

# WYOMING WATER ASSESSMENT AND PROTECTION PROGRAM (SWAP)



## SOURCE WATER ASSESSMENT PROGRAM EXECUTIVE SUMMARY

Source Water Assessment Prepared For:  
Sierra Madre JPB

Assessment Completed By:  
**Lidstone and Associates, Inc.**  
Engineering, Geology & Water Resource Consultants  
4025 Automation Way, Building E  
Fort Collins, CO 80525



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## **SOURCE WATER ASSESSMENT SUMMARY FOR Sierra Madre JPB**

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

The Sierra Madre Joint Powers Board (JPB) water facility serves the small community of Riverside, which is located about 18 miles south of Saratoga. It provides water on a year round basis to about 180 people through 84 service connections. Source water for the facility is obtained from two wells that are completed in the North Park Formation. Water from these wells is pumped to a central valve and control building where it is valved into a common pipe that serves the distribution system. Gaseous chlorine is injected as the pipe leaves the building. A 280,000-gallon storage tank completes the system.

The JPB scores medium for land use susceptibility because the land surrounding the water sources is classified as irrigated agriculture. The overall point source and transportation corridor contaminant susceptibility rating is low due to the lack of contamination sources being present within the delineated zones.

### **Delineation Methods**

The Sierra Madre JPB maintains a community water system that obtains its source water from a porous sandstone formation. WhAEM methods were used to delineate the source water areas for the wells based on information obtained from the Wyoming SEO, the sanitary survey, and Wyoming Water Research Institute reports. Due to the narrow zones that were developed using the WhAEM method, hydrogeologic mapping techniques were also used to establish the source water areas.

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 two year and five 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.

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 JPB obtains groundwater for its community supply from two wells that are completed to depths ranging from 215 to 622 feet. These wells obtain water from saturated sandstone beds of the North Park Formation. Recharge to the North Park Formation occurs through the direct infiltration of precipitation on outcrops. Groundwater flows through these sandstone beds to the wells under confined artesian conditions through porous media. Additional information on each of these wells is available on the enclosed Well Information Sheets.

As shown on the attached source water area map, contaminant inventory zones for the wells encompass areas immediately adjacent to the wells near Lordier Reservoir. Zones 2 and 3 are generally long narrow areas that extend southwestward from the wells. The shape and size of the source water areas is a reflection of well pumping rates, aquifer transmissivities, and groundwater flow directions. As a factor of safety, an additional area that was delineated using hydrogeologic methods was placed around the wells.

## **Integrity Summary**

The two wells used by the JPB, WWDC Riverside #4 and #6, were completed after 1993 when stringent construction standards were required by the State of Wyoming. Records show the wells were properly sealed to protect against surface infiltration of potential contaminants and flooding around the wellheads. As shown on the Integrity Summary Table, the wells received a low score of 2, which is a direct reflection of the well completion date and wellhead accessibility.

## **Water Source Sensitivity Summary**

The Sierra Madre JPB obtains its water from two wells that are completed in the confined North Park Formation. As shown on the Source Sensitivity Summary Table, both wells received a sensitivity score of 6.

These wells received a sensitivity score of 6 for two reasons. First, the porous confined aquifer is less vulnerable to contamination. The second reason is that laboratory analysis of water samples from the Joint Powers Board within the last five years detected a few contaminants that are listed on EPA's primary and secondary drinking water standards. According to the SDWIS database, with the exception of cyanide, all other 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 Sierra Madre Joint Powers Board received medium land use susceptibility scores because the land surrounding the water sources is classified as irrigated agriculture. The overall point source and transportation corridor contaminant susceptibility ratings are low due to the lack of contamination sources 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](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 Sierra Madre JPB  
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