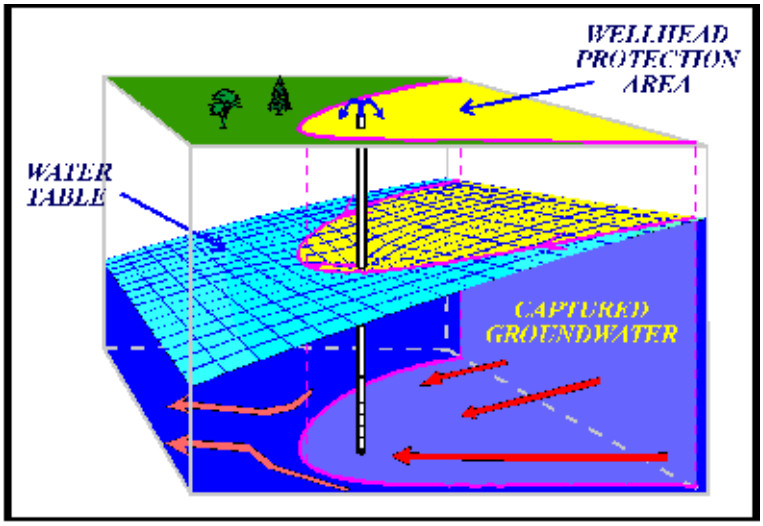
April 2003

City of

Cloquet, Minnesota

WELLHEAD PROTECTION PLAN



Part 2

- **Potential Contaminant Source Inventory**
- **Potential Contaminant Source Management Strategy**
- **Evaluation Plan**
- **Emergency/Conservation Plan**

April 2003

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Abbreviations

AST	Above-ground Storage Tank
BMP	Best Management Practice
CITY	City of Cloquet
DWSMA	Drinking Water Supply Management Area
Extension	University of Minnesota Extension Service
FDL	Fond du Lac Tribe
LGU	Local Governmental Unit
LUST	Leaking Underground Storage Tank
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MNDNR	Minnesota Department of Natural Resources
MNDOT	Minnesota Department of Transportation
MRWA	Minnesota Rural Water Association
NRCS	Natural Resources Conservation Service
PWS	Public Water Supply
PCSI	Potential Contaminant Source Inventory
SWCD	Soil and Water Conservation District
VSQG	Very Small Quantity Generator
WHP	Wellhead Protection
WHPA	Wellhead Protection Area
WHPP	Wellhead Protection Plan
WLSSD	Western Lake Superior Sanitary District

Definitions

Class 5 Injection Well

1. Large Capacity Cesspool

   Typically a drywell with an open bottom and/or perforated sides that receives untreated sanitary waste. A large-capacity cesspool is any residential cesspool used by multiple dwellings, community or regional establishments, or non-residential cesspools that have the capacity to serve 20 or more people.

2. Motor Vehicle Waste Disposal Wells

   Shallow waste disposal systems that receive or have received fluids from vehicular repair or maintenance activities, such as auto body or automotive repair, car dealerships, car washes, or other vehicular repair work.

WATER SUPPLY PROFILE

1. Public Water Supply

City of Cloquet, Minnesota
1307 Cloquet Avenue
Cloquet, Minnesota 55720
Telephone: 218-879-3347
Fax: 218-879-6555
Email: jprusak@ci.cloquet.mn.us

2. Wellhead Protection Manager

James Prusak, Director of Public Works
1307 Cloquet Avenue
Cloquet, Minnesota 55720
Telephone: 218-879-6758
Fax: 218-879-6555
Email: jprusak@ci.cloquet.mn.us

3. Technical Assistance

Dave Neiman, Resource Specialist
Minnesota Rural Water Association
Rt. 2 Box 29
Elbow Lake, MN 56531
Telephone: 218-820-0595
Fax: 218-685-5272
Email: daven@brainerd.net

4. General Information

Unique Well Numbers: 229069 (well #1), 229067 (well #6)
400334 (well #8), 400332 (well #11)
Population Served: 11,201, 2000 US Census
Metered Water Connections: 3500
Township: County: Carlton

5. Wellhead Protection Committee

James Prusak	Public Works Director
Bill Schlenvogt	City Planner
Joan Weyandt-Fulton	Carlton County Water Planner
Tom Hill	Resident
Bob Pokela	Cloquet Planning Commission
Tom Cook	Resident
Ferdinand Martineau	Fond du Lac Band
Katie Larson	Fond du Lac Band

6. Minnesota Department of Health Contact

Beth Kluthe
Source Water Protection Planner
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1819 Bemidji Avenue North
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7. Plan Development

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Wenck Associates, Inc.
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DOCUMENTATION LIST

STEP	DATE PERFORMED
Scoping Meeting II Held: (4720.5349, subp. 1)	**02/27/02**
Scoping Decision Notice Received: (4720.5340, subp. 2)	**03/25/02**
Remaining Portion of Plan Submitted to Local Units of Government (LGU's): (4720.5350, subp. 1 & 2)	_____
Review Received From Local Units of Government: (4720.5350, subp. 2)	_____
Review Considered: (4720.5350, subp. 3)	_____
Public Hearing Conducted: (4720.5350, subp.4)	_____
Remaining Portion WHP Plan Submitted: (4720.5360, subp. 1)	_____
Approved Review Notice Received:	_____
Notice of Plan Implementation sent to LGU's:	_____
Date of WHP Plan Implementation	_____

EXECUTIVE SUMMARY

This portion of the wellhead protection plan for the City of Cloquet includes:

- The results of the Potential Contaminant Source Inventory,
- The Potential Contaminant Source Management Strategy,
- The Emergency/Alternation Water Supply Contingency Plan, and
- The Program Evaluation Plan.

Part 1 of the wellhead protection plan presented the delineation of two separate wellhead protection areas (WHPA), and two corresponding drinking water supply management areas (DWSMA). For reference, the DWSMAs are referred to as the northern (City Well #11) and southern (City Wells #1, #6, #8 and Spring Lake Reservoir) DWSMAs. Part 1 also included the vulnerability assessments for the City's wells and aquifers within the DWSMAs. The first part of the WHP plan was approved on March 29, 2002 by the Minnesota Department of Health.

