

Leaky ditches key to Stillwater County groundwater

Building of subdivisions has had little effect on aquifer, study says

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A boom in subdivisions along the Yellowstone River corridor hasn't had much effect on groundwater in Stillwater County, according to a report soon to be released through the Montana Bureau of Mines and Geology.

John Olson, associate research hydrogeologist with the bureau who conducted the two-year study, found that neither water availability nor quality had been significantly affected by growth in the Yellowstone River Valley. What he did find was that leaky irrigation ditches play a key role in replenishing groundwater there.

"The water is there because of ag," he said. "As long as the ditches go through there, they should be in pretty good shape."

Olson said the study, which monitored 158 wells and 20 surface-water sites from June 2004 to June 2006, was driven by concerns from area residents. They were worried about the impact of new home construction on water availability and quality in the valley, he said.



John Olson has recently completed a study on water in the Yellowstone corridor of Stillwater County. Olson stands on a hill overlooking the Yellowstone River near Columbus.

Between 1990 and 2000, Stillwater County experienced 24 percent growth, much of which took place near Park City and Columbus. Landowners with existing wells were beginning to question whether new wells would cause their existing wells to dry up and whether new septic systems might contaminate aquifers, he said.

According to the report, there is little cause for concern in either regard. As it currently stands, well withdrawal accounts for less than one percent of the groundwater flow in the alluvial gravels along the river corridor.

"As long as recharge remains viable to the aquifer, it can likely support the population growth in the area," Olson wrote in the study.

Olson also found that 86 percent of the recharge in the study area could be traced to permeation from large irrigation ditches like the Cove and Big Ditch, which originate in Stillwater County and have been sending water eastward for roughly a century.

The ditch flow is so crucial in recharging groundwater, he said, that at the start of irrigation season "It's almost like turning on a spout."

In light of that finding, Olson cautions against lining ditches. Preventing leaks might improve irrigation efficiency, but it has the potential to significantly decrease groundwater flows and levels, he said.

While ag played a key role in maintaining groundwater levels, ag practices were also recognized for having the greatest negative impact on water quality. Overall, the study found groundwater quality to be "relatively fresh" along the length of the river corridor through Stillwater County.

"Just a little bit different from river water," Olson said.

However, of the 50 tons of nitrates per year that are added to the Yellowstone River system there, roughly 90 percent can be attributed to agricultural fertilizers and manure applications. Only 1 to 4 percent are derived from septic systems, Olson said. An unidentified source near Park City accounts for the remaining 7 percent.

Besides providing information on recharge and nitrate concentrations, the study includes two maps. One shows how underground water flows through the study area and the other indicates the depth of groundwater.

"It shows how deep you will have to drill a well," Olson said. "And it also shows places where you will probably not hit water."

In general, the study focused on the alluvial gravels along the Yellowstone River Valley as it drops 430 feet from the western end of the county to the east in a 29,000-acre swath that ranges in width from roughly half a mile to three miles. Olson found that wells in that alluvial gravel averaged 28 to 45 feet in depth and 20 to 50 gallons per minute. Areas of bedrock do not tend to be so productive, he said.

The Stillwater County study is the most recent of several studies completed along the Yellowstone corridor. It's interesting to note, Olson said, that his findings for Stillwater County differ somewhat from a similar study completed several years ago on Billings' West End.

"All have unique twists, which you wouldn't think, being in the same river valley," he said.

Olson found the water quality to be better in Stillwater County, in part because the ditches, which can flush away nitrates, play a bigger role in recharge there. In Yellowstone County, recharge is linked more closely to water infiltrating through the fields, where fertilizers have been applied.

A similar study is under way in Big Horn County, and Olson hopes to continue next year with a study of the Rosebud and Stillwater corridors in Stillwater County.

"The issue there is mostly fractured bedrock, which doesn't have the same kind of filtering capacity," he said. "So nitrates and availability are a bigger issue there."

In spite of the study's encouraging findings in Stillwater County, Olson cautions that the water resource is finite and increased population could affect the situation.

"We can't answer all of the questions, but at least we provided a snapshot for now," he said. "Ideally we would do a follow-up study to compare in 10 years."

The study, which will be published soon, will be available at local conservation district offices and online at <http://mbmggwic.mtech.edu>

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