

# WYOMING WATER ASSESSMENT AND PROTECTION PROGRAM (SWAP)



## SOURCE WATER ASSESSMENT PROGRAM EXECUTIVE SUMMARY

Source Water Assessment Prepared For:  
Pine Bluffs

Assessment Completed By:  
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**June 30, 2004**

## **SOURCE WATER ASSESSMENT SUMMARY FOR Pine Bluffs**

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

The Town of Pine Bluffs maintains a community water system that serves a population of approximately 1,150 through 535 service connections. Source water for this system is obtained from the Brule Aquifer through five wells that are located throughout the town. Water from the wells is pumped through an isolated transmission line to a chlorination facility and then into the Town's two storage tanks. After adequate contact time, water from the tanks is distributed to the Town via gravity flow. Pine Bluffs also has a pumping station that was constructed to deliver water with adequate pressure to a housing development situated on a hillside south of Interstate 80. The operation of the facilities is controlled through a telemetry system.

In general, Pine Bluffs' water sources rated low for land use susceptibility and high for potential point source susceptibility. The low land use susceptibility rating occurred despite the fact that much of the land surrounding the water sources is irrigated or dryland agriculture. The high point source susceptibility ratings are due to the presence of multiple underground tanks and other sources in the source water area of the wells. In addition, the presence of an interstate and a railroad within the delineation zones garnered a high transportation corridor contaminant susceptibility for the wells.

### **Delineation Methods**

Pine Bluffs has a community water system that obtains municipal drinking water from fractured siltstones in the area. Lidstone used hydrogeologic mapping techniques to encompass the area that may contribute water to the Town's wells. Hydrogeologic and geologic maps, reports, and other information from the Wyoming Water Development Commission and the U.S. Geological Survey were used to identify the source water areas.

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 applied to Pine Bluffs' water sources because its wells obtain groundwater from fractured bedrock. Conduit flow aquifers have extremely variable flow patterns and rates, making the calculation of time of travel difficult. 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**

Pine Bluffs obtains its groundwater from five wells that are completed in the Brule Formation to depths between 100 and 130 feet. The Brule Formation is a fractured siltstone that will yield sufficient quantities of water where saturated. Recharge to this formation occurs the direct infiltration of precipitation, and reaches the wells through an interconnected series of permeable fractures. Groundwater in the Brule Formation generally flows eastwardly toward the Stateline.

Additional information on each of these wells is contained in the attached Well Information Sheets.

As shown on the enclosed source water area maps, Lidstone developed contaminant inventory zones that encompass the area that could contribute water to the Brule Formation and the Town's wells. Zone 2 includes all outcrops of the Brule Formation in the area, and extends from the western margin of the outcrops to the Stateline on the east and terminates on the north and south along groundwater divides in the Brule Aquifer. Zone 3 extends beyond the margins of the Brule Formation outcrops and includes outcrops of the Arikaree Formation. Lidstone included these areas because of the possible hydrologic connection between these two formations which could allow groundwater from this formation to recharge the Brule Formation.

### **Integrity Summary**

Pine Bluffs maintains a community groundwater system that obtains its source water from five wells. Pine Bluffs Municipal #1, Pine Bluffs #2, #4, and Ekxtrom #1(Well #6) were constructed before 1983 when less stringent construction standards were required by the State of Wyoming. Well #7 and Well #8 were constructed after 1993 when stringent construction standards were required. Well #8 is currently used as an irrigation well and does not contribute to municipal supply. All of the wells were completed with surface seals, and are enclosed in buildings to restrict access and to protect the wells from flooding. As shown on the Integrity Summary Table, Ekxtrom #1(Well #6), Pine Bluffs #2, #4, Pine Bluffs Municipal #1 received integrity scores of 3 which reflect their completion dates. Well #7 and Well #8 received a score of 1 due to their more recent completion date.

### **Water Source Sensitivity Summary**

Pine Bluffs obtains source water for this system from the fractured Brule Aquifer. As shown on the Source Sensitivity Summary Table, Ekxtrom #1(Well #6), Pine Bluffs #2, #4, Pine Bluffs Municipal #1, Well #7, and Well #8, each received a sensitivity score of 10.

These wells received the maximum sensitivity score for two reasons. The first reason is that their source water is obtained from a fractured siltstone in which groundwater flow rates are variable. The second reason is that laboratory analysis of water from the wells within the last five years detected a few contaminants that are listed on EPA's primary and secondary drinking water standards. These include nitrate, arsenic, sulfate, radionuclides, and selenium among others. 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, Pine Bluffs scores high for land use susceptibility within Zone 1, due to urban land use, and scores low within Zones 2 and 3 despite the presence of irrigated and non-irrigated cropland. The presence of underground storage tanks, wastewater discharge points, underground injection wells,

solid/hazardous waste sites, oil/gas wells, and storage tanks resulted in a high point source contaminant susceptibility rating for Zone 2 and a medium rating for Zone 3. While Pine Bluffs #2 Well and Well #8 were assigned a high susceptibility rating for a state highway in Zone 1, all the wells received a high transportation corridor susceptibility rating for Zones 2 and 3 due to the presence of all four types of transportation corridor contaminants. 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 Pine Bluffs  
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
Wastewater Discharge	N/A	N/A	12
Underground Tank	N/A	54	300
Underground Injection	N/A	N/A	24
Storage Tank	N/A	N/A	54
Sol/Haz Waste Site	N/A	6	24
Oil & Gas Well	N/A	N/A	48

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