

*Milford Colony  
Public Water Supply*

*Source Water Delineation and  
Assessment Report (SWDAR)*

*Montana Public Water Supply ID# MT0001646*

**September 2003**



# **Source Water Delineation and Assessment Report (SWDAR)**

## **Milford Colony Public Water Supply**

**Public Water Supply ID# MT0001646**

Highway 2 - 287  
Wolf Creek, Montana 59648

**Phone:** 562-3533



**The University of Montana - Helena**  
COLLEGE OF TECHNOLOGY

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## **List of Acronyms**

BMP - Best Management Practices

CAFO - Confined Animal Feeding Operation

CECRA - Comprehensive Environmental Cleanup and Responsibility Act

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act

LUST - Leaking Underground Storage Tank

MCL - Maximum Contaminant Level

MBMG-GWIC - Montana Bureau of Mines and Geology – Ground Water Information Center

MPDES - Montana Pollutant Discharge Elimination System

NPDES - National Pollutant Discharge Elimination System

PWS - Public Water System.

RCRA - Resource Conservation and Recovery Act

SMCL - Secondary Maximum Contaminant Levels

SWDAR - Source Water Delineation and Assessment Report.

SWPP - Source Water Protection Plan

SWL - Static Water Level

SOC - Synthetic Organic Compounds

TMDL - Total Maximum Daily Load

UST - Underground Storage Tank

VOC - Volatile Organic Compounds

*See glossary at end of text for definitions of acronyms and other terms used in this report*

## 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 Montana SWAP was formally approved by the US Environmental Protection Agency (EPA) 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. For communities that have already developed wellhead protection plans, SWAP revises these plans to meet the expanded requirements. DEQ also works with other groups such as Montana Rural Water Systems, Inc., and Midwest Assistance Programs to implement the program.

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. Milford Colony is classified as a community water system.
- 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.

Source water protection is a common sense approach to guarding public health by protecting drinking water supplies. In the past, water suppliers have used most of their resources to treat water from rivers, lakes, and underground sources before supplying it to the public as drinking water. Source water protection means preventing contamination and reducing the need for treatment of drinking water supplies. Source water protection also means taking positive steps to manage potential sources of contaminants and contingency planning for the future by determining alternate sources of drinking water. Protecting source water is an active step towards safe drinking water; a source water protection program (along with treatment, if necessary) is important for a community's drinking water supply. A community may decide to develop a source water protection program based on the results of a source water assessment, which includes the delineation of the area to be protected and an inventory of the potential contaminants within that area.

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 Montana Source Water Protection Program is responsible for completing delineation and assessment reports for all 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 communities to develop source water protection plans. 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. Although voluntary, source water protection plans are the ultimate focus of source water delineation and assessment.

### **Scope and Purpose**

This report presents the source water delineation and assessments for the public water supply for the Milford Colony located north of Wolf Creek, in Lewis and Clark 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 James Swierc with the University of Montana – Helena (UM-Helena) as part of a cooperative agreement with the Lewis and Clark Water Quality Protection District, using funding provided by the Source Water Protection Program of the Montana Department of Environmental Quality. Kathy Moore with the Lewis and Clark Water Quality Protection District provided support to completion of the report and project.

### **Limitations**

This report was prepared to assess threats to Milford Colony public water supply and is based on published information, and information obtained from local residents familiar with the community. 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.

The term "contaminant" is used in this report to refer to any chemical or biologic constituent in water that are listed as regulated under state and federal regulations. Water constituents are generally regulated based on health effects that may occur when ingested at certain levels. Water quality standards are based on maximum contaminant level goals (MCLGs) for a compound, which represents a concentration where adverse health effects are not considered likely to occur when ingested. However, as natural waters contain many dissolved constituents and MCLGs are frequently not attainable using economically viable water treatment alternatives, maximum concentration levels (MCLs) are used. MCLs represent concentrations that may result in chronic or acute health problems when ingested. MCLs are based on the relative risk, or likelihood that health problems may occur, and economics associated with a treatment technology for a specific

constituent of water. In some cases, sources for constituents with Secondary MCLs are also evaluated in this report. Secondary MCLs are non-regulatory guidelines regarding cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water.

