Lonesomehurst Campground

Source Water Delineation and Assessment Report (SWDAR)

Lonesomehurst Campground United States Forest Service Public Water Supply

State of Montana Public Water Supply ID# MT0063649

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INTRODUCTION

The Safe Drinking Water Act (SDWA) Amendments of 1996 require states to develop and implement Source Water Assessment Programs (SWAP) to analyze existing and potential threats to the quality of the public drinking water supplies throughout the state. The US Environmental Protection Agency (EPA) formally approved the Montana SWAP, prepared and administered by the Montana Department of Environmental Quality (MDEQ), in November 1999. The Montana SWAP was developed from the former Wellhead Protection Program, but includes surface water sources and requires a more rigorous inventory of potential contaminant sources.

SWAP addresses only public water systems (PWS) regulated according to the Federal Safe Drinking Water Act. A public water supply system is defined, according to Federal and Montana regulations, as a system that supplies water for human consumption. A public water supply system has at least 15 service connections or regularly provides water to at least 25 persons daily for a minimum of 60 days in a calendar year. There are three types of public water supply systems:

- Community water systems provide water on a year-round basis, and have a minimum of 15 service connections or regularly serve at least 25 residents. In addition to incorporated towns, community systems may serve smaller areas such as housing subdivisions or trailer courts.
- Non-transient non-community systems do not serve communities, but provide water regularly to a minimum of 25 of the same people for at least 6 months of a year. These systems serve public buildings such as schools and hospitals, where people are employed but do not reside.
- Transient non-community systems do not serve communities, and do not regularly serve a minimum of 25 of the same people for at least 6 months of the year. These systems are usually seasonal, and are located in areas such as campgrounds and parks. *The Lonesomehurst Campground PWS is a transient non-community system.*

The Montana Source Water Protection Program is intended to be a practical and cost-effective approach to help public drinking water supplies protect their water source from contamination. The United States Forest Service (USFS) works with the Montana DEQ to complete delineation and assessment reports for USFS managed public water supplies in Montana. The Source Water Delineation and Assessment Report (SWDAR) compiles the appropriate data and other technical information about an area to allow the USFS to develop source water protection plans for potable water supplies. Delineation is a process whereby areas that contribute water to aquifers or surface waters used for drinking water, called source water protection areas, are identified on a map. Geologic and hydrologic conditions are evaluated in order to delineate source water protection areas. Assessment involves identifying potential contaminant sources in delineated source water protection areas, and evaluating the potential for contamination of drinking water from these sources under "worst-case" conditions such as a flood, fire or human error.

Scope and Purpose

This report presents the source water delineation and assessments for the public water supply for the Lonesomehurst Campground located northwest of the town of West Yellowstone, in Gallatin County, Montana. This report is intended to meet the technical requirements for the completion of the delineation and assessment report for this PWS, as required by the Montana Source Water Protection Program (DEQ, 1999) and the federal Safe Drinking Water Act (SDWA) Amendments of 1996 (P.L. 104-182).

Acknowledgements

This report was prepared by Brian Story, an Environmental Engineering Trainee with the USFS Region 1 office, as part of a cooperative agreement with the United States Environmental Protection Agency. Montana Department of Environmental Quality staff provided additional information and review.

Limitations

This report was prepared to assess threats to the Lonesomehurst Campground public water supply and is based on published information. The terms "drinking water supply" or "drinking water source" refer specifically to sources for regulated public water supplies, and not any other type of water supply. The inventory of potential contaminant sources focuses on the management areas delineated for the public water supply in this report. As a result, other potential sources of contamination to surface and ground water in the area may not be identified.

BACKGROUND AND DELINEATION

The Lonesomehurst Campground is located within the Gallatin National Forest, approximately seven and a half miles northwest of West Yellowstone, Montana. The campground is located along the west shore of the South Arm of Hebgen Lake. The Lonesomehurst Campground is located at approximately 44.74º North latitude and 111.23º West longitude, in Section 3 of Township 13 South, Range 4 East. The location of the well in the Gallatin National Forest is shown in Figure 1, with a more detailed location shown in Figure 2. The Lonesomehurst Campground well provides water for patrons of the campground. The sanitary survey for the system (Appendix A) indicates an estimated maximum population of 4 residents and 50 nonresidents served daily by the PWS during the operating season. Both the campground and water system are open from about May 15 to September 15 each year.

