CITY OF McKINLEY, MINNESOTA

SOURCE WATER ASSESSMENT

PWSID 1690033

Facility Contact:

Mr. Dan Kedrowski
Water Superintendent
City of McKinley
5495 First Avenue East
McKinley, Minnesota 55741
Telephone: 218-749-2115

Minnesota Department of Health Contact:

Ms. Beth Kluthe
Minnesota Department of Health
1819 Bemidji Avenue
Bemidji, Minnesota 56601
Telephone: 218-755-4173
Email: beth.kluthe@health.state.mn.us

PART 1

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 supply systems.

The requirements of the SDWA addressed herein are intended to provide McKinley drinking water customers with 1) a general description of the area which supplies water to the McKinley 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 McKinley water utility, assembled a source water assessment team to develop this source water assessment. This team included representatives from the McKinley water utility, the city of McKinley, St. Louis County, St. Louis Soil and Water Conservation District, the Minnesota Department of Natural Resources, and the Minnesota Pollution Control Agency.

STATUS OF SOURCE WATER PROTECTION

Although not a requirement of the SDWA, the city of McKinley 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, McKinley will work to develop a source water protection strategy.

DESCRIPTION OF THE SOURCE WATER

The city of McKinley obtains its public water supply from the Corsica iron ore pit, which is located approximately one-quarter mile southwest of McKinley. Although the water level in the Corsica Pit has risen in the past, it has fallen approximately three feet in the past two or three years. The water treatment plant has a pumping capacity of approximately 40,000 gallons per day. Average demand is approximately 15,000 - 20,000 gallons per day. McKinley has a water storage capacity of approximately 75,000 gallons.

Property around the Corsica Pit is currently owned by the State of Minnesota and other fee owners. There is currently no development around the pit. The Corsica Pit is located within the upper portion of the St. Louis River watershed, at the top of the Lake Superior drainage basin, less than one mile south of the Laurentian Divide.

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 volume of water in the Corsica Pit (a water depth of 400-600 feet) helps to attenuate contaminant concentration and also affects the movement of contaminants to the public water supply intake. Other factors influencing the sensitivity of a surface water body include topography, hydrology, geology, vegetation, and the distribution of various soil types within the subwatersheds of the Corsica Pit. The closer the source of contamination is to the intake, the greater the impact on the quality of the water used by McKinley. 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 attenuated through dilution and water movement.

Although new mining activities in the vicinity of the Corsica Pit are not currently anticipated in the foreseeable future, any such activities could significantly influence the water level in the Corsica Pit.

SOURCE WATER ASSESSMENT AREA

The source water assessment area for McKinley contains an inner emergency response area and an outer source water management area. 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 found 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 the source water.

The inner emergency response area for McKinley is shown in Figure 1. This area is the surface watershed surrounding the Corsica Pit that drains directly into the pit. The surface watershed surrounding the Corsica Pit was delineated by the Minnesota Department of Natural Resources (DNR). This drainage area has been influenced by past mining activities in and around the Corsica Pit. The boundary of the inner emergency response area is within several hundred feet of the Corsica Pit on the east and south, and extends approximately one-quarter mile to the west and north of the pit. The north boundary of the inner emergency response area is formed by the two drainage ditches that divert runoff, that would otherwise flow into the Corsica Pit, to the southwest and southeast respectively out of the source water assessment area.

Figure 1 also shows the outer source water management area for McKinley. This area reflects the groundwater divide around the Corsica Pit that has been estimated on the basis of currently available data on 1) surface topography, 2) the configuration of the Biwabik Iron Formation in the area, 3) water levels in surrounding lakes and flooded mine pits, and 4) water levels in surrounding wells. This estimate was produced by MDH staff. The east and northwest portions of the outer source water management area boundary are coincident with the inner emergency response area boundary. The southern and southwestern portion of the outer source water management area extends as much as one-half mile beyond the inner emergency response area boundary. This area includes land that has been disturbed by past iron mining activities. Additionally, taconite mining activities are currently taking place within approximately one-half mile west of the Corsica Pit, within both the inner emergency response area and outer source water management area.