## **BACKGROUND**

### **The Community**

Milford Colony is located 15 miles south of the Town of Augusta, in Lewis and Clark County. The colony is located approximately 45 miles west of Great Falls, and 50 miles north of Helena. Milford Colony is located in a rural area, with a small population in the area. Ranching is the basis of the local economy. The major access road to Milford Colony is US Highway 287, which runs in a general north-south direction west of the colony.

Wastewater in Milford Colony is collected and treated with a wastewater lagoon system. The lagoon is located outside of the main colony area, away from the PWS well.

### **Geographic setting**

Milford Colony is located at approximately 47.330° North latitude and 112.209° West longitude, in Section 11 of Township 18 North, Range 5 West. Milford Colony is located in the Flat Creek watershed (USGS HUC#10030102050), approximately 10 miles northeast of the southern part of the northern Rocky Mountain Front. The area around Milford Colony is predominantly open grassland with intermittent trees, used for ranching. Flat Creek flows in an eastward direction south of the colony towards the Missouri River. The elevation of the colony is 4,220 feet above sea level. The elevation of the Rocky Mountains are as high as 9,000 feet above sea level in the Rocky Mountain Front Range. Surface drainage in the area is to the southeast. The climate in the area is typical for southwestern Montana. Weather data is reported for Augusta, located fifteen miles north of the colony. Data for Augusta is available from 1896 to 2003. Augusta receives an average of 14.02 inches of precipitation annually, with the wettest months in May and June averaging 2.35 and 2.88 inches. The driest months are November through February, with averages between 0.44 and 0.57 inches per month. Augusta receives an average total of 43.1 inches of snowfall per year. The temperature ranges from an average high of 81.9° F in July (minimum July average of 48.2° F) to an average of 34.3° F in January (minimum January average of 9.9° F).

### **General description of the Source Water**

Milford Colony obtains water from one well (Source WL 002) located north of the central part of the colony building area. The well is installed into the Cretaceous Eagle Sandstone underneath the Two Medicine Formation sandstones. Recharge to the artesian or confined aquifer occurs from surface water infiltration and ground water flow from adjacent bedrock units. Ground water in the area is recharged in the higher elevations of the Rocky Mountains, with stream loss feeding the aquifer system in the drainages. Ground water flow in the source aquifer is considered likely to occur in fracture systems in addition to primary porosity. The Flat Creek watershed, considered as the recharge area for the aquifer for this assessment, is depicted in [Figure 2](#).

### **The Public Water Supply**

The most recent sanitary survey for the PWS is from 1991. Water is obtained from one well installed to an approximate depth of 330 feet. The well log for the PWS well is included in Appendix B. The well log indicates the well yields 8 gpm at the surface; however, the colony

maintains a pump in the well. Water is pumped into a 16,000 gallon glass lined tank, which feeds the distribution system with gravity pressure. The sanitary surveys for the system (Appendix A) do not indicate any treatment for the water. Well logs from the MBMG-GWIC database for the PWS well and other wells in the area are included in Appendix B.

### **Water Quality**

Every PWS is required to perform monitoring for contamination to their water supply. The monitoring parameters typically include coliforms (as an indicator of pathogenic organisms), nitrates, metals and multiple chemicals. The monitoring schedule depends on many factors such as the size of the system, the water source for the PWS, the number of sources (e.g. wells), and land use in the area.

A specific monitoring program is designed for each PWS that follows the general protocols for operation of a PWS defined by DEQ following the guidelines originally established in the federal Safe Drinking Water Act. A review of the DEQ PWS database of monitoring results for Milford Colony PWS indicates several monitoring violations during the past few years. There were no significant violations of any drinking water quality standards based on detections of regulated contaminants (Appendix A).

The Montana Bureau of Mines and Geology (MBMG) database (GWIC) was queried for water quality data for the area near Milford Colony. No data is present for any wells within a minimum of a 10 mile radius. The lack of data means that there is no readily available background data for water quality in the Milford Colony area.

