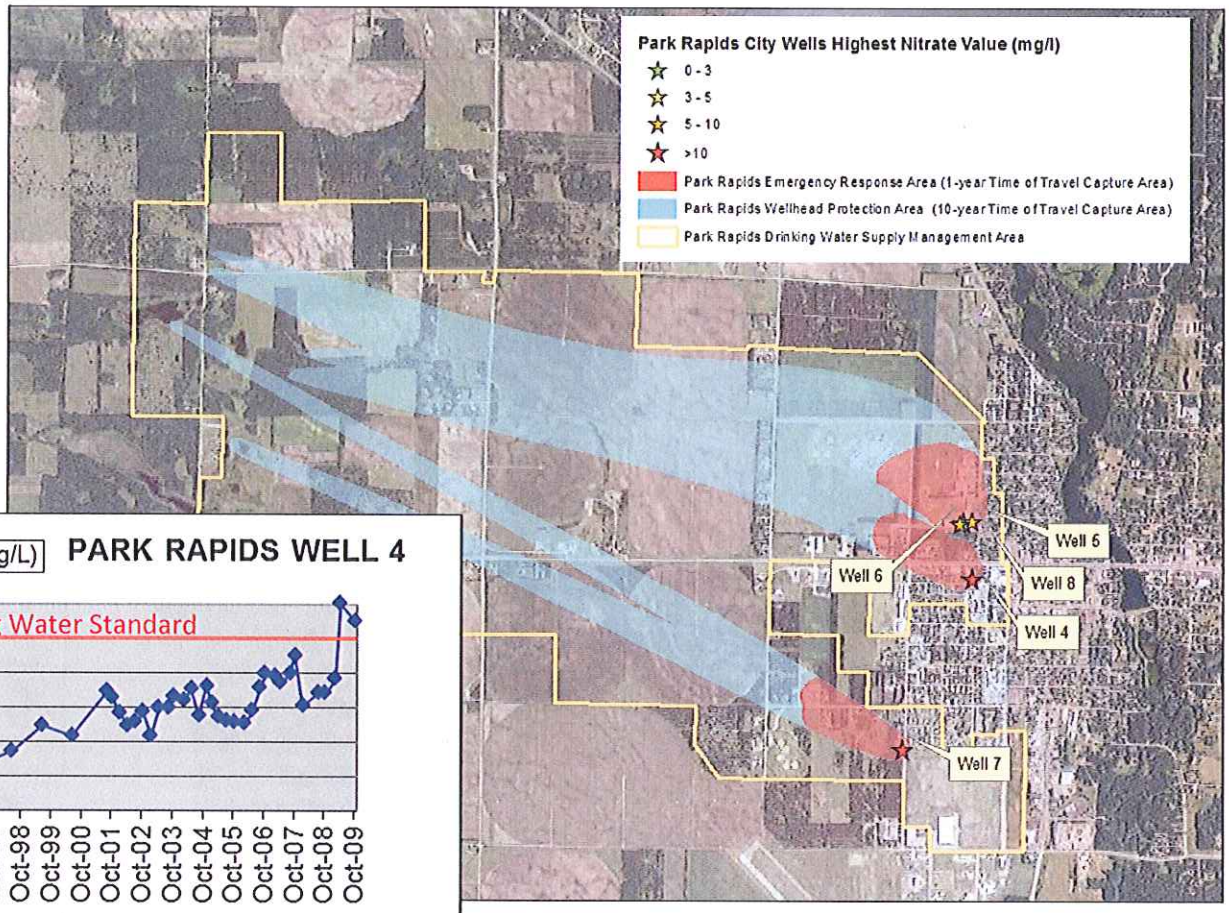
July 17, 2013 LCCMR field stop, Byron Twp. - Conversion of forested land to irrigated potatoes

