

# CITY OF FAIRMONT

## SOURCE WATER ASSESSMENT

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### PART I

#### INTRODUCTION

The 1996 Amendments to the federal Safe Drinking Water Act (SDWA) require the Minnesota Department of Health (MDH) to complete source water assessments for public water systems.

The requirements of the SDWA addressed herein are intended to provide Fairmont drinking water customers with 1) a general description of the area which supplies water to the Fairmont Water Department; 2) an overview of why this water supply is susceptible to potential contaminants; 3) a description of the contaminants of concern which may impact the users of the public water supply; and 4) to the extent practical, the origins of the contaminants of concern.

The MDH, with the assistance of the Fairmont Water Department, assembled a team that developed the information herein. The source water assessment team included resource persons representing the following agencies: Fairmont Water Department, Martin County Environmental Services, Martin County Soil and Water Conservation District, Blue Earth River Basin Initiative, U.S. Department of Agriculture Natural Resource Conservation Service, Minnesota Pollution Control Agency (MPCA), Minnesota Department of Natural Resources (DNR), Minnesota Department of Agriculture, University of Minnesota Extension Service for Martin County, and MDH.

Over the past few years there has been a diverse group of interests discussing water quality issues within the Dutch Creek Watershed. This interest has led to efforts by city, county, and citizen groups to systematically collect surface-water quality data from selected sites and begin educational outreach programs to interested parties.

## STATUS OF THE SOURCE WATER PROTECTION AREA

Although not a requirement of the SDWA, the city of Fairmont intends to use this source water assessment as the basis and framework for the development and implementation of a source water protection plan. A cooperative approach is beneficial because the public water supplies for Fairmont are drawn from the Dutch Creek and Southern Chain of Lakes Watersheds. Future efforts to develop and implement a source water protection plan will require the cooperation of various federal, state, and local units of government and interested parties within the watershed.

## DESCRIPTION OF THE SOURCE WATER

The water supply for the city of Fairmont is primarily from Dutch Creek and Southern Chain of Lakes Watersheds with additional contributions from the minor subwatersheds within the city of Fairmont. The water intake and water treatment plant are located on Budd Lake in Fairmont. The watershed above the city's water intake is approximately 40.9-square miles. Typical usage from Budd Lake by the Fairmont Water Department is 2.3 million gallons per day, while flow through Budd Lake under normal climatic conditions is approximately 11.2 million gallons per day.

## SOURCE WATER SENSITIVITY

In determining the sensitivity of a source water, the intrinsic physical properties of the geologic setting or landscape within the watershed must be considered. Variations in seasonal stream flow can influence the sensitivity of the lake system to contamination. Other factors influencing the sensitivity of a surface-water body include topography, hydrology, geology, vegetation, and distribution of various soil types within the watershed. The closer the source of contamination is to the intake the greater the impact will be on the quality of the water used by the city of Fairmont based on the factors listed in this section. The farther the contaminant is from the intake the factors described in this section will help attenuate the movement of contaminants to the intake.

## SOURCE WATER ASSESSMENT AREA

The source water assessment area for the city of Fairmont includes two distinct areas. The **inner-emergency response area** is designed to help the city of Fairmont address contaminant releases which present an immediate (**acute**) health concern to water users. This geographic area is defined by the amount of time the city of Fairmont needs to be notified, shut off the surface-water intake, and a "buffer" to accommodate unanticipated delays in notification and shut down. The **outer source water management area** is the remainder of the watershed flowing into Budd Lake and is designed to protect water users from long-term (**chronic**) effects related to periodic low levels of chemical contamination or other contaminants in the surface water used by the city of Fairmont. Also, this area should protect users from contaminants such as pathogens which may be 1) usually present at treatable levels in the source water and 2) occasionally present an acute health concern under certain conditions, such as low flow conditions in the Dutch Creek and Southern Chain of Lakes systems.

The **inner-emergency response area**, as shown in Figure 1, can be described primarily as urbanized subwatersheds adjacent to Hall Lake and Budd Lake.

The **outer source water management area**, also shown in Figure 1, can be described as those small subwatersheds that flow directly into the inner-emergency response area and the remainder of the entire watershed.

The **entire watershed**, shown in Figure 1, is the Dutch Creek Watershed, Southern Chain of Lakes Watershed, and urban subwatersheds which flow into Hall Lake and Budd Lake. This area includes the inner-emergency response area and the outer source water management area. Designation of the **entire watershed as the source water area** provides the water supplier with a broad perspective in which to prioritize management efforts toward specific lands uses that may impact water quality within the source water area.