The **vulnerability assessment for the aquifers within the DWSMAs** using available information indicate that the northern aquifer is moderately vulnerable to contamination due to relatively young age dating of the groundwater (less than 50 years old). However, the aquifer is protected by a thick layer of clay material that overlay the aquifer. Due to this fact, the City's northern aquifer is not vulnerable to most land-uses that may occur within this area, the only land-uses that were necessary to inventory were other private wells that reach or penetrate into the sand aquifer and above and underground storage tanks. The information indicated that the southern aquifer ranges from high to moderate in vulnerability to contamination. The City has chosen to designate the City's southern aquifer as vulnerable to most land-uses that may occur within the area, all land-uses were inventoried and considered in the development of management strategies. This information was relayed to the WHP team during the Second Scoping meeting held with MDH on February 27, 2002 when the necessary requirements for the content of Part 2 were outlined and discussed in detail. Exhibit #1 contains MDH's second scoping letter. The readily obtainable data requested in the second scoping letter is included in this document.

The **vulnerability assessment for the City's wells** indicated that the well in the Northern DWSMA (Well #11) is moderately vulnerable to contamination due to its depth and the information that documented the integrity of the construction of the well and the geological setting of the DWSMA. The City's well is located in sand quaternary deposit that is overlaid with a protected clay layer. The wells in the Southern DWSMA (Wells #1, #6, #8 and Spring Lake Reservoir) are considered vulnerable to contamination due to

their depth and the information that documented the integrity of the construction of the well and the geologic setting of the DWSMA.

The information and data contained in Chapters 1 – 4 of this WHP Plan provide support, and a basis, for the approaches taken in addressing the potential contaminate sources identified in this WHP Plan. These chapters provide the framework for the selection of the management strategies pertaining to all the data collection detailed in Chapter 5.

CHAPTER ONE

DATA ELEMENTS; ASSESSMENT (4720.5200)

I. REQUIRED DATA ELEMENTS

A. Physical Environment Data Elements

1. Precipitation

Precipitation data has been collected and used in the delineation of the WHP area. The precipitation data is included in Exhibit #2. A portion of the DWSMA receives surface water and run off from Otter and Fond du Lac Creeks watersheds. Figure 1 shows the boundaries of the southern and northern WHP / DWSMA. Direct storm water runoff into Otter and Fond du Lac Creeks is a concern since storm water sewers and drainage ditches outlets discharge into these creeks. The plan's management strategies emphasize the importance of protecting these surface waters from impacted runoff.

2. Geology

Wells Nos. 1, 6, 8 and 11 and the Spring Lake Reservoir draw from different portions of a complex package of glacial sediments that rest on top of a hummocky bedrock surface. At the main well field, which is the site of Wells Nos. 1, 6, and 8 and the Spring Lake Reservoir, the package consists of a surficial layer of outwash sand that is widely distributed in the Cloquet area, and a sequence of underlying glacial sediments that includes varying proportions of clay or till and buried sand and gravel horizons. The buried sand and gravel horizons locally appear to be in contact with surficial sand, such as in the vicinity of prominent glacial depositional features such as eskers and kames. The thicker portions of the buried aquifers appear to coincide with low spots on the bedrock surface. It is unclear to what degree the buried aquifers are interconnected at depth. The Spring Lake Reservoir receives water from the surficial sand aquifer. Wells Nos. 1, 6 and 8 draw from deeper portions of the sedimentary package. The glacial stratigraphy at Well No. 11 is dominated by clay-rich till that overlies a buried lens of sand and gravel that rests on the bedrock surface. The buried aquifer used by Well No. 11 appears to be less laterally extensive than those that are at the main well field.

The hydrologic setting of the southern DWSMA (including Wells Nos. 1, 6, 8 and Spring Lake Reservoir) is such that management strategies and the plan of actions will include all potential contaminant sources. The geology of the northern DWSMA (including Well 11) affords more moderate protection to the aquifer the management strategies will include only well sources that penetrate through the overlaying clay till and underground storage tanks.

3. Soils

Soil data has been collected and used in the delineation of the WHP area. Soils deposits are generally well drained sandy and gravely soils that do not limit contaminate migration and infiltration (see Figure 2). Management strategies related to the control and prevention of contaminate releases onto the ground surface are consider important. These management strategies would be less important to the northern DWSMA because of the protection the confining layer provides to the aquifer.

4. Water Resources

An apparent relationship between the City's wells in the southern DWSMA and Otter and Fond du Lac creek watersheds was indicated in Part 1. These surface watersheds were delineated and described in Part 1. The management strategies in the plan of action portion of this plan consider the impacts surface waters and associated riparian areas may have on the management of potential sources of contamination.

Surface water resources are not applicable to the northern DWSMA.

B. Land Use Data Elements

1. Land Use

a. Parcel Boundaries: Exhibit 3 lists the parcels within the boundaries of the City. A parcel map for the City may be viewed at City Hall.

b. The land use within the vulnerable portion of the drinking water supply management area is shown in Figure 3. This current land use includes residential, recreational/park, and some commercial uses. Figure 4 shows the locations of underground storage tanks, wells and other potential contaminant sources in the southern and

northern DWSMAs. These locations were field verified by City staff. The importance and the high priority of management strategies related to commercial and residential land uses as potential contaminant sources were considered in the development of this plan.

c. The comprehensive land use map was updated in 2000 by Carlton County and the City of Cloquet. The City's original Plan from 1956 did not include the areas where the DWSMAs are now located.

d. Figure 5 show the existing City zoning for the DWSMAs.

2. Public Utility Services

a. Transportation routes or corridors: The major transportation routes and corridors through the Southern DWSMA include Highway 33 and Big Lake Road. No major transportation routes or corridors pass through the Northern DWSMA. Highway 33 is heavily utilized for commercial transportation including the transportation of hazardous materials. Figure 6 shows the major transportation routes and corridors within the DWSMAs.

b. The City of Cloquet provided the existing map of storm sewers and its public water supply system (Figure 7). The City utilities do not have a significant potential impact to the DWSMA with the exception of the previously discussed storm water sewers that outfall to surface waters.

c. Williams Pipeline is located through the southeastern edge of the southern DWSMA. No pipelines are located in the northern DWSMA.

d. Locations of public drainage systems were included in Part 1 on a map of the drinking water supply management area. The public drainage systems, as well as the storm sewers of the City, can influence the Otter and Fond du Lac Creek watershed portions of the Southern DWSMA.

e. No other public water wells exist within either DWSMA and there are 118 and 22 other private wells respectively located within the southern and northern DWSMAs (Figures 4).

