



WESTERN GALLATIN VALLEY ARSENIC DISTRIBUTION PROJECT - 2016

PROJECT SUMMARY

In 2016 the Gallatin Local Water Quality District conducted groundwater sampling for arsenic in the western part of the Gallatin Valley in southwest Montana. Prior to the project, existing data indicated that the area near the Madison Plateau and Camp Creek Hills on the west side of the Gallatin Valley is a concern due to multiple wells exceeding the U.S. EPA Maximum Contaminant Level (MCL) of 10 µg/L (0.010 mg/L) for arsenic in drinking water. The Lower Madison River Valley, to the west of this area, is known to have elevated arsenic because of geothermal discharge from Yellowstone National Park, but it is unclear whether or not the arsenic in groundwater on the Madison Plateau area is related. A probable source of arsenic in this area of interest is from volcanic ash that is present in Tertiary geologic sediments. See the map on page 2 for the distribution of Tertiary sediments and arsenic concentrations.

The focus of the project was to better understand the spatial distribution of the problem and inform local residents through education and outreach. Of the twenty-three wells sampled for the project, over half (61%) had arsenic levels exceeding the MCL for drinking water. Additional samples were collected for nitrate+nitrite and total iron. Arsenic speciation (type of arsenic) and total hardness was analyzed for wells with arsenic MCL exceedances. Speciation results demonstrated that all of the samples except for one had arsenic present solely in the form of arsenate [As(V)], while arsenite [As(III)] was not detected. The arsenic speciation, iron, and water hardness results can be important when selecting a household water treatment system if project participants choose to install one to treat elevated arsenic. Most groundwater oxygen levels were fairly high (>2 mg/L dissolved oxygen). The single sample that had detectable arsenite was considered an outlier due to its unique characteristics in terms of the exceptionally high arsenic level, non-detectable nitrate+nitrite, low-oxygen conditions, and other factors.

We were unable to identify a specific water bearing zone where elevated arsenic is found, possibly because of the geographically large study area and the sparse scattering of the wells that were sampled. The only characteristic or parameter measured that appeared related to the arsenic concentration was temperature, where higher groundwater temperatures were correlated with higher arsenic concentrations. Because there is no ability to identify which wells do or do not have elevated arsenic, all wells in the area should be screened.

RECOMMENDATIONS

Based on the results of this study, we recommend that residents in Gallatin County who live west of the Gallatin River test their well water for arsenic at least once and consider repeating this screening every 5 years, in addition to annual nitrate and bacteria (total coliform and *E. coli*) testing. If arsenic in drinking water exceeds 10 µg/L, we recommend retesting to confirm the results and then installing a treatment system with the help of a water treatment specialist. Additional data outside of this project suggests that homeowners using private domestic wells in the Big Sky, Three Forks, or West Yellowstone areas should also consider testing their well water for arsenic.

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Arsenic Levels in Gallatin County and Madison Plateau / Camp Creek Hills Area

