

Introduction

A wide range of activities have the potential to contaminate groundwater. In addition, several naturally occurring constituents can limit the suitability of groundwater for some uses. The State of Wyoming has established rules and programs to protect groundwater quality, as well as agencies to implement the rules and programs. The Wyoming Groundwater-Quality Monitoring Network (WGQMN) is one such program that Wyoming Department of Environmental Quality (WDEQ) is implementing to evaluate the State's groundwater.

Network design and objectives

The WGQMN samples wells to establish baseline groundwater quality in priority areas where groundwater has been identified as an important source of public or private water supplies, is susceptible to contamination,

and is overlain by one or multiple land-use activities that could negatively impact groundwater resources (Bedessem and others, 2005; fig. 1). Priority areas are grouped together and sampled based on major watersheds. Sampling by the U.S. Geological Survey (USGS), in cooperation with the WDEQ began in the High Plains aquifer within Laramie County in November 2010. Sampling will resume in the southeastern part of the High Plains aquifer in May 2011.

Objectives of the WGQMN are to:

- Measure water levels and collect groundwater samples from selected wells;
- Analyze groundwater samples for a variety of natural and man-made compounds;
- Report the results through publically available USGS reports, fact sheets, and water-quality web site (<http://waterdata.usgs.gov/wy/nwis/qw/>).