## HYDROGEOLOGIC SETTING AND DELINEATION

The source water protection area, the land area that contributes water to Milford Colony PWS, is identified in this chapter. For the PWS sources, three management areas are identified within the source water protection area; the control zone, inventory region, and recharge region. The control zone, also known as the exclusion zone, is an area at least 100-foot radius around the wells. The inventory region for the wells is delineated based on a 1,000 foot buffer around each wellhead. The recharge region represents the area where the aquifer is replenished. For source water protection planning purposes, a one-mile radius around the wellhead is also delineated.

### Hydrogeologic Conditions

There is no readily available information on the hydrogeology of the area near Milford Colony. The source aquifer for the PWS well is the Eagle Sandstone, with water present in artesian conditions in the area. The PWS well is installed to an approximate depth of 330 feet, through sandstones of the Two Medicine Formation. The source aquifer is interpreted to represent a fractured bedrock system which receives recharge in the higher elevations in the Rocky Mountains west of the colony. The fracture system is evidenced by several faults which run through the mountains west of the colony. A geologic map of the Flat Creek Watershed Region showing the major units and faults is shown in [Figure 4](#). Shallow ground water is present in the location of Milford Colony; however, this water yields greater dissolved solids than the deeper PWS well. Water in the system is interpreted to flow generally to the east following topography. Recharge to the Tertiary aquifer occurs from stream loss along the valley margins, direct infiltration of precipitation, and from direct infiltration of water from bedrock aquifers in the subsurface.

### Conceptual Model and Assumptions

A conceptual hydrogeologic model is a simplified representation of the hydrogeologic system. For Milford Colony PWS, water is obtained from a confined aquifer in sandstone. Ground water flow is generally to the east, following topography. Recharge to the aquifer occurs from stream loss from surface drainages, infiltration from precipitation, and from the older bedrock present as a boundary to the aquifer unit in the subsurface. The confined aquifer is considered to be a bedrock aquifer, classified by DEQ (1999) as having a *low* source water sensitivity to contamination.

### Well Information

The well for Milford Colony PWS is located north of the central part of the colony as depicted in [Figure 3](#). A copy of the well log is included in Appendix B. Well information is summarized in Table 1.

### Methods and Criteria

The methods and criteria used to delineate the source water protection zones for Milford Colony water system are specified in the Montana Department of Environmental Quality Source Water Protection Program (DEQ, 1999). The criteria for a confined aquifer system was applied. The control zone was established using a fixed radius of 100 feet around each wellhead. The

**Table 1 - Source Well Information for Milford Colony.**

Information	Well 1
PWS Source Code	002
Well Location	T18N, R5W, Sec 11 BCAA
	Lat 47.3310 N Long 112.2093 W
MBMG/GWIC #	73303
Water Right #	--
Date Completed	23 Apr 1968
Total Depth	335 feet
Perforated Interval	313 – 336 feet
Static Water Level	Artesian flowing well
Pumping Water Level	--
Drawdown	--
Yield	8 gpm
Specific Capacity	--

inventory zone was delineated using a fixed radius of 1,000 feet around each wellhead. The recharge area for the alluvial aquifer is considered to be the entire Flat Creek Watershed above Milford Colony ([Figure 2](#)).

#### **Delineation Results**

The inventory zone of a 1,000 foot radius around the wellhead is depicted in [Figure 5](#). The area within a one-mile radius of the colony is also depicted, to support future source water protection planning efforts.

#### **Limiting Factors**

The lack on data on the local aquifer limits the evaluation of the source aquifer for the wells. The interaction of surface water between the aquifer and surface water systems is not completely understood at this time due to the limited amount of data on the system. In particular, the changes in the flow regime under seasonal conditions of high and low flow are not known. The delineation was completed using conservative assumptions to help ensure that the inventory zone reflects the actual area where contamination to the system may occur. In all cases, the interpretations and conclusions on ground water flow in the aquifer(s) are based on general principles of hydrogeology, and the physical mechanics of ground water flow.

