Resources, January 2012) (Parsen, 2012).

Just as the initial step of overburden recharge affects local hydrological patterns, infilling of completed mine sites, choice of fill, and attention paid to preexisting geological conditions and drainage process dictate the long term level of impact during the reclamation process (Wisconsin Dept of Natural Resources, January 2012).

In addition to complex underground aquifer systems, Wisconsin and Minnesota are home to plentiful streams and lakes. No frac sand mine location is far from such surface water resources. Surface water impacts are most directly felt when sand is removed from the surface water locations themselves. Among the environmentally harmful impacts are siltation, erosion, increased turbidity, and degraded aquatic and riparian habitat. Ongoing mining operations in these areas can adversely impact the chemical makeup of local waterways. Thermal impacts (unnaturally warm or cool waters) have also been noted as a

potential concern, but few studies exist to validate the significance of such impacts (Wisconsin Dept of Natural Resources, January 2012).

The primary wastewater streams at frac sand mining operations are wash water generated during processing as well as excess precipitation and/or groundwater removed during pit dewatering. Contamination of natural waterways occurs via seepage or direct discharge to surface waters. The major pollutant of the wastewater discharge that is regulated and/or permitted is the suspended sediment. While suspended sediment is generally non-toxic, it can choke sensitive habitats if exposure is chronic (Wisconsin Dept of Natural Resources, January 2012).

Fishery impacts in Wisconsin and Minnesota are of particular concern to many local citizens as their livelihood and recreational interests are attached to the fishery industry. Long-term fishery impacts are still unknown, due to the exponential expansion of the frac sand mining industry. Citizens have detailed many concerns of detrimental impacts as a result of frac sand mining. The WI DNR details the following as specifically pointing to runoff causing turbidity and affecting trout reproduction, runoff causing sedimentation, thermal increases causing cold-water aquatic life to disappear, decreased stream flow from groundwater withdrawals, entrapment of fish, and realignment of stream channels (Wisconsin Dept of Natural Resources, January 2012).

An emerging and potentially highly damaging water pollution problem is the issue of acid mine runoff that could contaminate groundwater and surface water. Acid mine runoff is normally associated with mineral mining. However, WI DNR data of heavy metal content in sand wash ponds adjacent to mines obtained by Midwest Environmental Advocates demonstrate the same issue arises in frac sand mining.[7] The more acidic water allows heavy metals at toxic levels to leach into water supplies, such as arsenic, cadmium, aluminum, lead, manganese, copper. This water contamination problem extends to reclamation processes that use sand from formations located near frac sand formations (the Tunnel City sandstone formation). Moreover, groundwater contamination can occur as a result of farming on such reclaimed land. (Midwest Environmental Advocates, 2014) Full report can be found here: http://www.civilsocietyinstitute.org/media/pdfs/092514%20CSI%20BAR%20frac%20sand%20mining%20report%20FINAL2%20-%20EMBARGOED.pdf

[7] WI DNR sand wash pond data can be found on the MEA website at: http://midwestadvocates.org/assets/resources/Frac%20Sand%20Mining/2014h9h 12_storm_water_sampling_results_page_1_FINAL.pdf http://midwestadvocates.org/assets/resources/Frac%20Sand%20Mining/2014h9h 12_storm_water_sampling_results_page_2_FINAL.pdf

"In this (Chippewa Sands) permit application (for a frac sand mine), there is no mention of the retention ponds, the amount of water used to fill the ponds, how they will dispose of the chemical laced slurry, what plan of action will be taken in the event of a spill or the level of pollution in these ponds. I feel these ponds are highly toxic due to the signs posted next to the ponds...."!!!