CITY OF HOYT LAKES, MINNESOTA

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 Hoyt Lakes drinking water customers with 1) a general description of the area which supplies water to the Hoyt Lakes water utility; 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 Hoyt Lakes water utility, assembled a source water assessment team to develop this source water assessment. This team included representatives from the Hoyt Lakes water utility, city of Hoyt Lakes, St. Louis County, North St. Louis Soil and Water Conservation District, Minnesota Power, Minnesota Department of Natural Resources, and Minnesota Pollution Control Agency.

STATUS OF SOURCE WATER PROTECTION

Although not a requirement of the SDWA, the city of Hoyt Lakes intends to use this source water assessment as a basis and the framework for the development and implementation of a source water protection plan. Therefore, in conjunction with the MDH and other state and local government agencies, Hoyt Lakes will work to develop a source water protection strategy.

DESCRIPTION OF THE SOURCE WATER

The city of Hoyt Lakes obtains its public water supply from Colby Lake, with two intakes at different depths in the lake to allow for seasonal variations in lake water quality. Colby Lake is located on the north edge of Hoyt Lakes. The lake has a surface area of 539 acres, an average depth of 15 feet, and a maximum depth of 34 feet. The Partridge River flows through Colby Lake, flowing into the eastern end of the lake and flowing out the northwest end of the lake. Colby Lake is flushed approximately twice per year as a result of the flow of the Partridge River through the lake. The water treatment plant has a design capacity of 1.5 million gallons per day—average use is 350,000 gallons per day. The city has storage capacity of approximately 1.9 million gallons. The treatment plant provides approximately 50,000 gallons per day to Minnesota Power for its steam generating needs. Colby Lake also serves as a reservoir for Minnesota Power, which operates a steam electrical generating plant on the west shore of the lake.

Colby Lake is connected to Whitewater Lake, a reservoir constructed to supply water for taconite mining operations which are no longer active. Whitewater Lake, which has a surface area of 1,210 acres, is used by Minnesota Power to maintain the water level in Colby Lake. There is a control structure between Colby and Whitewater Lakes and a control structure at the outlet of Colby Lake. Minnesota Power withdraws water from Colby Lake for "one-pass, non-contact" cooling purposes and discharges this water back into Colby Lake.

Colby Lake is located within the upper portion of the St. Louis River watershed, at the top of the Lake Superior drainage basin. It is located within the Northern Lakes and Forests Ecoregion. Based on Carlson's Trophic Status Index (TSI), the water in Colby Lake is mesotrophic, characterized by moderate levels of nutrients, water clarity, and dissolved oxygen. The TSI value for Colby Lake places it in the 35th percentile of lakes in the Northern Lakes and Forests Ecoregion; meaning that, by the TSI measure, the water quality of Colby Lake is better than that of 35 percent of the lakes in this ecoregion.

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. The large quantities of water in Colby and Whitewater Lakes, the movement and mixing of water in the lake, and the flow of the Partridge River through Colby Lake help reduce contaminant concentrations. Other factors influencing the sensitivity of a surface-water body include topography, hydrology, geology, vegetation, and the distribution of various soil types within the drainage basin of Colby and Whitewater Lakes. The closer the source of contamination is to the intake the greater the impact on the quality of the water used by Hoyt Lakes. The further the source of contamination is from the intake the more likely that the influence of such contamination on the public water supply will be reduced through dilution and lake water movement.

SOURCE WATER ASSESSMENT AREA

The source water assessment area for the city of Hoyt Lakes includes two distinct nested areas. The inner emergency response area is designed to help the city address contaminant releases which present an immediate (acute) health concern to water users. This geographic area is defined by the amount of notification time the city needs to close the surface intake and a "buffer" to accommodate unanticipated delays in notification and shut down.

The outer source water management area is designed to enable protection of water users from long-term (chronic) health effects related to low levels of chemical contamination or the periodic presence of contaminants at low levels in the surface water used by the city. This area is intended to enable protection of users from contaminants that may 1) be usually present at treatable levels in the source water and 2) occasionally present an acute health concern under certain conditions, such as periods of high runoff or storm events. The establishment of this area also recognizes the potential for future development that may influence source water.