The public water supply uses one well (Source 002), installed to an approximate depth of 60 feet. The well was completed on 11 July, 1984. The well log (Appendix B) reports a static water level of 10 feet. The MBMG_GWIC ID number is 106737 and the DNRC Water Right number is C058302-00. Water is pumped into the distribution system with a submersible pump. There is no treatment of the water prior to use.

Table 1. Source Well Information Summary

Well	Well 1
Source ID	002
MBMG-GWIC ID#	106737
DNRC Water Right #	C058302-00
Location	44.7349°N Lat 11.2316°W Long
	T13S R4E, Section 3
Total Depth	60 feet
Completion Date	11 July 1964
Perforated Interval	40-60 feet SLOTS
Static Water Level	10 feet
Pumping Water Level	60 feet
Pump Test Rate	20 gpm
Drawdown ; Yield	50 feet ; 0.40 gpm/ft

Hydrogeologic Assessment

The evaluation of the hydrogeology of the area is based predominantly on standard principles of hydrogeology. A generalized geologic map for the area is depicted in Figure 3. Ground water in the area near the Lonsomehurst Campground is present in an unconfined fractured bedrock aquifer. The bedrock is mantled by Tertiary-Quaternary fluvial and glacial sediments; the well log reports 15 feet of obsidian sand overlying granitic bedrock. According to the well log for the PWS well, the well is completed to a depth of 60 feet, and produces from a fractured zone intersected at 55-60 feet below ground surface. Ground water flow in the aquifer is interpreted to generally follow the topographic gradient towards the Madison River and Hebgen Lake, although fractured bedrock systems are less constrained by local topography than other aquifer types. Recharge to the well for the Lonsomehurst Campground PWS is interpreted to occur from infiltration of snowmelt and precipitation in the mountains to the southwest of the PWS. Additionally, some recharge may be contributed by stream loss from the South Fork of the Madison River. Based on the hydrogeologic setting, the Lonsomehurst Campground water source is an unconfined shallow fractured bedrock aquifer, which is considered to have a high source water sensitivity to contamination according to the Montana SWAP Program (DEQ, 1999).

Source Water Protection Management Zones

The source water protection areas for the Lonesomehurst Campground PWS are identified based on the criteria for a transient non-community PWS as defined in the Montana SWAP Program (DEQ, 1999). For the PWS source, two primary management areas are identified within the source water protection area: the control zone and the inventory region. The control zone, also known as the exclusion zone, is delineated as the area within a 100-foot radius around the well. For an unconfined aquifer, the inventory region for the well is delineated as the area within a 1-mile radius around the well (See Figure 4).

Since the aquifer may be in communication with surface water, a surface water buffer zone is delineated as a secondary management zone. The surface water buffer zone represents the area of one-half mile on each side of a stream, within a four-hour time of travel distance not to exceed ten miles upstream from the inventory region. For Hebgen Reservoir, stream flow during a storm event would not exceed ten miles in four hours. Therefore, a 4-hour time to travel is assumed, and the South Arm of Hebgen lake is buffered upstream of the campground. The surface water buffer zone is shown in Figure 4.

Lonesomehurst Campground Sampling Results and Water Quality

Every PWS is required to perform monitoring for contamination to their water supply. The monitoring parameters for transient non-community systems typically include coliforms (as an indicator of pathogenic organisms), and nitrates as an acute health risk. A review of DEQ and USFS databases of monitoring results for the Lonesomehurst Campground PWS shows no health-based violations in the past 10 years. The detected level of nitrates has been consistently less than the drinking water standard of 10 mg/L.