## PART II

### POTENTIAL CONTAMINANTS OF CONCERN

The contaminants of concern are those regulated under the federal SDWA. They are divided into organic chemicals, inorganic chemicals, radionuclides, and microorganisms. A listing can be found at: <http://www.epa.gov/safewater>. Of greatest concern are petroleum products; pesticides; microorganisms, such as *cryptosporidium* and *giarda*; and plant nutrients, such as nitrate-nitrogen and phosphorus that may create health and/or aesthetic concerns. The Fairmont Water Department has also identified pharmaceuticals and endocrine disrupting chemicals as emerging issues. These types of potential contaminants are not well understood at this time.

### SOURCES OF CONTAMINANTS

To the extent practical, the table below is a listing of point sources of contamination and an **estimate** of the numbers of each type located in the **inner-emergency response area** and the **outer source water management area**.

#### INVENTORY OF POTENTIAL CONTAMINANT SOURCES

AREA	TOTAL	GENERAL TYPE OF POTENTIAL SOURCE
Inner Emergency Response Area	27	Individual Sewage Treatment Systems
Inner Emergency Response Area	< 5	Acres Designated for Manure Application
Inner Emergency Response Area	24	Fairmont Storm Sewer Outlets into Lakes
Inner Emergency Response Area	6	Fairmont Storm Sewer Outlets into Sloughs
Inner Emergency Response Area	12	MPCA Minimal Hazardous Waste Generators
Inner Emergency Response Area	2	MPCA Very Small Hazardous Waste Generators
Inner Emergency Response Area	8	MPCA Leaking Above/Underground Storage Tanks
Inner Emergency Response Area	2	MDA Licensed Seed, Ag Chem, Feed, Fertilizer, Pesticide
Inner Emergency Response Area	1	MDA Non-Licensed Seed, Ag Chem, Feed
Inner Emergency Response Area	1	MDA Spill Incident Sites
Inner Emergency Response Area	9	Sara Title III Hazardous Waste Sites

Inner Emergency Response Area	3	Boat Landings
Inner Emergency Response Area	4	Highway Crossings
Inner Emergency Response Area	1	Cemeteries
Outer Source Water Management Area	3	National Pollutant Discharge Elimination System
Outer Source Water Management Area	76	Individual Sewage Treatment Systems on Record
Outer Source Water Management Area	37	Martin County Feedlot Permits
Outer Source Water Management Area	10,948	Acres Designated for Manure Application
Outer Source Water Management Area	45	Fairmont Storm Sewer Outlets
Outer Source Water Management Area	1	MPCA Closed Dumps
Outer Source Water Management Area	1	MPCA Salvage Yards
Outer Source Water Management Area	1	MPCA Salvage Yards (Inactive)
Outer Source Water Management Area	39	MPCA Minimal Hazardous Waste Generators
Outer Source Water Management Area	11	MPCA Very Small Hazardous Waste Generators
Outer Source Water Management Area	2	MPCA Small Hazardous Waste Generators
Outer Source Water Management Area	29	MPCA Leaking Above/Underground Storage Tanks
Outer Source Water Management Area	6	MDA Licensed Seed, Ag Chem, Feed, Pesticide, Fertilizer
Outer Source Water Management Area	3	MDA Non-Licensed Seed, Ag Chem, Feed
Outer Source Water Management Area	3	MDA Spill Incident Sites
Outer Source Water Management Area	14	Sara Title III Hazardous Waste Sites
Outer Source Water Management Area	3	Boat Landings
Outer Source Water Management Area	6	Pipeline Crossings
Outer Source Water Management Area	10.15	Pipeline Miles
Outer Source Water Management Area	1	Railroad Crossings
Outer Source Water Management Area	4.7	Railroad Miles
Outer Source Water Management Area	30	Highway Crossings
Outer Source Water Management Area	1	Cemeteries
Outer Source Water Management Area	2	Golf Courses

The potential sources of contamination listed in the table above represent data collected from a number of state and federal data bases. Editing the data sets for duplication and the accuracy of the locations for potential contaminant sources was not possible to perform as part of the preparation of the source water assessment.

To the extent practical, the table on the following page is an estimate of percentages of land uses found within the Fairmont source water assessment area (**inner-emergency response area and outer source water management area**) reflecting non-point sources of potential contamination.

