

**SOURCE WATER ASSESSMENT
EXECUTIVE SUMMARY
FOR
Bedford Water & Sewer District**

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PROJECT: 424-001

ASSESSMENT COMPLETED BY: TRIHYDRO CORPORATION

1252 Commerce Drive, Laramie, WY 82070



ENGINEERING SOLUTIONS. ADVANCING BUSINESS.

Home Office | 1252 Commerce Drive | Laramie, WY 82070 | phone 307/745.7474 | fax 307/745.7729 | www.trihydro.com

SOURCE WATER ASSESSMENT SUMMARY FOR Bedford Water & Sewer District

PWS Source Water Assessment Summary

The Bedford Water and Sewer District is a community groundwater system that serves approximately 300 residents through 136 service connections. Facilities include two springs with collection boxes, one well, and the interconnecting distribution systems. The springs scored high and the well received a medium with respect to the combined integrity and sensitivity ratings. The district scored medium with respect to land use susceptibility and low with respect to point source susceptibility.

Delineation Methods

This water system is a community system that draws water from a fractured formations and a porous sedimentary formation. Groundwater modeling and hydrogeologic mapping methods were implemented to estimate the 2-year and 5-year time of travel for the groundwater flow systems. These methods utilized well information in the sanitary survey and aquifer parameters were assumed for similar type deposits.

Hydrogeologic mapping techniques use surface observations in combination with subsurface geologic and hydrogeologic data to identify aquifer boundaries and areas that contribute water to the aquifer. These techniques were used when a PWS's source was derived from a spring, fractured bedrock, or from a limestone or dolomite aquifer. Conduit flow aquifers have extremely variable flow patterns and rates, making the calculation of time of travel difficult. In some instances, only one contaminant inventory zone was identified beyond Zone 1 due to the inherent difficulty in attempting to assign a particular time of travel to a given area. Because of this issue, aquifer vulnerability mapping techniques were also used as part of the hydrogeologic mapping effort to identify and delineate vulnerable areas. These areas (faults, fractures, exposed bedrock, etc.) are anticipated to be more susceptible to the rapid infiltration of contaminants released at the ground surface.

U.S. EPA's Wellhead Analytic Element Model or WhAEM method was used for community water systems that derive their sources from alluvial or shallow bedrock aquifers. The WhAEM model uses well and limited hydrogeologic data to estimate time-of-travel capture zones in relatively simple hydrogeologic settings for either confined or unconfined aquifers. For the source water assessment, the WhAEM model was used to develop 2 year and 5 year groundwater capture zones. Due to this methodology, the delineated source water areas may be larger than the true capture zones for each well. However, use of this method typically results in source water protection areas that can be used to more reliably protect the water supply.

Groundwater Sources

The Bedford Water and Sewer District utilizes three sources of water for its municipal water supply: two springs and a well that draws water from the Salt Lake Formation. The two springs draw water from Bighorn Dolomite, Gallatin Limestone, Gros Ventre and Flathead Sandstone formations. Recharge for the springs originates from outcrops of these formations and fracture

systems in the area immediate to the springs, and flows westward toward the springs through conduit flow. Bedford #1 draws water from the sandstone units within the Salt Lake formation. Recharge occurs in outcrops of the Salt Lake formation and generally flows to the well under artesian conditions from east to west. Additional information on these springs and the well is included on the Attached Spring and Well Information Sheets. As shown on the enclosed source water area delineation map, Zone 2 of the spring encompasses the alluvium along Strawberry Creek extending to the perennial reaches of the creek. Zone 3 includes various fault systems and formations that could influence the springs. Zone 3 terminates on the north and east at a fault system, the south is terminated at a surface water divide and the west is terminated at a geologic contact. Zones 2 and 3 for Bedford #1, represent 2-year and 5-year groundwater travel times, respectively. These capture zones extend generally to the east of the wellhead.

Integrity Summary

The Bedford Water and Sewer District utilizes three sources of water for its municipal water supply: two springs and one well that is approximately 350 feet deep. As shown on the Integrity Summary Table, the New Spring, Old Spring, and Bedford #1 received scores of 8, 6, and 3 with respect to integrity. Both the springs and the well have conveyance structures greater than one mile and were constructed before 1983, when less stringent construction standards were required by the State of Wyoming.

Water Source Sensitivity Summary

As shown on the Source Sensitivity Summary Table, the two springs each received sensitivity scores of 10 and the well received a sensitivity score of 6. The two springs received the score for two reasons. The first reason is that springs are more vulnerable to contamination due to unpredictable flow pathways and their proximity to the ground surface. Second, there are documented chemical detections in the groundwater. The well received a score of 1 for aquifer sensitivity due to drawing water by porous media flow, in a confined aquifer. The well received the score of 5 for chemical sensitivity due to documented chemical detections in the groundwater.

Water System Susceptibility Rating

Susceptibility is defined as the potential for a public water supply to draw contaminated water at concentrations that would pose a threat or concern to human health. In general, the springs scored medium with respect to land use susceptibility, because even though the land use contaminant ratings were low, the intake susceptibility rating was high resulting in the overall rating of medium. The well scored high with respect to land use susceptibility because the land surrounding the water source is irrigated cropland. The overall point source contaminant susceptibility rating is low due to the lack of contamination sources within the delineated zones.

A review of your PWS's routine water analysis results revealed that one or more chemicals that are considered contaminants in drinking water were detected at some time within the last five years. Chemical detections have a large impact on your PWS's sensitivity score because it may indicate that there is a pathway for contaminants to reach the water supply. However, it is likely that these chemicals are present only in small amounts and are not a danger to your health. Some

of these chemicals may also occur naturally in water.

For more information about which chemicals were detected, please contact the PWS for a copy of the most recent Consumer Confidence Report or water analysis results. Chemical detections at levels that are a concern to human health are reported on the EPA's website: http://www.epa.gov/enviro/html/sdwis/sdwis_query.html. To see if your PWS has exceeded the federal primary or secondary drinking water standards, just click on the State of Wyoming and then type in the name of your PWS. Consumer Confidence Reports are prepared by the PWS on a yearly basis. The reports should include information about any chemicals found in the water, even those found at very low levels. Please contact Kim Parker at DEQ, 307-777-7781, or WARWS for assistance. You may also contact EPA to find out what contaminants were detected. You may have to fill out a Freedom of Information Act request to obtain the water test results for your PWS. Please call EPA's Safe Drinking Water Hotline at 1-800-426-4791.

**POINT SUSCEPTIBILITY SUMMARY TABLE
FOR Bedford Water & Sewer District
Point Source Susceptibility Summary**

It may appear from the results of this point source susceptibility summary table that your system has too many PSOCs influencing the final ratings. In some cases, a specific PSOC falls within a specific contaminant inventory zone shared by multiple wells or intakes. When this is the case, that PSOC will be scored for each intake. For example, an underground storage tank may appear within a contaminant inventory zone shared by four different wells. This would cause that single storage tank to be entered into the table four times, or once for each well or intake.

Point Source Type	Low	Medium	High
None Identified	N/A	N/A	N/A

- * Illustrates the number of PSOCs in a particular rating class for all water sources
- * N/A - Not Applicable