3. Potential Contaminant Source Inventory

POTENTIAL CONTAMINANT SOURCE	NUMBER	
	Southern DWSMA	Northern DWSMA
AGRICULTURAL RESIDENCE	0	0
NON-AG RESIDENCE	1085	24
SEPTIC SYSTEMS	118	24
WELLS – RESIDENTIAL	118	24
WELLS – IRRIGATION	0	0
WELLS – CLASS 5	0	0
AG CHEMICAL SITES	0	0
CEMETERY	4	0
TRANSPORTATION CORRIDORS - ROADS	Hwy. 33, Big Lake Road	Na
TRANSPORTATION CORRIDORS – GAS LINE	1	0
GRAVEL MINING	0	0
TANKS – LUST	5	0
TANKS – ABOVE / BELOW GROUND	12	0
HAZARDOUS WASTE GENERATORS	2	0
TURF MANAGEMENT SITES (LAWNS)	1	0
AG CROP LAND	0	0
FEEDLOTS	0	0
STORMWATER OUTFALLS	3	0

Exhibit #4 contains a summary of the listed Potential Contaminant Sources.

C. Water Quantity Data Elements

1. Surface Water Quantity

There are no known surface water quantity issues with Otter and Fond du Lac Creeks.

2. Groundwater Quantity

a. Wells covered by state appropriation permits: There were no other wells within the DWSMAs covered by state water appropriation permits, other than the public wells owned and operated by the City of Cloquet.

b. Description of known well interference problems and water-use conflicts: There are no documented well interference problems or water-use conflicts with the City's wells.

c. Existing list of state environmental bore holes: No known state environmental boreholes were located in the DWSMAs.

D. Water Quality Data Elements

1. Surface Water Quality

Otter Creek is a DNR designated trout stream. There does not appear to be any surface water quality data for Otter Creek within the southern DWSMA. Surface water quality data is available down stream of the DWSMA through the MPCA. The Fond du Lac Indian Tribe (FDL) has a water quality-monitoring program for Otter Creek located down gradient of the southern DWSMA. It is anticipated that with cooperation between the City of Cloquet and FDL that this data will be available for review. FDL is also monitoring water quality in First and Second Lakes, which are located within the southern DWSMA.

2. Groundwater Quality

a. Summaries of existing ground water quality data are included in Part 1 of the Plan.

b. Summaries of existing water chemistry and isotopic data from wells, springs, or other groundwater sampling points are included in Part 1 of the Plan. The City's 2001 Consumer Confidence Report is included in Exhibit #5.

c. Existing reports of groundwater tracer studies: There are no known tracer studies within the DWSMA.

d. Existing site studies and well water analyses of known areas of groundwater contamination: With the exception of the sites noted in the following section f, there are no known site studies and well water analyses of known areas of groundwater contamination located within the DWSMAs.

e. Existing property audits identifying contamination: There are no known property audits identifying contamination within the DWSMAs.

f. Existing reports to the Minnesota Department of Agriculture and the Minnesota Pollution Control Agency of contaminated spill and releases: The potential contaminant source inventory indicates there are no MDA reported sites and five MPCA leaksites within the southern and northern DWSMAs. Each of the MPCA leaksites has associated reports that include details of the related spills and or releases.

II. ASSESSMENT OF DATA ELEMENTS

A. Use of the Well: Municipal water supply for the City of Cloquet.

B. Wellhead Protection Area Delineation Criteria

1. Time of Travel: The City of Cloquet has adopted a 10-year time of travel to characterize groundwater movement in the aquifers that supply their wells.

2. Flow Boundaries: The flow boundaries for the aquifers include their physical limits, and adjacent drainages including Otter and Fond du Lac Creeks (in the vicinity of the main well field), the St. Louis River, and Hay Creek near Well No. 11. No other high-capacity wells have been identified in proximity to either well field.

3. Daily Volume: City of Cloquet records were used to identify the maximum volume of water pumped annually by their system over the previous 5-year period as shown in Table 1. The City of Cloquet does not expect to exceed the maximum values shown in this table over the coming 5-year period. As a result, the maximum values were used in the groundwater flow model to delineate the WHPAs.

Table 1: Annual gallons of water pumped from City of Cloquet wells.

Well	1995	1996	1997	1998	1999	Maximum
1	72,908,160	62,863,669	79,285,545	59,812,831	84,721,111	84,721,111
6	64,471,023	77,785,342	79,416,847	70,941,223	72,693,761	79,416,847
8	75,552,760	110,366,381	77,877,609	102,775,951	87,597,192	110,366,381
11	95,622,788	91,881,794	102,136,731	101,223,843	86,722,320	102,136,731
Spring Lake	115,609,379	115,055,663	111,045,938	110,989,380	101,250,745	115,609,379

4. Ground Water Flow Field: The groundwater flow field was determined by contouring water level data from area wells. At the main well field, groundwater flow is southeasterly towards Otter Creek with a gradient of approximately 0.0057 – 0.0067. This result is similar to that shown in Akin and Jones (1952) and Myette (1986). At Well No. 11, flow is to the southwest toward the St. Louis River with a gradient of approximately 0.0067. No published figures are available for comparison in this area. Both flow fields are reasonably well simulated by the groundwater flow models developed for the WHPA delineation.

5. Aquifer Transmissivity: The transmissivity of the surficial aquifer that contributes water to the Spring Lake Reservoir was estimated to be approximately 9,000 ft2/d based on results of a pumping test published in Myette (1986). The transmissivity of the buried aquifer that contributes water to Well Nos. 1, 6 an 8 was estimated to be approximately 4,000 ft2/d. This is an average value that is based on the results of aquifer tests at Well No. 8 and others (Wenck Associates, Inc., 2000). The transmissivity of the buried aquifer that contributes water to Well No. 11 was estimated to be approximately 2,700 ft2/d based on the results of a pumping test conducted on November 11-13, 2000 (Wenck Associates, Inc., 2000).

