

WYOMING WATER ASSESSMENT AND PROTECTION PROGRAM (SWAP)



SOURCE WATER ASSESSMENT PROGRAM EXECUTIVE SUMMARY

Source Water Assessment Prepared For:
Cowley

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June 30, 2004

SOURCE WATER ASSESSMENT SUMMARY FOR Cowley

PWS Source Water Assessment Summary

The Town of Cowley municipal water system is classified as a community groundwater supply and is located on U.S. Highway 310 residents approximately three miles north of Lovell. The system currently serves a population of 700 through 222 service connections. Source water for this system is obtained from a flowing artesian Madison Formation well. Artesian water from the well is delivered to a 250,000 gallon above ground water storage tank. There is no treatment or disinfection provided.

In general, the Town of Cowley scores low for land use susceptibility. The overall point source contaminant susceptibility rating is low due to the lack of contamination sources being present within the delineated zones.

Delineation Methods

The Town of Cowley is a community water system that obtains its water from a fractured limestone bedrock aquifer. While these conditions dictate that the source water area be delineated using hydrogeologic mapping techniques, the calculated fixed radius (CFR) method was used to complete the delineation. This method was used because the area that should be included in this system's source water area through the use of hydrogeologic mapping techniques lies across the stateline in Montana. In accordance with DEQ's SWAP guidelines, source water areas that lie outside of Wyoming were not included.

The CFR method is appropriately used when groundwater flow to the well can be characterized as porous. This process was implemented for small communities that derive water from deeper, confined aquifers, or for non-community water systems. The CFR calculation, $r = [(Qt)/(\pi nH)]^{1/2}$ (FS), requires discharge (Q) during a period of time (t), aquifer porosity (n), and length of the well's open interval (H), to determine the radius (r) of a cylinder containing the volume of water discharged from the well during a chosen time period. A factor of safety of 1.5 was applied to all systems where portions of the data were suspect. At the ground surface, the radius can be used to delineate an area around the well to be used for wellhead protection. The radius is the distance from the well to a point from which groundwater (and contaminants) can reach the well over a specified time period. Input data requirements are limited, and consist of the pumping rate, open area (screened interval) of the well, porosity of the aquifer, and the selected time of travel (two years and five years).

Groundwater Sources

Cowley's well is completed in the Madison Limestone to a depth of 2,300 feet. Sufficiently saturated portions of the Madison Limestone and Bighorn Dolomite in this area form one of the most prolific aquifers in Wyoming and Montana, 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 and flows

southward to the wells under artesian conditions through fracture and conduit flow. Additional information on this well is included on the enclosed Well Information Sheets.

As shown on the attached source water area map, contaminant inventory zones that were delineated for Cowley's well using the CFR method are centered around the wellhead. Zone 2 extends approximately 1,877 feet radially from the wellhead, while Zone 3 extends approximately 2,970 feet.

Integrity Summary

The Town of Cowley uses one Madison Aquifer well to supply water to its system. The well, Madison #1, was constructed between 1983 and 1993, when more stringent construction standards were required by the State of Wyoming. Records also indicate that the well was properly sealed to protect against surface infiltration of potential contaminants and flooding around the wellhead. As shown on the Integrity Summary Table, the well received a low score of 3. This score reflects the wells completion date, in addition to its accessibility.

Water Source Sensitivity Summary

Cowley obtains its source water from a flowing artesian Madison Aquifer well. As shown on the Source Sensitivity Summary Table, the well received a sensitivity score of 10.

This well received the maximum sensitivity score for two reasons. The first reason is that groundwater is obtained from the Madison Limestone which generally allows water to flow to wells at variable rates through interconnected fractures or caverns. The second reason is that laboratory analysis of water samples from the Town 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. Despite detection, these contaminants were generally 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. In general, the Town of Cowley scores low for land use susceptibility. The overall point source contaminant susceptibility rating is low due to the lack of contamination sources being present within the delineated zones. 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 Cowley
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