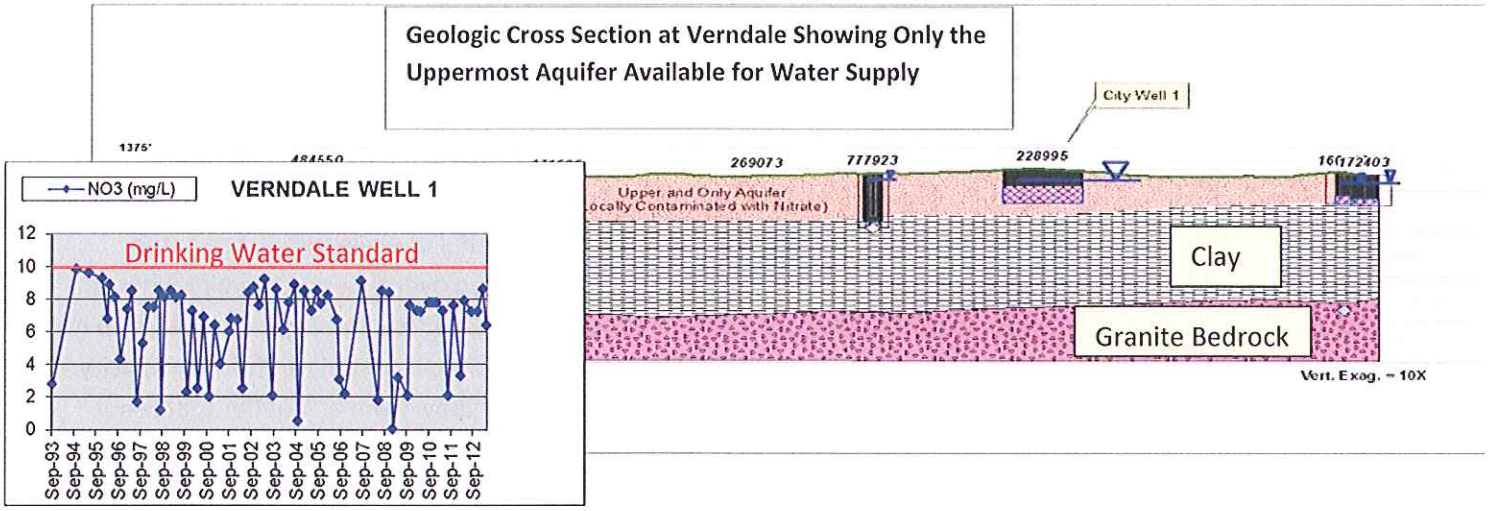
Issue Statement - Where row-crop agriculture is practiced in sensitive geologic settings, it is common for the uppermost aquifer to become contaminated with nitrate. Once in the groundwater, nitrate is difficult and costly to remove and when present above the drinking water standard (10 milligrams per liter) poses a health threat to infants who consume that water either directly or in formula. For these reasons, it is preferable to keep nitrate contamination from occurring in the first place rather than responding to it after it has occurred. The cost of dealing with nitrate-contaminated drinking water has historically been borne by individual well owners or public water suppliers whose water supply has been impacted. These costs have ranged from drilling deeper replacement wells to installing nitrate removal systems. The following are two examples of nearby communities whose wells have been impacted by nitrate contamination and how they are dealing with this.

Park Rapids Example - For many years, the city of Park Rapids has relied on a handful of wells completed in the uppermost sand aquifer for its water supply. Nitrate levels in these wells have risen over time to the point where several of them have had to be abandoned because they couldn't meet drinking water standards (see red stars on map). Abandonment of these shallow wells has required the city to look to alternative sources to replace the lost capacity. The city is currently in the process of exploring for and installing deeper wells that will draw from an aquifer that is not contaminated with nitrate. However, the levels of naturally occurring iron and manganese in this deeper aquifer will require the installation of a treatment plant that will cost the city upwards of $2 million, excluding ongoing operation and maintenance costs.



Verndale Example

Located just up Highway 10 from our field stop, the city of Verndale has historically relied on 2 shallow wells for its water supply. For the past 20 years, the nitrate levels at one of these wells have fluctuated widely, often approaching the drinking water standard. Fortunately the other well is slightly lower in nitrate so the city has been able to meet drinking water standards by blending. However, any significant increase in the nitrate levels at either well would render blending useless. In addition, exploration for a deeper aquifer at Verndale has proven unsuccessful (see below). As a result, the city could be forced to turn to an expensive nitrate removal system to meet drinking water standards over the long run.



This map shows the distribution of public water wells serving large resident populations that are considered threatened by nitrate contamination.