C. Quality and Quantity of Water Supplying the Public Water Supply Wells

Existing data indicates that the quality of the water supplying the Public Water Supply Wells is not impaired and is generally of high quality. Data also indicates the aquifers have sufficient yields to supply the City's required demands.

D. The Land and Groundwater Uses in the Drinking Water Supply Management Area

Land-use includes residential, commercial, and agricultural/forest uses in the southern DWSMA and rural residential/agricultural use in the northern DWSMA. Groundwater use besides the City's wells within the DWSMAs would include the domestic residential wells shown on Figure 4.

CHAPTER TWO

IMPACT OF CHANGES ON PUBLIC WATER SUPPLY WELLS (4720.5220)

I. CHANGES IDENTIFIED IN

A. Physical Environment

There are no physical changes anticipated in the physical environment of the DWSMAs.

B. Land Use

The FDL Tribe has the potential for a housing development adjacent to the southwest boundary of the City. There would be the potential for individual wells and septic systems within this development. FDL Tribe is also developing a wetlands management plan for the Tribe.

The City of Cloquet has potential for increased industrial development within an Industrial Park that is located in the northern part of Cloquet, northwest of the northern DWSMA. The City also predicts increased commercial development along the Highway 33 corridor and multi-residential developments in the City. Residential development is also a potential for areas located in the southwestern portion of the southern DWSMA. These developments have potential impacts on the City's storm water management and City provided sewer and water services.

C. Surface Water

There was a concern about the potential of increased impervious surface areas caused by increased development resulting in increased runoff that could influence the southern DWSMA.

D. Groundwater

City is considering the location of an additional municipal well in the area of the southern DWSMA.

II. IMPACT OF CHANGES

A. Expected Changes in Water Use

Residential, commercial and possible industrial expansion will increase water demands. The City is exploring locating a new production well in the southwestern portion of the City.

B. Influence of Existing Water, Land Government Programs and Regulations

Many existing agencies and regulations may be used to achieve the identified wellhead protection planning goals specified in this plan. Federal, state and local governmental units such as NRCS, MDH, MnDNR, SWCD, Carlton County and the City of Cloquet enforce land-use ordinances, zoning laws, sewer ordinances, well permits, state groundwater appropriation permits and cost share programs to assist agricultural landowners. The City and FDL Band are both developing wetlands management plans to manage wetlands within their jurisdictions. FDL also enforces a tribal water quality standard within the Tribe that provides means for wellhead protection of tribal lands within the southern DWSMA. FDL also has a Land Use and Management Plan.

Due to the adequate and existing amount of support, the WHP Plan, at this time, recommends no additional regulations be imposed to implement the City's WHP Plan. The WHP Plan can be successfully implemented through existing processes, including public education, and Best Management Practices.

C. Administrative, Technical, and Financial Considerations

The City will implement their WHP Plan using existing City Administrative process with no new staff to be added. The City has existing educational programs that could be expanded to include WHP issues and land owners not connected to City utilities. Additional educational subjects may need to be emphasized other than those currently covered by the City. Existing City staff has the expertise to implement the WHP Plan with assistance from the County Water Plan, MRWA, SWCD, Extension Service, FDL, and NRCS. The City may consider a special assessment per service connection for funding of its WHP. State budget cutbacks could influence future spending and budgets for the utility department that could influence the WHP Plan.

CHAPTER THREE

ISSUES, PROBLEMS, AND OPPORTUNITIES (4720.5230)

I. LAND USE ISSUES, PROBLEMS, AND OPPORTUNITIES RELATED TO

A. The Aquifer

The City utilizes two areas for their municipal water supply. The northern area (Well No. 11) and the southern area (Well Nos. 1, 6, 8, and Spring Lake Reservoir) draw water from two different aquifers. The southern aquifer complex consists of a surficial layer of outwash sand that is widely distributed in the Cloquet area, and a sequence of underlying glacial sediments that include varying proportions of clay or till and buried sand and gravel horizons. The buried sand and gravel horizons locally appear to be in contact with surficial sand, such as in the vicinity of prominent glacial depositional features such as eskers and kames. The thicker portions of the buried aquifers appear to coincide with low spots in the bedrock surface. It is unclear to what degree the buried aquifers are interconnected at depth. The Spring Lake Reservoir receives water from the surficial sand aquifer. Well Nos. 1, 6, and 8 draw from deeper portions of the sedimentary deposits.

The northern aquifer is dominated by clay-rich till that overlies a buried lens of sand and gravel that rests on the bedrock surface. The buried aquifer used by Well No. 11 appears to be less laterally extensive than those of the southern well field area.

B. The Well Water

The southern aquifer ranges from high to moderate vulnerability within the DWSMA. The WHP team has chosen to treat the **southern aquifer as vulnerable** to contamination as a more protective strategy. The land uses surrounding the City wells in the southern DWSMA may contribute contaminants that would present a health concern to the users of the public water supply. Because of the highly sensitive nature of the aquifer in this region, the southern aquifer may be vulnerable to numerous potential contaminants of concern. These include pathogens, nitrate-nitrogen, pesticides and other organic chemicals such as fuels and solvents.

The **northern aquifer is moderately susceptible** to contamination because of the geologic setting. Therefore, the wellhead protection plan is primarily concerned

with other water supply wells that penetrate the protective clay, and underground fuel or chemical storage tanks located within the northern DWSMA.

C. The Drinking Water Supply Management Area

Two individual DWSMAs cover the source water area for the City's drinking water supply. For reference, these DWSMAs are referred to as the northern DWSMA and the southern DWSMA.

The northern DWSMA includes the source area for the City's Well #11. The aquifer that supplies Well #11 is dominated by clay-rich till that overlies a buried lens of sand and gravel that rests on the bedrock surface. The clay-rich till provides moderate protection to the aquifer. Therefore potential contaminate sources of concern include other wells that penetrate the protective clay layer and underground fuel or chemical storage tanks that could potentially leak chemicals into the aquifer. Land use in the northern DWSMA includes rural residential and agricultural.