**LAND USE WITHIN THE SOURCE WATER ASSESSMENT AREA  
FOR THE CITY OF FAIRMONT**

<b>LAND USE</b>	<b>OUTER AREA</b>	<b>INNER AREA</b>	<b>OUTER %</b>	<b>INNER %</b>	<b>TOTAL ACRES</b>	<b>TOTAL %</b>
Cultivated Land	24,743	426	98.3	1.7	25,169	75.1
Deciduous Forest	914	29	96.9	3.1	943	2.8
Farmsteads and Rural Residences	426	2	99.5	0.5	428	1.3
Grassland	1,186	63	95.0	5.0	1,249	3.7
Grassland-Shrub-Tree (Deciduous)	24	0	100.0	0.0	24	<0.1
Other Rural Developments	95	0	100.0	0.0	95	0.3
Transitional Agricultural Land	19	0	100.0	0.0	19	<0.1
Urban and Industrial	1,898	1,009	65.3	34.7	2,907	8.7
Water	1,809	781	69.8	30.2	2,590	7.7
Wetlands	78	7	91.8	8.2	85	0.3
<b>TOTALS</b>	<b>31,192</b>	<b>2,317</b>	<b>93.1</b>	<b>6.9</b>	<b>33,509</b>	<b>100.0</b>

Both point sources (such as industrial discharges or hazardous waste generators) and non-point sources (such as runoff from agricultural and urban areas) are present in the **inner emergency response area** and the **outer source water management area**.

In the Dutch Creek and Southern Chain of Lakes Watershed, intensive crop and animal agriculture dominates the land uses. Small portions of the eastern or northern parts of the watershed are dominated by urban land uses.

The water quality of Dutch Creek is monitored and is a significant contributor of contaminants to Hall and Budd Lakes. Forms of pollution in the lakes, and many of its tributaries, include suspended solids, nutrients, oxygen-using materials, pathogenic microorganisms, and several organic and inorganic chemical constituents. An inventory of potential oil and chemical spill sources within the inner emergency response area and outer source water management area indicated more than 158 potential spill sources, including pipeline, highway, and railroad stream crossings; above- and below-ground petroleum and chemical storage tanks; agricultural chemical storage facilities; and hazardous waste storage facilities.

**RESULTS OF MONITORING THE SOURCE WATER**

Source water monitoring results can be found in various state and local programs present in the watershed. Some of those programs include: MPCA's Citizen Lake Monitoring Program and the Total Maximum Daily Load Program (see [www.pca.state.mn.us/water](http://www.pca.state.mn.us/water)); Minnesota Department of Agriculture's assessment of agricultural practices within the source water area (see [www.mda.state.mn.us/appd/ace/fanmap.html](http://www.mda.state.mn.us/appd/ace/fanmap.html)); Martin County Environmental Services' Dutch Creek monitoring; DNR fisheries monitoring; and the MDH's *Department of Health's Fish Consumption Advisory Handbook*. The DNR's website ([www.dnr.state.mn.us/lakefind/index.html](http://www.dnr.state.mn.us/lakefind/index.html)) and Minnesota State University-Mankato, Water Resources Center, website (<http://mrbdc.mankato.msus.edu>) contains water monitoring information collected by various state and local agencies. The public water supplier also provides a continuous monitoring program for finished water.

In addition to the base monitoring conducted on the treated water, a limited study was conducted from spring of 1995 through spring 2000 for synthetic organic chemicals (SOCs) and nitrate-nitrogen. Grab samples from both the raw and treated drinking water were collected during the May to June time period each year. The data from these six years showed SOC's were not a concern. However, the monitoring results did show that nitrate-nitrogen levels would fluctuate after a significant rainfall. Additional surface-water sampling during 2001 of Amber, Budd, and Hall lakes by Martin County Environmental Services indicates nitrate-nitrogen concentrations above the range typically seen in regional lakes, yet these numbers are below the state drinking water standard. Nitrate-nitrogen levels in the lakes dropped throughout the summer months.

Based on water quality parameters used by the MPCA to describe suitability for recreational uses, Amber, Budd, and Hall Lakes would be considered hypereutrophic lakes. Although past monitoring by the MPCA and county of fecal coliform has indicated the presence of fecal coliform. The fecal coliform test cannot be interpreted that human pathogens are either present or absent in the water samples. Most water monitoring upstream of the public water supply intake is generally related to swimmable and fishable goals. A greater emphasis on drinking water standards in the future would be beneficial.

