

# WYOMING WATER ASSESSMENT AND PROTECTION PROGRAM (SWAP)



## SOURCE WATER ASSESSMENT PROGRAM EXECUTIVE SUMMARY

Source Water Assessment Prepared For:  
WYDOT Bitter Creek RA-Westbound

Assessment Completed By:  
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## **SOURCE WATER ASSESSMENT SUMMARY FOR WYDOT Bitter Creek RA-Westbound**

### **PWS Source Water Assessment Summary**

The Wyoming Department of Transportation (WYDOT) Westbound Bitter Creek Rest Area Water System is classified as a transient non-community groundwater supply located on I-80 west of Patrick Draw. The rest area is open year round to provide water to the traveling public. Source water is obtained from two deep wells that are completed in the Wasatch Formation. Groundwater from the wells is passed through a 5-micron cartridge filter, disinfected, and stored in a 150-gallon retention tank before use. Two 80-gallon hydropneumatic tanks provide system pressure and some additional water storage.

In general, the Westbound Bitter Creek Rest Area water system scores low for land use susceptibility. The overall land use susceptibility rating is low due to the lack of contamination sources within the delineated zones. WYDOT should be aware that an interstate highway and a pipeline cross through the source water areas of the wells.

### **Delineation Methods**

Because the Westbound Bitter Creek Rest Area is classified as a transient non-community groundwater system and obtains water from a porous sandstone aquifer, Lidstone delineated the source water area for this system using calculated fixed radius (CFR) methods. This method was used to estimate the two and five year time of travel radii for the groundwater system based on data obtained from the Wyoming SEO, the PWS sanitary survey, and the SWAP guidance document.

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, consisting 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**

The Westbound Rest Area obtains its source water from two wells that are completed in the Wasatch Formation to depths ranging from 450 to 457 feet. Recharge to the Wasatch Formation occurs through the direct infiltration of precipitation. Groundwater reaches the wells through porous media flow. Additional information on these two wells is included on the attached Well Information Sheet.

As shown on the enclosed source water area maps, the contaminant inventory zones for these wells are centered around the wellheads. For Bitter Creek #1, Zone 2 extends approximately 458 feet radially from the wellheads, while Zone 3 extends about 724 feet. For Bitter Creek #3, Zone 2 extends approximately 290 feet radially from the wellheads, while Zone 3 extends about 458 feet.

### **Integrity Summary**

The Westbound Bitter Creek Rest Area water system is classified as a transient non-community groundwater supply. The Bitter Creek #1 and #3 wells were constructed between 1983 and 1993 when more stringent construction standards were not required by the State of Wyoming. Records show that the well was properly sealed from surface infiltration of potential contaminants and flooding around the wellhead. As shown on the Integrity Summary Table, the Bitter Creek #1 and #3 wells received scores of 3, due to the well completion dates and uncertainty of the presence of an annular seal.

### **Water Source Sensitivity Summary**

The Westbound Bitter Creek Rest Area water system obtains source water from two deep wells that are completed in the Wasatch Formation. As shown on the Source Sensitivity Summary Table, both wells received a sensitivity score of 6.

The intake received an intermediate sensitivity score for two reasons. Both wells are completed in a confined aquifer which is relatively insensitive to contamination. The second reason is that laboratory analysis of water samples within the last five years detected several contaminants that are listed on EPA's primary and secondary drinking water standards. These included sulfate, total dissolved solids, and fluoride. While sulfate and total dissolved solids exceeded EPA's secondary standards, the remaining 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 Westbound Bitter Creek Rest Area water system scores low for land use susceptibility. The overall land use susceptibility rating is low due to the lack of contamination sources within the delineated zones. Because an interstate highway crosses through Zones 2 and 3 and a pipeline runs through Zone 3, the wells were assigned a high rating for transportation corridor susceptibility. 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](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 WYDOT Bitter Creek RA-Westbound  
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