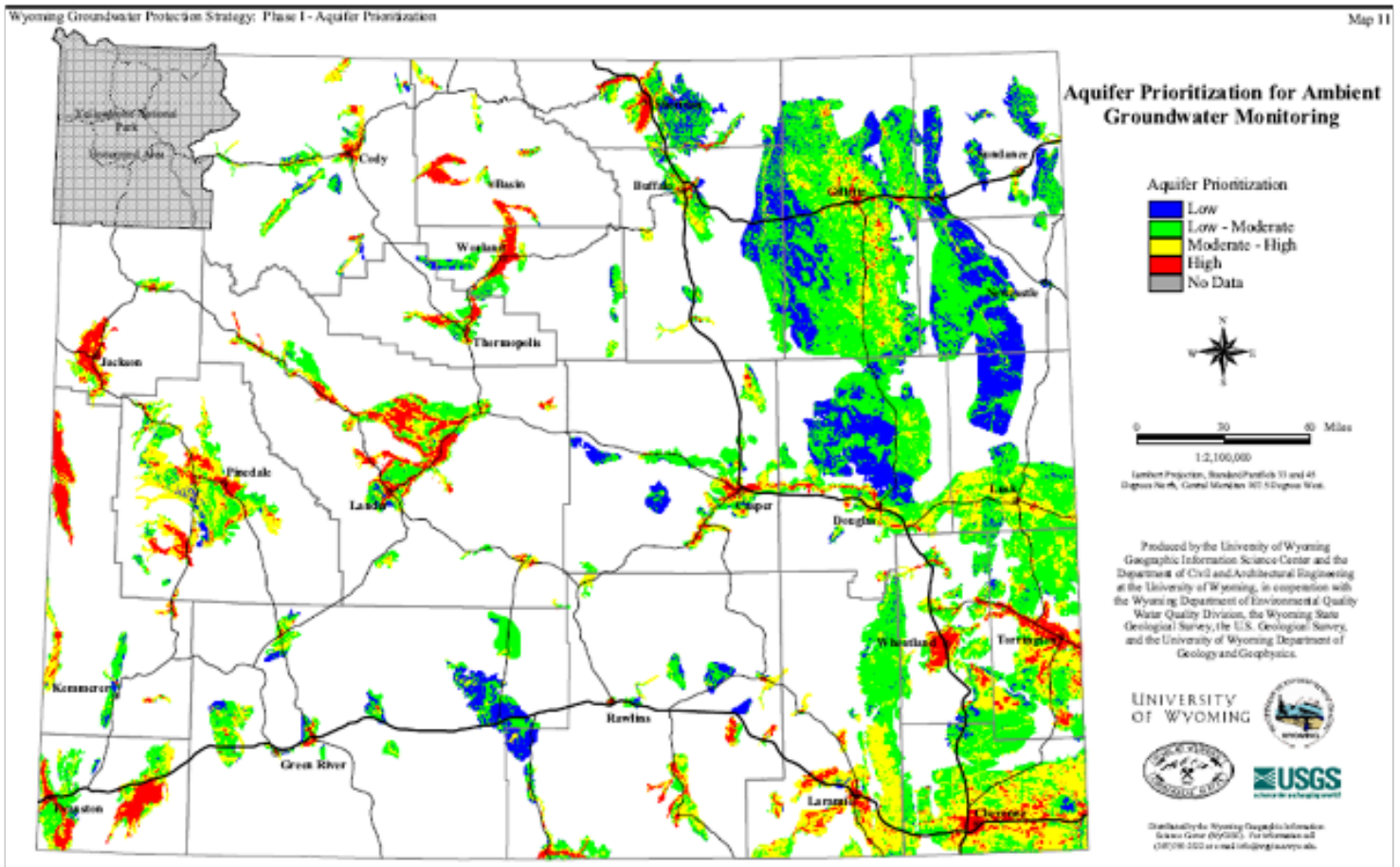


Figure 1 - Groundwater with the highest priority for sampling is shown as red and yellow

Groundwater sampling

Groundwater samples are collected from existing shallow wells (fig. 2, fig. 3). All samples are analyzed for common minerals, nutrients, trace elements, selected bacteria, and other compounds. Additionally, selected samples are analyzed for waste water compounds, radon, hydrocarbon gases, and other chemical and biological components.

Before sampling a well, the depth to water is measured, if possible. Wells are pumped (purged) until it is apparent that aquifer water, rather than water stored in the casing, is being sampled. If no pump is installed, a submersible pump is used for purging and sampling. Water temperature, pH, specific conductance, dissolved oxygen, oxidation reduction potential, and turbidity are measured and recorded periodically during purging.

Samples are collected in accordance with specific USGS sampling protocols (USGS, 1997-present) to ensure a quality sample. Samples are containerized and preserved according to the analysis method's requirements, and shipped to either the EPA Region 8 Laboratory or the USGS National Water Quality Laboratory, depending on the analysis to be performed.



Figure 2 – Mobile water-quality lab used to sample groundwater wells



Figure 3 – Wellhead connections for groundwater sampling that lead to the mobile water-quality lab or a lawn sprinkler

Collected and available data

In addition to collecting samples, details about the well being sampled are useful for analyzing data. These data include photographs, geographic coordinates, information about sampling conditions, well construction, and water levels. All data are stored at the USGS office in Cheyenne, and much of the data are available on the internet at:

<http://waterdata.usgs.gov/wy/nwis/qw/>. Information about the WGQMN's project goal, progress, results, and publications can be found at:

http://wy.water.usgs.gov/projects/gw_monitoring/index.htm

References Cited

- Bedessem, M.E., Casey, B., Frederick, K, and Nibbelink, N, 2005, Aquifer prioritization for ambient ground water monitoring: *Ground Water Monitoring & Remediation* 25, no. 1, pp 150-158.
- U.S. Geological Survey, 1997-present, National field manual for the collection of water-quality data: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chaps. A1-A9, 2 v., variable pagination. [Also available online at <http://pubs.water.usgs.gov/twri9A>. Chapters originally were published during 1997-1999; updates and revisions are ongoing and are summarized at <http://water.usgs.gov/owq/FieldManual/mastererrata.html>

To Request That Your Well be Considered for Sampling

If you are interested in having your well considered for sampling as part of this project, we would like to compile your contact information. Not all wells can be sampled because of limited funding; however, if you would be willing to grant permission to have your well sampled by the USGS, please contact:

Jane Francis, Geological Supervisor
Wyoming Department of Environmental Quality
122 W 25th St, Herschler Building
Cheyenne, WY 82002
(307) 777-7092

Jfranc@wyo.gov

For More Information

Visit the project's USGS web site at:
http://wy.water.usgs.gov/projects/gw_monitoring/index.htm,

Or contact

Gregory K. Boughton, Hydrologist
USGS Wyoming Water Science Center
2617 E. Lincolnway, Suite B
Cheyenne, WY 82001
(307) 775-9161

gkbought@usgs.gov