### **SUSCEPTIBILITY OF THE SOURCE WATER TO CONTAMINATION**

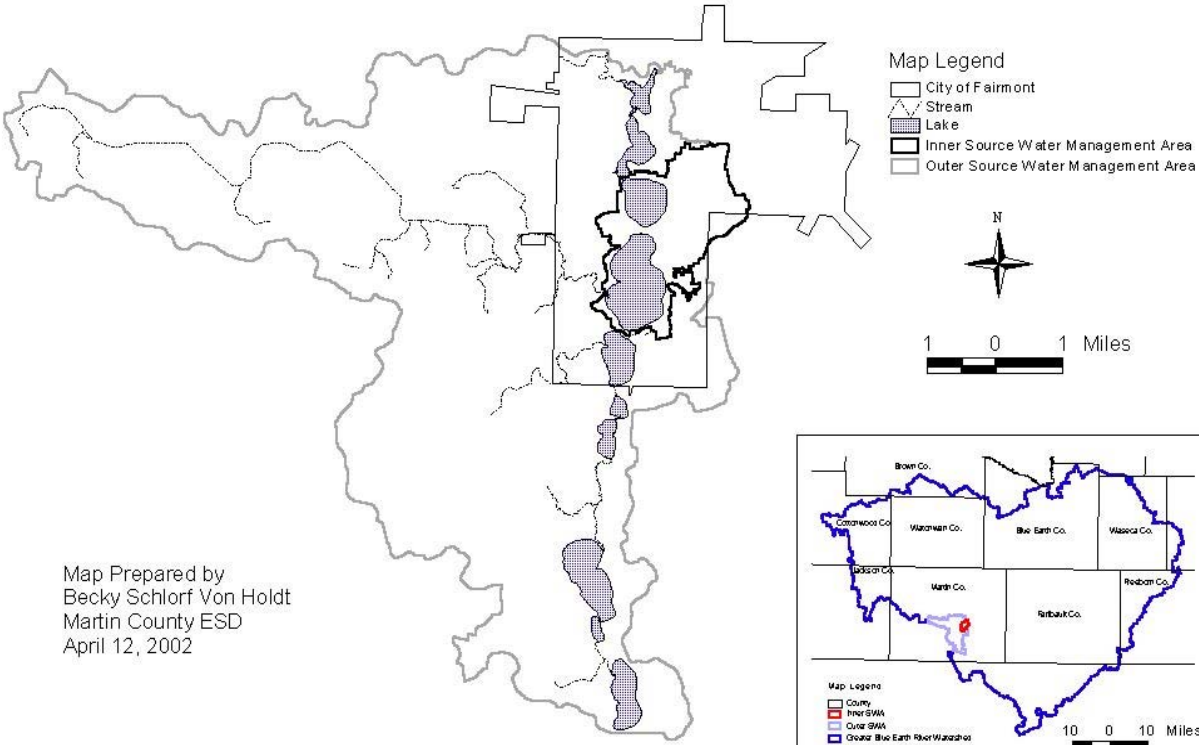
Susceptibility is defined as the likelihood that a contaminant will enter a public water supply at a level that may result in an adverse human health impact. The determination of susceptibility is on a scale of low, medium, and high. The overall susceptibility of any surface water is determined to be high because there is no practical means of preventing all potential contaminant releases into surface waters. However, a susceptibility determination for a specific public water supply system is based on comparing the sensitivity of the surface-water intake to the presence of a source which may release a contaminant of concern. This secondary analysis allows for differentiation between surface-water based public water supply systems. The sensitivity of the source for Fairmont is considered high based on the sensitivity factors. Based on a comparison of the sensitivity of the surface-water intake to the presence of potential contaminant sources, **the susceptibility of the Fairmont Public Utilities water intake is considered to be high for a surface-water based public water supply system.** While it has been determined that the Fairmont source water is highly susceptible to the source water's potential contaminant sources, it is noted that, historically, the city of Fairmont water department has effectively treated this source water to meet drinking water standards.

### **USING THIS ASSESSMENT**

Protecting the drinking water source is a wise and relatively inexpensive investment in the community's future. The overall intent of this assessment is to provide background information for the community to use in developing a local Drinking Water Protection Program. The assessment benefits the community by providing the following:

- ***A basis for focusing limited resources within the community to protect the drinking water source.***  
The assessment provides the community with information regarding activities within the **source water protection area** that may directly affect your water supply.
- ***A basis for informed decision-making regarding land use within the community.***  
The assessment provides the community with a significant amount of information regarding where your drinking water comes from (the source) and what the risks are to the quality of that source. Knowing where the resource is allows communities planning authorities to make informed decisions regarding proposed land uses within the source water assessment area that are compatible with both the drinking water resource and the vision of growth embraced by your community.

# Source Water Management Areas City of Fairmont



**FIGURE 1**  
**SOURCE WATER AREAS FOR THE CITY OF FAIRMONT**