U.S. Environmental Protection Agency guidelines suggest including the entire watershed beyond the outer source water management area up to the state boundaries in a source water assessment. If potential contaminant sources of concern are identified outside of the first two areas at a later date, the boundaries of the assessment areas can be modified to address them. This approach to designating a source water assessment area may need to be modified as circumstances dictate. This is the case for the city of Hoyt Lakes. The geographic area beyond the outer source water management area for Hoyt Lakes was not included because 1) the watersheds for Colby and Whitewater Lakes extend so close to the Laurentian Divide that they effectively reflect local surface-water drainage areas, and 2) the area north of the Hoyt Lakes watershed has been substantially disturbed by recent taconite mining and local watershed designations do not reflect current topographic controls.

The inner emergency response area for Hoyt Lakes is shown in Figure 1. The inner emergency response area is bounded on the south by County Road 110 (Kennedy Drive) through Hoyt Lakes, following a line from this road at the west end of town northwest across Colby Lake to a point on the northwest shore of the lake just west of the Minnesota Power generating plant, then extending northeast across the DM&IR railroad tracks and extending eastward on the north side of the railroad tracks to the Colby Lake sub-watershed boundary just east of the lake, and then following this boundary south to its intersection with County Road 110 at the east edge of Hoyt Lakes. This area encompasses the northern portion of Hoyt Lakes, including the shopping center and main street through town, most of the northern and eastern shoreline of Colby Lake, and Minnesota Power generating plant on the west side of Colby Lake.

Figure 1 also shows the outer source water management area for Hoyt Lakes. The boundary for this area generally follows the boundary of the sub-watersheds for Colby and Whitewater Lakes. This area was further defined by the source water assessment advisory committee to include the area east of Hoyt Lakes, along the DM&IR railroad track crossing of the Partridge River and Wyman Creek. This area includes the:

1) municipal golf course east of town;
2) portion of the city of Hoyt Lakes south of County Road 110, which drains into Whitewater Lake; and
3) area north of Hoyt Lakes near the Laurentian Divide that has been disturbed by taconite mining.

PART II

POTENTIAL CONTAMINANTS OF CONCERN

The contaminants of concern are the contaminants regulated under the federal SDWA that are listed in the "National Primary Drinking Water Standards." They are divided into organic chemicals, inorganic chemicals, radionuclides, disinfection byproducts, and microorganisms. A listing can be found at: *http://www.epa.gov/safewater*. Of greatest concern to the Hoyt Lakes water supply are fertilizer and pesticide runoff, potential oil and chemical runoff and spills into the lake, chemicals commonly associated with stormwater runoff, leachate from septic systems, and possible landfill leachate.

SOURCES OF CONTAMINANTS

Both point sources and nonpoint sources of potential contaminants are present in the source water assessment area for Hoyt Lakes. Specific concerns relative to the Hoyt Lakes water supply are fertilizers and pesticides from the golf course and shoreland development around Colby Lake; potential leachate from possible septic systems from the future residential development around Colby Lake (most of which is now sewered); oils and chemicals associated with Minnesota Power's generating plant on Colby Lake; railroad tracks adjacent to north side of Colby Lake, which also cross the Partridge River and Wyman Creek and the railroad spur to Minnesota Power's generating plant; stormwater drainage from Hoyt Lakes into Colby and Whitewater Lakes; and the closed and capped landfill on the northeast end of Colby Lake. Mining of metals in sulfide deposits upstream of Colby Lake is a future possibility, in which case runoff and discharges from such a facility could be a source of metals and other potential contaminants upstream of Colby Lake.

To the extent practical, Table 1 below contains a listing of potential point sources of contamination located in the inner emergency response area and the outer source water management area for Hoyt Lakes. The potential sources of contamination listed in the table represent data collected from a number of state and federal data bases. Due to the number of data sets involved in preparing this table, some duplication is possible. Many of the data files do not contain accurate locational information for potential contaminant sources. Editing the data sets for possible duplication and locational accuracy was not possible to perform as part of the preparation of this source water assessment.

TABLE 1
INVENTORY OF POTENTIAL CONTAMINANT SOURCES

GENERAL TYPE OF CONTAMINANT SOURCE	TOTAL
Agricultural Site Unknown	2
Air Release Site	2
Bridge	5
Dam	2
Golf Course	1
Hazardous Waste Generator	11
Historical Site	1
Hotel/Motel	1
Leaking Underground Storage Tank	18
National Discharge Elimination System Permitted Site	3
Pipeline Facility	4
Registered Storage Tank	10
School	1
Solid Waste Permitted Site	2

Since Colby and Whitewater Lakes are located at the top of the St. Louis River basin and Lake Superior watershed, most of the available information describing the basin and watershed does not apply to the watershed upstream of Hoyt Lake's water supply.