The southern DWSMA includes the source area for the City's Wells Nos. 1, 6, 8, and the Spring Lake Reservoir. These wells and the Spring Lake Reservoir draw water from different portions of a complex package of glacial sediment aquifer/s that rest on top of the hummocky bedrock surface. The DWSMA also includes a surface water component of Otter and Fond du Lac Creeks. The hydrologic setting of the southern DWSMA is such that management strategies and the plan of actions will include most potential contaminant sources. Land use in the southern DWSMA includes residential, commercial and light industrial.

II. IDENTIFICATION OF

A. Problems and Opportunities Disclosed at Public Meetings and in Written Comment

Several comments were received about the WHP Plan during the public meeting on May 14, 2002. The following concerns were expressed pertaining to the WHP Plan:

- Application of biosolids within the DWSMA.
- Additional regulations being established to implement the WHP Plan.
- Excessive drawdown in Well Nos. 11, causing conflicts with private domestic wells.
- The possibility of the proposed industrial park located west of the northern DWSMA effecting groundwater quality.

- A question of the accuracy of the flow model for the northern DWSMA was expressed.

B. Data Elements

Possible addition of observation wells for Well #11 to increase the geological data pertaining to the horizontal extent and hydrology of the northern DWSMA. Obtain additional geological data pertaining to the horizontal and vertical extent of the aquifers in the southern DWSMA.

FDL Tribe is establishing a long-term surface water-monitoring network for Otter Creek. This monitoring program with cooperation between the City and FDL can provide information concerning any observed impacts to the Otter Creek watershed within the southern DWSMA.

C. Status and Adequacy of Official Controls, Plans, and Other Local, State, and Federal Programs on Water Use and Land Use

Many existing agencies and regulations may be used to achieve the identified wellhead protection goals specified in this plan. Federal, state and local governmental units such as NRCS, MDH, MnDNR, SWCD, Carlton County and the City of Carlton enforce land-use ordinances, zoning laws, sewer ordinances, well permits, state groundwater appropriation permits and cost share programs to assist aquiculture landowners. Any commercial/industrial development within the DWSMAs would also require conditional use permits or may require rezoning from the City. The FDL Tribe also enforces a tribal water quality standard within the reservation that provides a means for wellhead protection of tribal lands within the southern DWSMA. The Band also has a Land Use and Management Plan.

At this time due to the adequate and existing amount of support, the WHP Team recommends, at this time, that no additional regulations be imposed to implement the City's WHP Plan. The WHP Plan can be successfully implemented through existing processes, including public education and Best Management Practices.

CHAPTER FOUR

WELLHEAD PROTECTION GOALS (4720.5240)

The overall GOAL of the City of Cloquet's Wellhead Protection Plan is to promote public health, economic development and community infrastructure by maintaining a potable public drinking water supply for residents of the community, both now and into the future.

The City water supply is a combination of underground and surface water recharge areas, which are classified as vulnerable. Consequently, this program will focus on managing most of the potential contaminant sources identified, in order to prevent possible contamination of the City's water supply.

The City has historically enjoyed a sufficient and safe water supply, and proposes, thru the implementation of this WHP Plan, to continue supplying safe, potable water for its residents into the future.

The wellhead protection program will achieve these stated goals through existing and planned programs, such as:

- Best Management Practices.
- Private Well Management Programs.
- Septic System Upgrades.
- Hazardous Waste Collection Programs.
- Agricultural and Turf Management.
- Emergency Response Procedures.
- Data Collection.

A vital aspect of successfully implementing a meaningful wellhead protection plan is public support. The committee recognizes this fact and will promote broad-based educational efforts. These efforts will cover nutrient management, home and farm solid waste management, well management, sewage treatment, commercial and industrial land uses and best management practices including other topics related to protecting both ground and surface waters from potential contaminant sources.

Finally, it is important to maintain a monitoring network of both surface and ground waters. Data collected from a properly designed monitoring system can provide the wellhead protection committee and partners with important information regarding the drinking water source. This in turn can aid in determining if additional research projects are needed and if implemented wellhead protection strategies are effective.

CHAPTER FIVE

OBJECTIVES AND PLANS OF ACTION (4720.5250)

I. ESTABLISHING PRIORITIES

The Cloquet WHP Committee considered the following factors in developing priorities to address potential contaminant sources within the DWSMA:

- Contamination of the public water supply wells by substances that exceed federal drinking water standards.
- Quantifiable levels of contamination resulting from human activity.
- The location of potential contaminant sources relative to the well(s).
- The number of each potential contaminant source identified and the nature of the potential contaminant associated with each source.
- The capability of the geologic material to absorb a contaminant.
- The effectiveness of existing controls.
- The time required to receive cooperation from other agencies and cooperators.
- The resources needed: staff, money, time, legal and technical.

POTENTIAL CONTAMINANT SOURCE INVENTORY

POTENTIAL CONTAMINANT SOURCE	NUMBER	
	Southern DWSMA	Northern DWSMA
AGRICULTURAL RESIDENCE	0	0
NON-AG RESIDENCE	1085	24
SEPTIC SYSTEMS	118	24
WELLS – RESIDENTIAL	118	24
WELLS – IRRIGATION	0	0
WELLS – CLASS 5	0	0
AG CHEMICAL SITES	0	0
CEMETERY	4	0
TRANSPORTATION CORRIDORS - ROADS	Hwy. 33, Big Lake Road	0
TRANSPORTATION CORRIDORS – GAS LINE	1	0
STORMWATER OUTFALLS	3	0
GRAVEL MINING	0	0
TANKS – LUST	5	0
TANKS – ABOVE / BELOW GROUND	12	0
HAZARDOUS WASTE GENERATORS	2	0
TURF MANAGEMENT SITES (LAWNS)	1	0
AG CROP LAND	0	0
FEEDLOTS	0	0

The WHP Team listed wellhead protection management issues in the following order of priority, with **A** being of the highest concern for the individual DWSMAs:

SOUTHERN DWSMA VUNERIBLE	**NORTHERN DWSMA MODERATELY VUNERIBLE**
A. Public Education	A. Public Education
B. Wells	B. Wells
C. Railroad/highway transportation corridors	C. Aboveground Storage Tanks (ASTS and Underground Storage Tanks (USTs)
D. Hazardous materials storage/generation	D. Data Collection
E. Aboveground Storage Tanks (ASTS and Underground Storage Tanks (USTs)	
F. Storm water runoff	
G. On-site Sewage Treatment Systems	
H. Agricultural land uses	
I. Turf Management	
J. Data Collection	

II. MANAGEMENT OBJECTIVES

A. PUBLIC INFORMATION (Applicable for both DWSMAs)

Objective A: Work to establish a line of communication between the City and the community and use that line to educate the community about how land use activities can impact local water quality.