## INVENTORY

An inventory of potential sources of contamination was conducted for Milford Colony PWS source within the control and inventory zones. Potential sources of all primary drinking water contaminants, including pathogens, were identified. However, only significant potential contaminant sources based on criteria outlined in the Montana Source Water Protection Program (DEQ, 1999) were selected for detailed inventory. The inventory for Milford Colony PWS focuses on all activities in the control zones, certain sites or land use activities in the inventory zone, and general land uses and large facilities in the recharge region. The inventory results from the various steps (Appendix E) are summarized in Table 3. The significant potential contaminants in the inventory region for the wells includes nitrates and pathogens from the sewer system lines, from animal waste in the colony barns; and from cropped agricultural land along with herbicides and pesticides.

### **Inventory Method**

The initial inventory steps comprise querying existing state and federal electronic databases for regulated facilities that use, store or release regulated chemicals. The steps to the database searches, and the results from each step are listed in Appendix E. The assessment of agriculture land use and urban areas, and major transportation routes through the area are shown on [Figure 6](#). The limits of the municipal sewer system and relative density of septic systems in the area are shown on [Figure 7](#). The database search is supplemented and verified with a "windshield survey" and a business directory search of the delineated inventory zones for each PWS in the study area. This method helps ensure the inventory is a complete data collection exercise to identify all potential contaminant sources.

The results of the inventory process are summarized in Table 2, which summarizes the potential contaminant sources within the inventory zone study area. The potential contaminants are listed, with a description of the potential release mechanism for the site. In all cases, releases may occur due to unavoidable conditions such as flooding, lightning or fire. The sites where this is the primary potential release mechanism are identified as concerns resulting from such a disaster. For other sites where other release mechanisms may be more common, the potential for a release from such a disaster is assumed.

The results of the "windshield survey" were consistent with the results from database searches, and did not indicate any facilities to review. Storm water in the colony area flows through the normal surface drainage towards Flat Creek. Storm water may be diverted to infiltration holding ponds, which are considered as Class V injection wells that discharge directly to shallow ground water. The evaluation of the use of Class V injection wells in Montana is currently the responsibility of the EPA.

The Montana Source Water Protection Program identifies specific types of potential contaminant sources as significant, for further evaluation of the susceptibility of the water source to these sources. The following categories of potential contaminant sources are considered significant:

1. Large quantity hazardous waste generators.
2. Landfills.
3. Underground storage tanks.
4. Underground injection wells.
5. Major roads or rail transportation routes.
6. Cultivated cropland greater than 20 % of the inventory region.
7. Known groundwater contamination (including open or closed hazardous waste sites, state or federal superfund sites, and UST leak sites).
8. Animal feeding operations.
9. Abandoned or active mines, and gravel pits.
10. Septic systems.
11. Sewer mains.
12. Storm sewer outflows.
13. Wastewater treatment facilities, sludge handling sites, or land application areas.

### **Inventory Results/Control Zone**

The control zone represents the most critical point to protecting the integrity of a wellhead for ground water sources. The control zone for the well is located near the pumphouse for the colony well. The land around the control zone for the wells open, with no fencing or other protection from access. Animal waste from barns or leakage from the sewer system represents potential contaminant sources that may be present within the control zones.

### **Inventory Results/Inventory Region**

The inventory region represents the area near the source wells where any contamination spilled onto the ground or subsurface has the potential to migrate directly into the PWS source aquifer. The potential contaminant sources represent the sewer system, animal barns and any areas where farm agricultural chemical and fuels may be stored. Land use in this area is classified as