Table 2 contains a description of land uses within the inner emergency response area and outer source water management area for Hoyt Lakes.

TABLE 2
LAND USES WITHIN THE HOYT LAKES INNER EMERGENCY RESPONSE AREA AND OUTER SOURCE WATER MANAGEMENT AREA

DESCRIPTION	ACRES
Open Water	1,728
Low Intensity Residential	186
High Intensity Residential	52
Commercial/Industrial/Transportation	190
Quarries/Strip Mines/Gravel Pits	1,821
Barren Transitional	11
Deciduous Forest	4,957
Evergreen Forest	1,668
Mixed Forest	2,024
Grasslands/Herbaceous	74
Pasture/Hay	242
Row Crops	317
Urban/Recreational Grasses	55
Woody Wetlands	2,784
Emergent Herbaceous Wetlands	178
TOTAL ACRES	16,287

RESULTS OF MONITORING THE SOURCE WATER

Source water monitoring results can be found in the various programs conducted in the Lake Superior Basin. These programs include the Minnesota Pollution Control Agency's water quality programs, Minnesota Department of Natural Resources' fisheries and water monitoring, county water planning, MDH's Fish Consumption Advisory Handbook, and Clean Water Partnership diagnostic studies.

Colby Lake (DNR Lake ID No. 69-0249) has been monitored by the Minnesota Pollution Control Agency as part of the Lake Assessment Program. Monitoring information for Colby Lake can be accessed at the website for this program: *http://www.pca.state.mn.us/water/lakereport.html.*

Colby Lake is bog-stained, due to the upstream drainage of bogs by the Partridge River and Wyman Creek. Consequently, the coloration level in Colby Lake raw water is higher than the U.S. Environmental Protection Agency's secondary drinking water color standard. However, secondary standards are non-enforceable guidelines that relate to cosmetic or aesthetic effects and not health effects.

The following websites provide access to information produced by various monitoring programs:

Minnesota Pollution Control Agency: *http://www.mpca.state.mn.us*
U.S. Environmental Protection Agency: *http://www.epa.gov/storet*

The Minnesota Pollution Control Agency's Lake Superior Basin Information Document contains a general description of water quality in the upper portion of the St. Louis River watershed area.

Most water quality monitoring programs are conducted for purposes other than drinking water protection. A greater emphasis on drinking water standards in the future would be beneficial to public water suppliers. Results of monitoring have verified the presence of many potential contaminants in the source water, all of which have been adequately treated by the water treatment plant. The public water supplier also conducts a monitoring program for raw and finished water.

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 which may result in an adverse human health impact. The determination of susceptibility by the U.S. Environmental Protection Agency is on a scale of low, medium, and high. The susceptibility of any surface-water source, such as Colby Lake, is determined to be high because there is no practical means of preventing all potential contaminant releases into surface waters. The federal SDWA recognizes the susceptibility of surface waters and requires filtration to remove pathogens and particulate contaminants. The susceptibility of the Hoyt Lakes surface-water intake to contamination is classified as high.

While it has been determined that Hoyt Lake's source water is highly susceptible to contaminants found in the lake, historically the city's water plant has effectively treated this source water to meet safe drinking water standards. However, water suppliers are being increasingly challenged to comply with new and changing standards and to respond to changing land uses and conditions within their source water assessment areas.

USING THIS ASSESSMENT

Protecting the drinking water source is a wise and relatively inexpensive investment in Hoyt Lake'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 Hoyt Lakes area to protect the drinking water source.*** The source water assessment provides the community with information regarding activities within the source water assessment area that may directly affect its water supply.

- ***A basis for informed decision-making regarding land use within Hoyt Lakes and St. Louis County.*** The assessment provides the community with information regarding the source of its drinking water and the contaminant threats to the quality of that source. Knowledge of the character and location of the resource allows planning authorities to make informed decisions regarding land uses within the source water assessment area that are compatible with protecting drinking water resources.