- **WHP Measure A-1:** Install informational signs at the perimeter of the wellhead protection area on major roadway corridors to compliment signs to be located at treatment plant and well site.

  Source of Action: City of Cloquet
  Cooperator(s): Carlton County Highway Department, Youth Groups, Boy Scouts, other civic organizations
  Time Frame: Year 1 – Spring 2003
  Estimated Cost: 10 signs @ $25.00 each = $250.00
  10 posts @ $15.00 each = $150.00
  Goal Achieved: The community becomes aware of the limits of the wellhead protection area and conscious of their actions within the protection area.

- **WHP Measure A-2:** The City will develop and print a tri-fold informational brochure explaining the WHP Plan and its purpose, to be distributed thru local outlets (including water rate bill mailing) to citizens served by the water system and the public.

  Source of Action: City Wellhead Protection Team.
  Cooperator(s): MRWA
  Time Frame: Immediately, repeated as needed.
  Estimated Cost: $100
  Goal Achieved: Citizens and customers become better informed about the City's Wellhead Protection Program, resulting in public acceptance and buy-in to the Plan, see Exhibit #6.

- **WHP Measure A-3:** Sponsor a program of water related presentations, to coincide with National Water Week, which will be made available to students, parents and the public.

  Source of Action: City of Cloquet Council, Staff and WHP Team.
  Cooperator(s): Local fourth grade teachers and students, Minnesota Rural Water Association, Carlton County Water Plan, local businesses (lunch).
  Time Frame: Annually.
  Estimated Cost: $300
  Goal Achieved: Teachers, students, parents and the general public population become more aware of the issues involved with protecting the City's water supply from contamination by human land-use activities.

- **WHP Measure A-4:** Develop presentation program materials that will educate and assist a presenter with knowledge about groundwater protection, citizen impacts on water quality and why the City is carrying out a WHP Plan. To be presented at Community Public Meetings, local service organizations, youth groups and churches.

  Source of Action: City of Cloquet WHP Team.
  Cooperator(s): MRWA, local citizens.
  Time Frame: Beginning Fall 2003, ongoing.
  Estimated Cost: $100 for printed color overheads, speaker notes and loose-leaf notebook.
  Goal Achieved: The City becomes more flexible and capable of easily educating well owners and the population at large.

- **WHP Measure A-5:** Send a letter to the Fond du Lac Band Planning Division regarding notification to the City of pending land use requests, in order to ensure that concerns regarding protection of the City's water supply are addressed in local land-use decisions. Provide input when adjacent governmental units are updating comprehensive land use plans, zoning ordinances and water plans.

  Source of Action: City of Cloquet WHP Team
  Cooperator(s): Fond du Lac Band, local citizens.
  Time Frame: Beginning Winter/Spring 2003, Annually.
  Estimated Cost: Limited to staff time.
  Goal Achieved: Tribal zoning decisions reflect measures to protect the City water supply.

- **WHP Measure A-6:** Develop a cooperative agreement with the Carlton County Water Plan Committee and Fond du Lac Band, to explore the advantages of mutual efforts to implement local wellhead protection plans.

  Source of Action: City of Cloquet WHP Team.
  Cooperator(s): Carlton County, FDL Band.
  Time Frame: Beginning Spring 2003, ongoing.
  Estimated Cost: Staff time.
  Goal Achieved: The City becomes more flexible and capable of implementing its wellhead protection management strategies.

B. OTHER WELLS (Applicable for both DWSMAs)

Objective B – 1: Locate any missing or unknown wells

- **WHP Measure B1-1:** The City conducted a survey of existing wells during development of necessary data for this WHP Plan. Some wells may have been unidentified due to lack of well logs and/or other information. The City will continually attempt to locate other wells that could possibly threaten the City's water supply.

  Source of Action: Cloquet Public Utilities
  Cooperator(s): Landowners
  Time Frame: Ongoing
  Estimated Cost: N/A
  Goal Achieved: Information will be collected about the current number of private wells that pose a threat to the City's drinking water. This measure also allows an opportunity for a public education and awareness campaign.

Objective B – 2: Seal unused or abandoned wells.

- **WHP Measure B2-1:** The City intends to help coordinate local efforts to properly seal unused wells. It will also attempt to obtain funding from other sources to help ease the financial burden of private owners to accomplish proper well abandonment.
  Source of Action: Cloquet WHP Team.
  Cooperator(s): Carlton County Water Plan, Carlton County SWCD, FDL and landowners.
  Time Frame: Summer 2003 and ongoing after that as needs arise.
  Estimated Cost: Unknown, estimated at $300-$400 per well.
  Goal Achieved: Private well owners become more likely to properly seal their unused wells and the City becomes aware of changes in well status.

Objective B – 3: Raise well owner awareness to prevent contamination of the aquifer via private wells.

- **WHP Measure B3-1:** City staff and members of the WHP Team will obtain and distribute brochures, describing proper well maintenance and operation, to private landowners.
  Source of Action: City water department, WHP Team
  Cooperators: Minnesota Department of Health, County Water Plan, SWCD, FDL and local well drillers
  Time Frame: Immediately, Winter 2003
  Estimated Cost: $100
  Goal Achieved: Private well owners will learn proper operation and maintenance of private wells, thereby reducing potential for contamination of City water supply.

Objective B – 4: Identify private well owners located within the WHPA/DWSMA.