**Table 2 - Summary of Inventory Results for Milford Colony PWS.**

<b>Source Type</b>	<b>Potential Contaminants</b>	<b>Description/Concern</b>
<b>Step 1 Results</b>		
<i>Agricultural Land Use</i>	<i>Pathogens and Nitrates; Pesticides and Herbicides</i>	<i>Non-point source pollution, concentration of fertilizers/chemicals in surface/ground water</i>
<i>Sanitary Sewer System</i>	<i>Pathogens and Nitrates</i>	<i>Leakage from sewer lines</i>
<i>Storm Water Discharge Points</i>	<i>Various chemicals</i>	<i>Non-point source releases from urban land use concentrated into point source to ground water.</i>
<b>EPA Envirofacts Sites (Step 2)</b>	<i>No sites identified</i>	
<b>EPA-PCSs Sites (Step 3)</b>	<i>No sites identified</i>	
<b>DEQ Database (Step 4)</b>	<i>No sites identified</i>	
<i>Active USTs</i>	<i>No sites identified</i>	
<i>LUST Sites</i>	<i>No sites identified</i>	
<i>CECRA Sites</i>	<i>No sites identified</i>	
<i>Landfills</i>	<i>No sites identified</i>	
<b>Business SIC Code Search Results* (Step 5)</b>		
<b>Miscellaneous Others, including Step 6</b>		
<i>Major Roads</i>	<i>Spills of various chemicals</i>	<i>Disaster – spill/release of chemicals and fuels transported on Highway</i>
<i>Hog Barns, Dairy Barns, Chicken Barns and Duck house</i>	<i>Pathogens and Nitrates</i>	<i>Disaster – spill/release of animal waste during storage or transportation to land application disposal</i>
<i>Class V Injection Wells</i>	<i>Various chemicals</i>	<i>Direct discharge of chemical to shallow ground water system</i>

predominantly agriculture. A summary of the inventory results of significant potential contaminant sources are listed in Table 3.

**Inventory Results/Recharge Regions**

The recharge region for the wells is the Flat Creek Watershed. The area within the watershed is predominantly national forest land, with a limited amount of agriculture. A limited amount of mining has occurred within the watershed.

**Inventory Update**

The certified operator for Milford Colony PWS will update the inventory every year. Changes in land uses or potential contaminant sources will be noted and additions made as needed. The complete inventory will be submitted to DEQ every five years to ensure re-certification of the source water delineation and assessment report.

**Inventory Limitations**

The inventory is limited by the accuracy of information in databases used for the assessment. The windshield survey provides a level of quality assurance that the information presented reflects current conditions at the time of preparation of this report. The location of Class V injection wells is not complete at this time, and is currently being compiled by EPA for the area. The data from the MBMG-GWIC database on wells in the area may not be complete, as not all wells are included in the database.

**Table 3. Significant potential contaminant sources for Milford Colony PWS.**

<i>Source</i>	<i>Contaminants</i>	<i>Description</i>
<i>Agricultural Land Use</i>	<i>Pathogens and Nitrate; Pesticide/Herbicides (SOCs)</i>	<i>Primary concern in cultivated and grazing lands in Flat Creek watershed upstream from well</i>
<i>Sanitary Sewer Main</i>	<i>Pathogens and Nitrate</i>	<i>The colony area is sewerred, within the inventory zone for the well. Concern from leaks and backfill around sewers providing a preferred conduit for other contaminants to migrate.</i>
<i>Storm Water Discharge Points</i>	<i>Various organic chemicals</i>	<i>Not inventoried at this time</i>
<i>Major Roads</i>	<i>Various Chemicals</i>	<i>Transportation corridor near PWS well and colony, concern over an accident and spill of any transported chemicals</i>
<i>Animal Barns</i>	<i>Pathogens and Nitrate</i>	<i>Animal waste stored in colony and land applied as fertilizer; concern over an accident and spill of any stored or transported waste</i>
<i>Class V Injection Wells</i>	<i>Various organic chemicals</i>	<i>Not inventoried at this time (EPA responsibility); may provide conduits for chemicals into subsurface</i>

## 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 local entities, in this case Milford Colony PWS.

The goal of Source Water Management is to protect the source water by 1) controlling activities in the control zone, 2) managing significant potential contaminant sources in the Inventory Region, and 3) ensuring that land use activities in the Recharge Region pose minimal threat to the source water. Management priorities in the Inventory Region are determined by ranking the significant potential contaminant sources identified in the previous chapter according to susceptibility. Alternative management approaches that could be pursued by Milford Colony PWS to reduce susceptibility are recommended.

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 Milford Colony PWS source (Table 4). Susceptibility ratings are presented individually for each significant potential contaminant source and each associated contaminant (Table 6). The susceptibility of each well to each potential contaminant source is assessed separately.