- ***A basis for developing a source water protection plan for the source water used by Hoyt Lakes.*** The input provided by the local source water assessment team has started local involvement with the source water protection planning process. Local acceptance of the initial source water assessment helps start protection efforts because there is already recognition of the areas that need to be addressed and the general types of potential contaminant sources that need to be addressed.

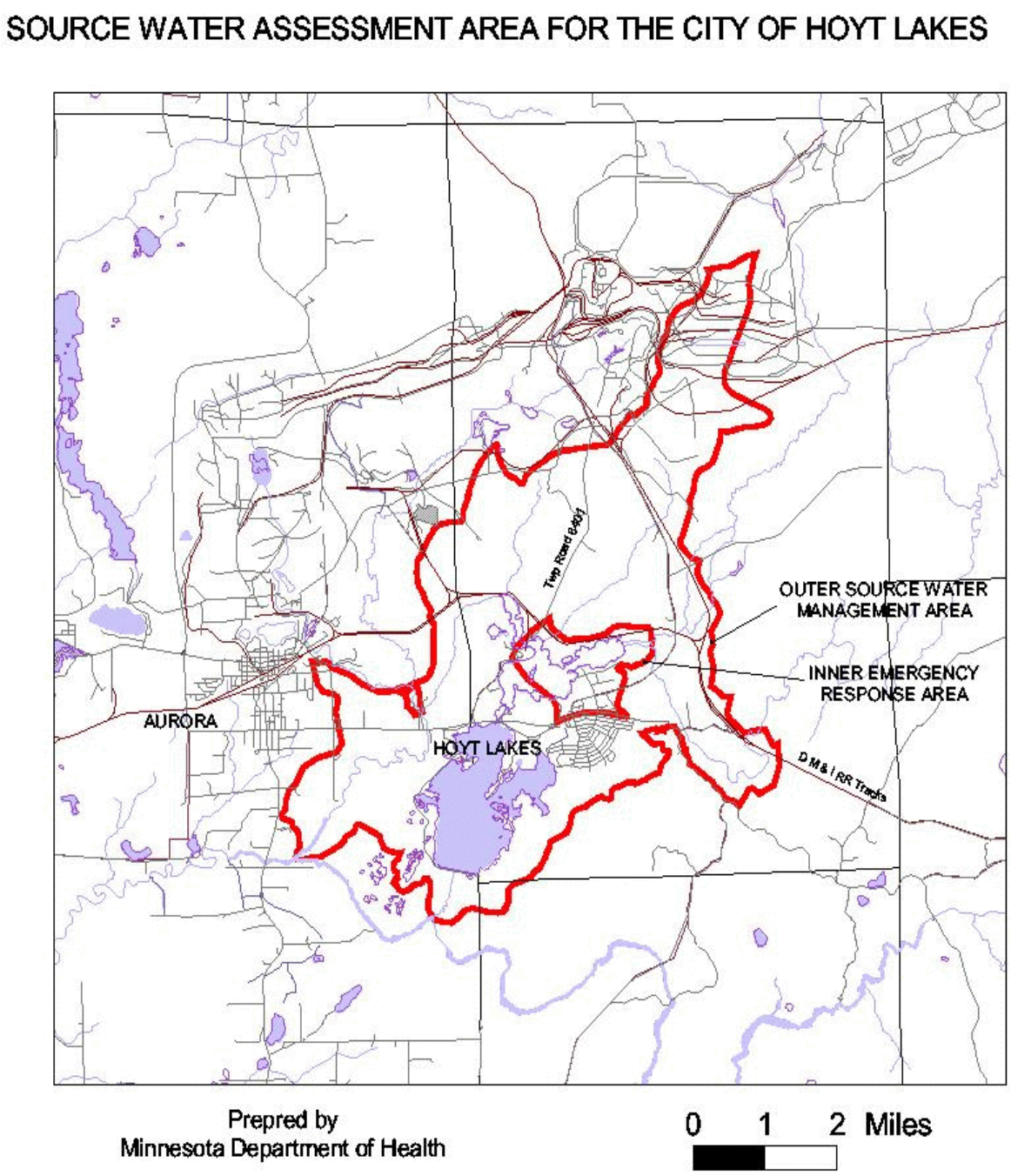

FIGURE 1
SOURCE WATER ASSESSMENT AREA FOR THE CITY OF HOYT LAKES