The source water assessment area for a surface water supply in Minnesota typically includes a third area – the entire watershed upstream of the water supply. Because the Corsica Pit is located so closely to the top of the watershed (the Laurentian Divide), the inner emergency response area and outer source water management area encompass the entire upstream watershed of the Corsica Pit. Therefore, the source water assessment area for McKinley is comprised only of the inner emergency response area and outer source water management area.

Delineation of a source water assessment area for a mine pit is problematic, due to the uncertainties associated with the complicated surface water and groundwater hydrology, as well as the interaction between the two systems on the Mesabi Iron Range. Water in mine pits on the Mesabi Range originates from three sources: 1) surface drainage and precipitation into pits; 2) groundwater from surficial drift aquifers; and 3) groundwater from the bedrock aquifer. Groundwater movement can contribute water to, or drain water from, pits and this pattern can change in response to changing water levels in pits. In addition, changes in mining activities on land surrounding pits that serve as public water supplies can drastically influence water levels in pits. Surface water supplies are components of dynamic hydrologic systems, and mine pits are

particularly sensitive to hydrologic changes. Finally, underground mines and related structures that were developed during early mining conducted on the Mesabi Iron Range created the potential for underground hydraulic connections among open pit mines. These underground mines and structures are, for the most part, unmapped and their locations unknown. For these reasons, a source water assessment should be viewed as reflective of conditions and knowledge at a certain point in time, and changing conditions or the acquisition of new data will require corresponding modifications to a source water assessment.

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 McKinley water supply are contaminants that may be associated with past mining activities in the vicinity of the Corsica Pit and current taconite mining by Inland Steel within the western portion of McKinley's source water assessment area.

POTENTIAL SOURCES OF CONTAMINANTS

Point and/or nonpoint pollution sources may be present in the source water assessment area for McKinley. Specific concerns relative to the McKinley water supply are contaminants that may be associated with 1) past mining activities in the vicinity of the Corsica Pit and 2) taconite mining activities currently being carried out by Inland Steel west of the Corsica Pit and within McKinley's source water assessment area, including potential contaminants associated with blasting in the active mining area to the west of the Corsica Pit.

A source water assessment typically includes a table listing potential sources of contamination located in the inner emergency response area and the outer source water management area. These potential sources of contamination are collected from a number of state and federal data bases. A check of these data bases revealed no known potential contamination sources within McKinley’s inner emergency response area and outer source water management area.

Since the Corsica Pit is located at the top of the St. Louis River Basin and the Lake Superior watershed, most of the available information describing the basin and watershed does not apply to the watershed upstream of McKinley's water supply.

Table 1 contains a description of land uses within the inner emergency response area and outer source water management area for McKinley.

TABLE 1
LAND USES WITHIN THE McKINLEY INNER EMERGENCY RESPONSE AREA AND OUTER SOURCE WATER MANAGEMENT AREA

DESCRIPTION	INNER	OUTER
Open Water	51.151	9.118
Low Intensity Residential	0.000	0.890
Commercial/Industrial/Transportation	10.453	5.337
Quarries/Strip Mines/Gravel Pits	18.681	20.460
Barren Transitional	0.445	7.339
Deciduous Forest	301.790	132.103
Evergreen Forest	18.014	0.445
Mixed Forest	201.935	17.124
Shrubland	0.890	18.459
Pasture/Hay	2.446	5.337
Row Crops	4.226	4.448
Woody Wetlands	18.459	2.891
Emergent Herbaceous Wetlands	0.222	1.334
TOTAL ACRES	628.712	225.285

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, the MDH Fish Consumption Advisory Handbook, and Clean Water Partnership diagnostic studies. The Corsica Pit has not been addressed by any of these monitoring programs. The following websites provide access to information produced by various monitoring programs:

The Minnesota Pollution Control Agency: http://www.mpca.state.mn.us
The 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 Environmental Protection Agency is on a scale of low, medium, and high. The susceptibility of any surface water source, such as the water in the Corsica Pit, is determined to be high because there are 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 McKinley surface water intake to contamination is classified as high.

