

Monkton Planning Commission Summary of the 2016 Groundwater Study

In May 2016 Amanda Fishbin, an undergraduate pursuing a degree in Geology at Middlebury College, completed her thesis titled "Geochemical and Hydrochemical Analysis of a Quartzite-Dolostone Bedrock Aquifer in the Central Champlain Valley, Monkton, Vermont". She was supervised by Professor Peter Ryan and Jon Kim of the Vermont Geological Survey.

This study is of particular interest because forty to fifty percent of Vermont's population, and all Monkton townpeople, depend on unregulated private wells from fractured bedrock for water. The town of Monkton lies in the central Champlain Valley where much of the bedrock is made up of fractured Monkton Quartzite. Amanda sought to further understand the effect that the rock has on the groundwater as the water moves through this fractured rock, and into residential wells.

Amanda's research into scientific studies showed that there can be natural occurring contamination from bedrock in Vermont. A geologic formation in the Champlain Valley called the Hinesburg Thrust Fault, which was created millions of years ago, has some issues with elevated levels of radionuclides—elements that give off radiation. Amanda's study in Monkton looked at where the Hinesburg thrust fault crosses the St George fault as no one had examined this part of the bedrock in the Champlain Valley. The bedrock in this part of the Champlain Valley is hard quartzite that forms the ridges and soft limestone or dolostone that is in the valleys. Groundwater was sampled from 28 residential wells in Monkton by collecting water before it had been softened or treated.

Groundwater from wells in certain rock formations in Vermont can have elevated levels of naturally-occurring contaminants such as radioactivity (gross alpha and uranium), arsenic, manganese, and fluoride. Since some of these rock formations can be found in the Champlain Valley, Amanda sampled groundwater from each of the major rock formations in town to look for trends.

Preliminary gross alpha results showed a small number of wells with slightly elevated levels, for which further testing is suggested. These well owners have been notified of additional tests that will help them determine the exact source of this radioactivity and ways to treat/filter their water to reduce or eliminate it. Manganese and Iron were slightly elevated in a few wells. Lead was elevated in one well, and Arsenic in all of the wells was below recommended limits

A previous study has shown that elevated radionuclides, and trace amounts of metals are found in the groundwater in the towns of Hinesburg and St George. This is due to the fractured Monkton quartzite, which is also found in that area. The bedrock aquifer of the central Champlain Valley has not been thoroughly studied by the scientific community. This study provides a useful model for further study of groundwater in this area.

If you would like to read the entire report including maps and geochemical analyses, it can be found through the link on the Monkton town website at

<http://monktonvt.com/boards-and-committees/planning-commission/project-reports/>