- **WHP Measure B4-1:** City staff and members of the WHP Team will request that the County formally identify the City's WHPA/DWSMA in county tax records and data base, or other means, in order that current and future land owners will be aware of issues.
  Source of Action: City water department, WHP Team
  Cooperators: Carlton County
  Time Frame: Immediately, Winter 2003
  Estimated Cost: Abstract Recording fees, $100 for publishing, and postage to distribute brochures

Goal Achieved: Private well owners will be made aware of the fact that their property is located within the City's WHPA/DWSMA and subject to the WHP Plan.

- **WHP Measure B4-2:** Request that local well drillers notify both the MDH and the City of proposed new wells to be located within the WHPA/DWSMA, through use of brochures and notices to landowners and well drillers

  Source of Action: WHP Team
  Cooperators: Local well drillers, MDH, land owners
  Time Frame: Winter 2003 and ongoing
  Estimated Cost: $100
  Goal Achieved: City will have opportunity to discuss the WHP Plan objectives with owners of new wells.

Objective B – 5: Identify new high-capacity wells that are proposed for construction in the WHPA/DWSMA, and/or major changes to groundwater appropriations for existing high-capacity wells, to determine whether the pumping of said wells will alter the current boundaries of the WHPA/DWSMA delineations or other portions of the City's WHP Plan.

- **WHP Measure B5-1:** City Staff and staff in the MDH Source Water Protection Unit will coordinate efforts with the MnDNR Water Appropriations Program to identify proposed high capacity wells in the City's wellhead protection area, and/or major changes to groundwater appropriations for existing high capacity wells. Proposed new high capacity wells or changes to current appropriation permits will be evaluated by MDH staff to determine whether proposed pumping will change the boundaries of the delineated wellhead protection area or drinking water supply management area for the City wells or if the vulnerability of the aquifer the wells utilizes will be affected. If either situation is found, the City, MDH and MnDNR will meet with the owner of the existing or proposed high capacity well to inform the owner of its impact on the City's wellhead protection efforts, and determine financial responsibility for any changes that may be necessary to the Carlton WHP Plan.

  Source of Action: Cloquet Public Works Department, MDH, and MnDNR.
  Cooperator(s): Adjacent and nearby landowners, well operators.
  Time Frame: Summer 2003 and ongoing.
  Estimated Cost: Limited to staff time and special studies if needed.
  Goal Achieved: The program will always be current and be able to incorporate new owners into its education programs. This action will also

assist the City with identifying new wells that are proposed for construction within the DWSMAs and determine if the pumping of those wells will affect the City's WHP Plan.

Objective B – 6: Identify Class 5 Injection Wells.

- **WHP Measure B6-1:** The City intends to help coordinate local efforts to properly identify Class 5 wells. It will also attempt to have the owners of said Class 5 wells report their existence to EPA Region 5 staff in Chicago, IL.
  Source of Action: Cloquet WHP Team.
  Cooperator(s): US EPA-Region 5**,** Carlton County Water Plan, landowners.
  Time Frame: Summer 2003 and ongoing as needs arise.
  Estimated Cost: Staff time.

C. TRANSPORTATION (Southern DWSMA)

Objective C: Educate hazardous cargo transporters who operate within the wellhead protection areas.

- **WHP Measure C-1:** See WHP Measure A-1

  Source of Action: City of Cloquet
  Cooperator(s): Carlton County Highway Department, Carlton Youth Group, Boy Scouts, other civic organizations
  Time Frame: Year 1 – Spring 2003
  Estimated Cost: 10 signs @ $25.00 each = $250.00
  10 posts @ $15.00 each = $150.00
  Goal Achieved: Transporters of hazardous materials are conscious of wellhead protection area and their actions within the protection area.

- **WHP Measure C-2**: Make major transportation firms (Williams Pipeline) aware of wellhead protection area and importance of protecting area from activities associated with transportation of hazardous materials within wellhead protection area.

  Source of Action: City of Cloquet
  Cooperator(s): Williams Pipeline
  Time Frame: Year 1 – Fall 2003
  Estimated Cost: City staff time

Goal Achieved: Transporters of hazardous materials are conscious of wellhead protection area and their actions within the protection area.

- **WHP Measure C-3:** Coordinate activities with emergency response personnel and agencies.

  Source of Action: City of Cloquet
  Cooperator(s): Carlton County, State of Minnesota
  Time Frame: Year 1
  Estimated Cost: Staff Time
  Goal Achieved: Coordinated planning and response to emergency situations impacting the water supply system.

D HAZARDOUS MATERIALS (Southern DWSMA)

Objective D: Promote existing programs to encourage the proper disposal of household and business hazardous waste.

- **WHP Measure D-1:** Increase public awareness and participation by preparing and distributing education material to promote the usage of the Carlton County Household Hazardous Waste (HHW) collection facility.

  Source of Action: City of Cloquet
  Cooperator(s): Carlton County Planning and Zoning, MPCA
  Time Frame: Ongoing
  Estimated Cost: Staff time and educational publications
  Goal Achieved: Proper disposal and management of HHW materials, thereby, reducing potential impact to local water quality by improper disposal of materials.

- **WHP Measure D-2:** Increase business awareness and participation in the Western Lake Superior Sanitary District's (WLSSD) Clean Shop Program to collect hazardous waste from very small quantity generators (VSQGs).

  Source of Action: City of Cloquet
  Cooperator(s): Carlton County Planning and Zoning, WLSSD, and MPCA
  Time Frame: Ongoing
  Estimated Cost: Staff time and educational publications
  Goal Achieved: Proper disposal and management of hazardous waste materials by VSQGs, thereby, reducing potential impact to local water quality by improper disposal of materials.

E ASTs AND USTs (Applicable for both DWSMAs)

Objective E: Establish status of existing storage tanks.

- **WHP Measure E-1:** Conduct a property survey to identify existing tanks and their status within the DWSMA. Identify tanks by category (ASTs, USTs, size, chemical storage). Identify tank owner and contact them with BMP information.

  Source of Action: City of Cloquet
  Cooperator(s): Landowners, MPCA and MDA
  Time Frame: ongoing
  Estimated Cost: staff time
  Goal Achieved: Identification of the status of storage tanks located within the DWSMAs will assist the WHP Team in determining what course of action to take in assisting tank owners in minimizing potential releases that could impact the aquifer.