While it has been determined that McKinley's source water is highly susceptible to contaminants found in its source water, historically the city's water plant has effectively treated this source water to meet or exceed 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 McKinley'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 McKinley 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 McKinley.**
  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 informed source water planning efforts for the source water assessment area for McKinley.**

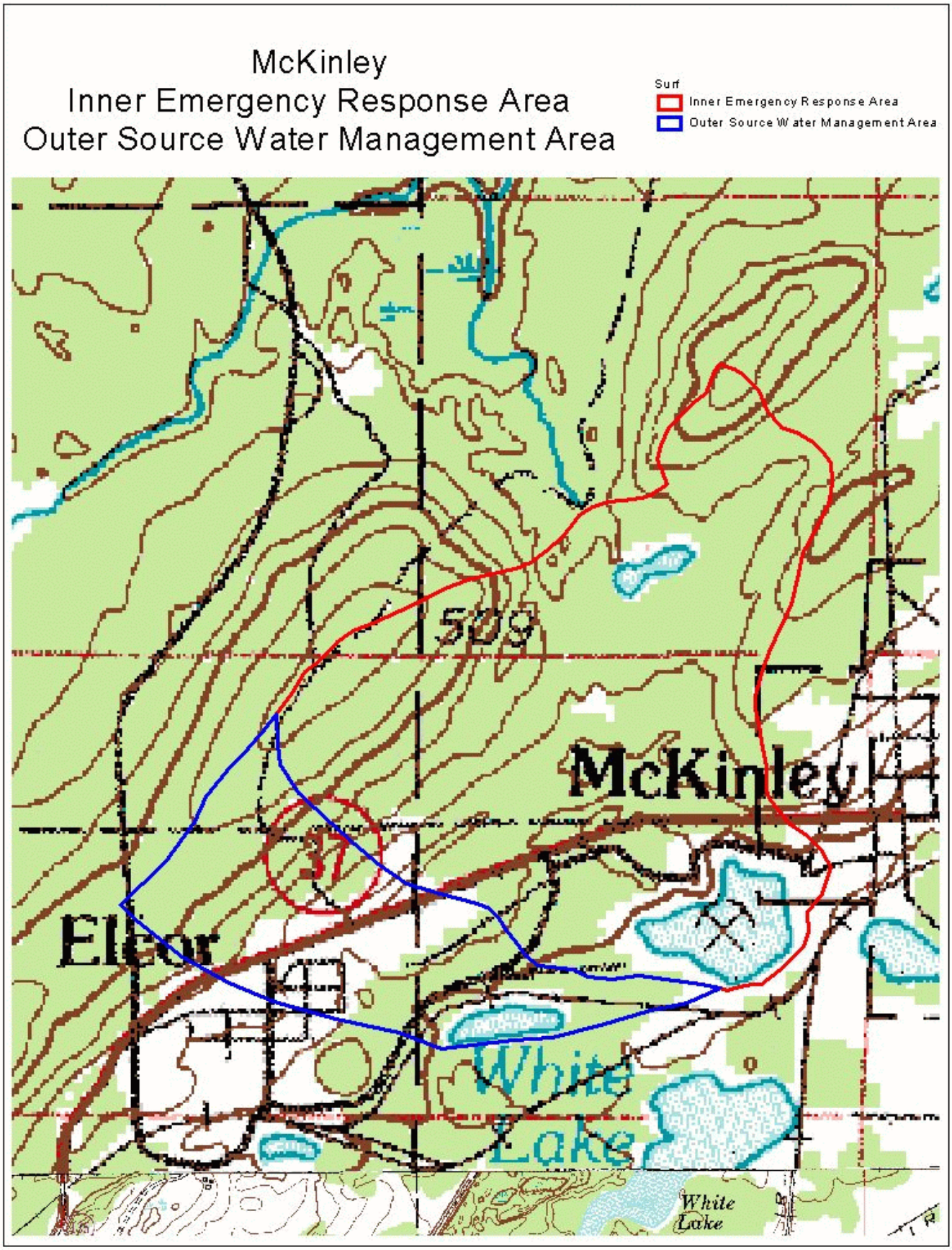
McKinley
Inner Emergency Response Area
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FIGURE 1