INVENTORY

An inventory of potential sources of acute health hazards was conducted for the Lonesomehurst Campground PWS source within the control and inventory regions. The contaminants in this category represent nitrates and pathogens, as required by the Montana Source Water Protection Program (DEQ, 1999). Potential sources include areas with septic systems and agricultural areas where nitrogen fertilizers may be used. These are shown in Figure 4 and Figure 5. While additional sources of contamination may be present, this assessment only focuses on the above listed potential contaminants.

Inventory Results/Control Zone
The control zone represents the most critical point to protecting the integrity of a wellhead for ground water sources. Vault toilets and the campground loop road are the two potential contaminant sources identified in the control zone. The control zone around the wellhead is not fenced or otherwise protected from access.

Inventory Results/Inventory Region
The inventory region, defined as the area within 1-mile of the wellhead, represents the area near the source well where any contaminant spilled onto the ground or subsurface has the potential to migrate directly into the PWS source aquifer. The only new contaminants identified in the inventory region were the campground access road (see Figure 4,) and fertilizers from nearby agriculture (see Figure 5.) Although private residences are present along the lake, they are not dense enough to pose a major threat to the source aquifer.

Inventory Results/Surface Water Buffer Zone
Land cover within the Surface Water Buffer Zone is divided between forest, shrub land, open water, and agriculture, as shown in Figure 5.

SUSCEPTIBILITY ASSESSMENT

Susceptibility is the potential for a public water supply to draw water contaminated by inventoried sources at concentrations that would pose concern. Susceptibility is assessed in order to prioritize potential pollutant sources for management actions by the Gallatin National Forest, in this case the Lonesomehurst Campground PWS.

The goal of Source Water Management is to protect the source water by controlling activities in the control zones and managing significant potential contaminant sources in the Inventory Regions. Management priorities in the Inventory Regions are determined by ranking the significant potential contaminant sources identified in the previous chapter according to susceptibility.

Susceptibility is determined by considering the hazard rating for each potential contaminant source and the existence of barriers that decrease the likelihood that contaminated water will flow to the Lonesomehurst Campground PWS source. Hazards are assigned based on the percent of land in the inventory region for non-point sources, and the location for point sources. Susceptibility ratings are presented individually for each potential contaminant source.

After the relative hazard of a potential contaminant source is assigned, the relative susceptibility is determined based on the presence of barriers that may mitigate the potential for a contaminant source to impact a water source. Barriers may represent natural conditions, engineered barriers or management actions. Natural barriers include anything that can be demonstrated as effective in slowing the migration of any chemicals released at the surface. Engineered barriers represent man-made structures to contain chemicals if they are released. Management barriers are plans that prohibit or control potentially polluting activities, but only if there is a plan or approach that has been formally implemented. For the Lonesomehurst Campground PWS source, no barriers were identified for the aquifer and well. A management barrier is noted for the vault toilets: the proper maintenance of the facilities.

Susceptibility Assessment Results

The results of the susceptibility assessment for the Lonesomehurst Campground PWS are listed in Table 2. The primary threats identified are the vault toilets and roads. The summary information in Table 2 reviews the relative hazard, barriers and susceptibility ranking of each potential source. Management alternatives are recommended that can help reduce the relative susceptibility of each identified potential contaminant source.

Table 2. Susceptibility assessment of significant potential contaminant sources.

Source	Contaminant	Hazard	Hazard Rating	Barriers	Susceptibility	Management
	Control Zone					
Vault Toilets	Nitrates and Pathogens	Infiltration and Runoff	High	Management	High	Maintain proper operation and maintenance protocols
Campground Loop Road	Various Chemicals	Spills	High	None	Very High	Develop emergency response plan
	Inventory Region					
Vault Toilets	Nitrates and Pathogens	Infiltration and Runoff	High	Management	High	Maintain proper operation and maintenance protocols
Campground Access Road	Various Chemicals	Spills	High	None	Very High	Develop emergency response plan
Agriculture	Various Chemicals and Nitrates	Spills, Infiltration, and Runoff	Low	None	High	Develop emergency response plan
Lake shore septic tanks	Nitrates and Pathogens	Infiltration and Runoff	Moderate	None	High	Develop emergency response plan

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