

WYOMING WATER ASSESSMENT AND PROTECTION PROGRAM (SWAP)



SOURCE WATER ASSESSMENT PROGRAM EXECUTIVE SUMMARY

Source Water Assessment Prepared For:
Worland Utilities Commission

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SOURCE WATER ASSESSMENT SUMMARY FOR Worland Utilities Commission

PWS Source Water Assessment Summary

The Worland Utilities Commission maintains a community groundwater system that serves the Town of Worland in northwestern Washakie County on U.S. Highway 16/20. The system provides water on a continuous basis to about 7,550 people through 2,450 service connections. Source water for the Worland Utilities Commission is obtained from two deep flowing artesian wells that are completed in the Madison Limestone, and are located in a remote area northeast of town. These wells are also one of the principal water sources being used by the Bighorn Regional Joint Powers Board to provide redundancy to member communities and to expand the service area into rural areas of the basin that are located in close proximity to the pipeline network.

Groundwater from Worland's wells is commingled in the transmission line and transported approximately 18 miles to the community. Gaseous chlorine that is used to disinfect the water is injected into the transmission line at the east storage tank. Water is then piped to the distribution system and a second storage facility via gravity flow. The two storage tanks have a capacity of 2.5 million gallons each.

The Worland Utilities Commission scores low for land use susceptibility in Zone 1 and high in Zones 2 and 3 because much of the land within the source water area is forested. The overall point source contaminant susceptibility rating is medium due to the presence of a contaminant source within the delineated zones.

Delineation Methods

The Worland Utilities Commission maintains a community water system that obtains its water supply from fractured and cavernous limestone bedrock. Hydrogeologic mapping techniques were consequently used to identify source water areas for the wells.

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.

Groundwater Sources

The Worland Utility Commission's two wells are completed in the Madison Limestone at depths

of 2,334 and 4,210 feet. Sufficiently saturated portions of the Madison Limestone and Bighorn Dolomite in this area form one of the most prolific aquifers in Wyoming, the Madison Aquifer. Where permeable fractures and caverns have been encountered in wells drilled into these formations, flowing artesian well yields have approached 14,000 gpm. Recharge for the aquifer originates as infiltrating precipitation on Madison Limestone and Bighorn Dolomite outcrops to the east and flows westward to the wells under artesian conditions through fracture and conduit flow. Additional information of each of these two wells is included on the enclosed Well Information Sheets.

As shown on the attached source water area map, contaminant inventory zones for the Worland Utility Commission's wells were developed to encompass those areas that contribute water to the Madison Limestone and Bighorn Dolomite. Between groundwater divides in the Madison Aquifer that were inferred from a University of Wyoming Master's thesis, Zone 2 includes outcrops of the Madison Limestone and Bighorn Dolomite that are exposed in the Bighorn Mountains to the east of the wells. Upstream from Zone 2, Zone 3 includes drainages that deliver water to the Madison and Bighorn outcrops.

Integrity Summary

The Worland Utilities Commission obtains its groundwater supply from two wells to supply water to the system. The wells, Husky Worland #1 and Worland #3, were constructed before 1983, when less stringent construction standards were required by the state of Wyoming. Available records indicate that the wells were properly sealed to protect against surface infiltration of potential contaminants and flooding around the wellheads. Historic failure of the pipeline in addition to its long length has resulted in concern regarding its structural integrity. As shown on the Integrity Summary Table, the wells received integrity scores of 5, which is a direct reflection of the well completion date, the conveyance structure length, and its risk of structural damage.

Water Source Sensitivity Summary

As shown on the Source Sensitivity Summary Table, the wells received sensitivity scores of 10. These wells received the maximum sensitivity score for two reasons. First, the Madison Limestone is known to be vulnerable to contamination because of high velocities associated with water flowing through fractures and caverns. The second reason is that laboratory analysis of water samples from the system within the last five years detected a few contaminants that are listed on EPA's primary and secondary drinking water standards. These include nitrate, fluoride, and sulfate among others. Despite detection, these contaminants were detected at concentrations below the EPA's maximum contaminant levels.

Water System Susceptibility Rating

Susceptibility is defined as the potential for a public water supply to draw water contaminated at concentrations that would pose a threat or concern to human health. The Worland Utilities Commission scores low for land use susceptibility in Zone 1 and high in Zones 2 and 3 because much of the land in the source water area that is located in the Bighorn Mountains to the east is

forested. The overall point source contaminant susceptibility rating is medium due to the presence of an underground injection well within Zone 3. Susceptibility ratings for each type of potential contaminant source are summarized on the attached susceptibility tables.

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 Worland Utilities Commission
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
Underground Injection	N/A	2	N/A

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