F STORM WATER MANAGEMENT (Southern DWSMA)

Objective F: Prevent potential contaminates from entering the surface water (Otter and Fond du Lac Creeks) via storm water runoff.

- **WHP Measure F-1:** Increased awareness of responsible parties that the storm water runoff can impact the aquifer.

  Source of Action: City of Cloquet
  Cooperator(s): Carlton County Highway Department
  Time Frame: Fall 2003
  Estimated Cost: staff time
  Goal Achieved: Responsible parties are aware that storm water runoff can impact the aquifer and or watershed component of the DWSMA.

- **WHP Measure F-2:** Install oil/water separator if determined necessary to protect areas of storm water discharge from contamination.

  Source of Action: City of Cloquet
  Cooperator(s): Carlton County Highway Department
  Time Frame: Fall 2003
  Estimated Cost: staff time

Goal Achieved: Protect DWSMA from potential releases within storm water management areas.

G INDIVIDUAL SEPTIC TREATMENT SYSTEMS (ISTS) (Southern DWSMA)

Objective G: Promote educational programs for property owners regarding proper ISTS maintenance and care.

- **WHP Measure G-1:** Promote distribution of educational materials and attendance of educational workshop pertaining to the construction, operation, and maintenance of ISTS within the DWSMA.

  Source of Action: Carlton County Water Plan, Extension, City of Cloquet and FDL
  Cooperator(s): landowners
  Time Frame: ongoing
  Estimated Cost: staff time
  Goal Achieved: Create awareness of how improper and failing ISTS can affect water quality.

- **WHP Measure G-2:** Promote/coordinate local efforts to upgrade non-conforming onsite sewage treatment systems. It will also attempt to obtain money from other sources to help ease the financial burden of private owners.

  Source of Action: Cloquet WHP Team
  Cooperator(s): Carlton County Water Plan, FDL, landowners, MPCA, other funders
  Time Frame: Beginning in the summer of 2003 and ongoing after that as needs arise.
  Estimated Cost: Unknown, estimated at $3000-$4000 per system
  Goal Achieved: All onsite sewage treatment systems located within the DWSMA will be in compliance with current regulations, thereby, reducing the threat to ground water quality.

H AGRICULTURE (Southern DWSMA)

Objective H: Promote and implement best management practices (BMPs) in agricultural areas to reduce potential pollution problems from point and non-point sources.

- **WHP Measure H-1: Work with SWCD and NRCS to identify qualifying projects for the Environmental Quality Incentives Program (EQIP) state cost share, and other conservation programs within the DWSMA.**

  Source of Action: City of Cloquet
  Cooperator(s): SWCD, NRCS, Extension, Carlton County Water Plan, and local landowners.
  Time Frame: ongoing
  Estimated Cost: staff time, any required cost share funding match requirements
  Goal Achieved: Implementation of Agriculture BMPs by landowners to decrease potential pollution by agriculture related activities.

I TURF MANAGEMENT (Southern DWSMA)

Objective I: Educate and promote the implementation of turf management BMPs with landowners within the DWSMA.

- **WHP Measure I-1:** Provide fact sheets, reports and news articles to households and businesses within the DWSMA.

  Source of Action: City of Cloquet
  Cooperator(s): Extension, Green Thumb Project, Carlton County Water Plan, and Cloquet County Club, FDL Band
  Time Frame: ongoing
  Estimated Cost: staff time
  Goal Achieved: Educate and implement turf management BMPs for homeowners and businesses within the DWSMA to minimize potential impact to the aquifer by fertilizers, pesticides and herbicides.

J DATA COLLECTION (Applicable for both DWSMAs)

Objective J: Increase the knowledge of the aquifer's stratigraphy to increase the

accuracy of the groundwater modeling.

- **WHP Measure J-1:** Obtain an updated PCSI Map for the DWSMA.

  Source of Action: City of Cloquet
  Cooperator(s): MDH and MRWA
  Time Frame: ongoing
  Estimated Cost: staff time
  Goal Achieved: Production of a digitized PCSI map and database to assist in the management of potential contamination sources.

- **WHP Measure J-2**: Obtain well log for any newly installed well within the DWSMA.

  Source of Action: City of Cloquet
  Cooperator(s): MDH, MnDNR, SWCD, well drillers, landowners
  Time Frame: ongoing
  Estimated Cost: staff time
  Goal Achieved: Increased data and accuracy of the geological setting of the DWSMA the will refine the boundaries of the WHP area.

CHAPTER SIX

EVALUATION PROGRAM (4720.5270)

The success of the wellhead protection source management strategy must be evaluated in order to determine whether the plan is actually accomplishing what the City of Cloquet set out to do.

The following activities will be implemented to:

1) Track the implementation of the objectives identified in the previous section of this plan.

2) Determine the effectiveness of specific management strategies regarding the protection of the City water supply.

3) Identify possible changes to these strategies that may improve their effectiveness.

1. Members of the wellhead protection team and the WHP plan manager drive through the drinking water supply management area on a regular basis to identify any changes in land use or contaminant source management practices that may adversely impact the City water supply.

2. The wellhead protection team will meet on an as-needed basis, with a minimum of one annual meeting, to review the results of each strategy and identify whether modifications are needed.

3. The wellhead protection plan manager will make an annual written report to the City council regarding progress in implementing the wellhead management objectives of this Plan. The annual reports will be compiled and used to review the overall progress in implementing source management strategies when the City's wellhead protection plan is updated in 10 years. Send a copy of the annual report to the Minnesota Department of Health WHP contact, Minnesota Rural Water, and the County Water Planner.

CHAPTER SEVEN

ALTERNATIVE WATER SUPPLY; CONTINGENCY STRATEGY. (4720.5280)

The City of Cloquet's "Water Emergency and Conservation Plan" was approved by the Minnesota Department of Natural Resources on August 7, 2002. The DNR's approval letter to the City from Mr. James Japs, Supervisor Water Permit Programs is included in Exhibit #7. The City decided not to publish its Water Emergency and Conservation Plan due to security concerns.

Figures

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APPENDIX A

REFERENCED DATA FOR PART 2