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Drinking, bathing come with a price

K.J. Hascall photo

James Rose, left, and John Wheaton, hydrologists with the Montana Bureau of Mines and Geology at Montana Tech, take measurements on a well south of Columbia Falls.

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By K.J. HASCALL / Hungry Horse News Hagadone Corporation

For many residents of Flathead Valley, their water source isn't something they think about every day. They turn on the tap and the water comes out and that's good enough.

But what happens if the water sources dry up? And we're not talking about the rivers. Most of Flathead Valley, with the exception of Whitefish, gets its drinking water from a series of aquifers underground, beneath our feet.

An aquifer is a wet underground layer of water-bearing permeable rock or materials like gravel, sand, silt or clay from which groundwater can be usefully extracted using a water well.

The deep confined aquifer in Flathead Valley is a thick deposit of sand and gravel 75 to 300 feet below the surface. Since the area population has increased rapidly in the past decade, Montana Bureau of Mines and Geology hydrologists John Wheaton and James Rose are studying the aquifer by testing wells to learn about declining water levels. The core question is this: What is the long-term sustainability of the water supply?

"We're interested in the deep alluvial aquifer," Wheaton said. "It's a very deep system with very clean gravel and excellent water quality."

The aquifer layer is protected by a near-impermeable glacial till layer left over from the last ice age. The till ensures that pollutants, like oil and gasoline, don't seep down into the water.

Part of the research by the hydrologists, called the ground water investigation program, is to discover how the aquifer is recharged, that is, refilled as wells deplete it. Another question the researchers are seeking to answer is whether or not the aquifers feed Flathead Lake. What is the relationship between the groundwater and the surfacewater — rivers and lakes?

"The continuing layer may be missing in places," Wheaton said of the aforementioned layer of glacial till. "Then rainfall, snow melt and irrigation can recharge it."

Another way the aquifer may recharge is on the edges of the valley in fractures in the Swan Mountains, running down into the earth through underground streams. There could be an underground stream flowing up from the Swan River Valley — the scientists have noted that the Swan has the highest precipitation in the state and water flows north from there.

The answers to these questions could tell local planning offices the rate at which the valley's population can continue to grow. Too many people pulling water from the aquifer faster than it can refill could mean a water shortage. There's a critical level of population that would ultimately jeopardize the aquifer's ability to refill as rapidly as it's depleted.

The hydrologists are monitoring wells around the valley to study water levels and learn about recharge.

"We're monitoring about 100 wells on a regular basis," James Rose said. "Some have pressure sensing data loggers that can log the change in water level every hour. We can download that data to computers and see seasonal and weather changes."

On a recent blustery day, Rose and Wheaton were testing wells south of Columbia Falls. The pair tries to test wells that are close together but that are pulling water from different aquifers or from the same aquifer at different well depths. Some of the wells are on private property — the pair has asked permission to test the water levels from every property owner — and some are in commercial locations. The data loggers, which record information hourly, can be plugged into a computer and the data is easily uploaded.

Preliminary results point to clustered recharge areas in Columbia Falls, Bigfork and Whitefish. The north and east perimeters of the valley seem the most likely.

Wheaton noted that the water level is affected by barometric pressure and by the time of day, as well as the season. In the winter, the data points to recharge, which makes sense because farmers aren't irrigating their fields. Water levels drop during the day when more people are consuming water and rise slightly at night.

"Does this water come down into Flathead Lake?" Wheaton asked. "Does it feed into rivers? Or is it totally independent? It's a real concern if this is the water feeding the lake. (The aquifer's) increased use would reduce flow, but if it's not feeding (the lake), there could be development without concern. How tightly are groundwater and surface water connected? It's not as straightforward as you think it would be.

"The idea is to give people in the valley a better understanding of the water system. We're trying to sort out characteristics of the groundwater system for future planning so we can be ahead of the curve instead of behind it when something comes up."

The Flathead groundwater investigation project is just one of seven around the state, all of which started in 2009 and will end this year. The other current projects are located in the hills north of Helena, the four corners area of Gallatin County, the lower West Gallatin River near Belgrade, the Lower Beaverhead River in Beaverhead and Madison counties, the Scratchgravel Hills in Lewis and Clark County and the Florence area in Ravalli County.

There are another 37 projects nominated statewide for study, but the project's funding is being debated in the legislature and may, like many other state programs, see reduced funding in the future or be cut entirely. The total cost of the first seven projects was about $4.2 million.

"We're hoping the funding is sustained," Wheaton said. "All this growth and development, there's impact because of this growth. There's interference of use, water quality issues."

For more information about the groundwater investigation program, visit http://www.mbmg.mtech.edu/gwip/gwip.asp.