***Table 4 - Relative susceptibility to specific contaminant sources as determined by hazard and the presence of barriers.***

Presence Of Barriers	Hazard		
	High	Moderate	Low
No Barriers	Very High Susceptibility	High Susceptibility	Moderate Susceptibility
One Barrier	High Susceptibility	Moderate Susceptibility	Low Susceptibility
Multiple Barriers	Moderate Susceptibility	Low Susceptibility	Very Low Susceptibility

For confined aquifers, hazards for point sources are assigned based on the presence of other wells in the inventory zone, and how the PWS well and other wells in the area are constructed. If the PWS well does not have a proper seal through the confining layer, than the relative hazard for any potential contaminant source within the 1,000-foot inventory area is assigned a relative hazard of high, and those within the three year time of travel distance are assigned a relative hazard of moderate. If the PWS well has a seal through the confining layer, but other wells are present in the 1,000-foot inventory zone that do not have a seal, then the relative hazard is moderate for point sources in this area and low for potential sources within the three year time of travel area. If all wells in the inventory region have effective seals through the confining layer, then the relative hazard is considered low for point sources within the 1,000-foot inventory area, and very low for other sources within the three year time of travel area.

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 mitigating the migration of any chemicals released at the surface, such as thick clay-rich soils or surface flowing artesian conditions. Engineered barriers represent man-made structure to contain chemicals if they are released, such as spill containment for underground storage tanks. 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 Milford Colony PWS sources, no natural or other barriers were identified.

For non-point sources, the relative hazard is assigned based on the relative concentrations present within the delineated inventory zone for the aquifer, following the criteria listed in Table 5.

**Table 5 – Relative Hazards for Non-Point Potential Contaminant Sources**

<i>Source Type</i>	<i>High Hazard</i>	<i>Moderate Hazard</i>	<i>Low Hazard</i>
Septic Systems	> 300 per sq. mi.	50 – 300 per sq. mi.	< 50 per sq. mi.
Municipal Sanitary Sewer (% Land Use)	> 50% of region	20% – 50% of region	< 20% of region
Cropped Agricultural Land (% Land Use)	> 50% of region	20% – 50% of region	< 20% of region

### **Susceptibility Assessment Results**

The results of the susceptibility assessment for Milford Colony PWS are listed in Table 6. The PWS well is considered to be constructed with a proper seal; however, there are potentially wells located in the inventory zone that were not constructed properly, prior to the existing standards for domestic wells. As a result, there may be wells in the management areas that do not have proper sanitary seals that can act as conduits for vertical migration of contaminated surface and shallow ground water down the wellbore. Information on the wells, owned by Milford Colony, is included in Appendix B. The primary threats identified within the inventory zone are agricultural land use, the barns and the sewer system. Based on the information on wells in the management zones, the potential susceptibility of the wells to these sources is classified as moderate to contamination from each of these sources. The location of the roads within the area represent potential threats with a moderate to low susceptibility rating, where an accidental spill or leak could impact water quality in the source aquifer.

The summary information in Table 6 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 to the PWS sources.

**Table 6. Susceptibility assessment of significant potential contaminant sources.**

Source	Contaminant	Hazard	Hazard Rating	Barriers	Susceptibility	Management
<b>Control Zone</b>						
Sewer System (potentially)	Pesticides/ Herbicides/ Nitrates and Pathogens	Infiltration and Runoff	High	None	Very High	Monitor system performance; connect to sanitary system if/when possible
<b>Inventory Zone</b>						
Agricultural Land	Pesticides/ Herbicides/ Nitrates and Pathogens	Infiltration and Runoff	Moderate	None	High	Promote the use and development of agricultural BMPs for the area
Sanitary Sewer Main	Pathogens and Nitrate	Infiltration and Runoff	Moderate	None	High	Monitor integrity of sewer lines
<b>Recharge Area (Flat Creek Watershed)</b>						
Cropped Agricultural Land	Pesticides/ Herbicides/ Nitrates and Pathogens	Infiltration and Runoff	Low	None	Moderate	Promote the use and development of agricultural BMPs for the area
Major Roads	Various Chemicals	Spills	Low	None	Moderate	Develop emergency response plan

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