CITY OF ELK RIVER (PWS 2180013)
SOURCE WATER ASSESSMENT FINAL REPORT

October 22, 2002

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated source water assessment area and sensitivity factors associated with the wells and aquifer characteristics.

This report, *Source Water Assessment for City of Elk River, Idaho,* describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

Final susceptibility scores are derived from equally weighting system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in other categories results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential contaminants are divided into four categories, inorganic contaminants (IOCs, i.e. nitrates, arsenic), volatile organic contaminants (VOCs, i.e. petroleum products), synthetic organic contaminants (SOCs, i.e. pesticides), and microbial contaminants (i.e. bacteria). As different wells can be subject to various contamination settings, separate scores are given for each type of contaminant.

The City of Elk River drinking water system consists of two ground water wells. Wells 6” N and 8” S share the same delineation and, therefore, land uses. Wells 6” N and 8” S have automatic high susceptibility ratings to VOCs and microbial contamination due to the detection of tetrachloroethylene (PCE) in July 1998 and the detections of total coliform bacteria in August 1993 and October 1995. Wells 6” N and 8” S rate moderate susceptibility for IOCs and SOCs. A lack of potential contaminant sources within the 3-year time-of-travel zone is the main factor for the reduced scores.

For the assessment, a review of laboratory tests was conducted using the Idaho Drinking Water Information Management System (DWIMS), the State Drinking Water Information System (SDWIS), and City of Elk River records. The IOCs barium, fluoride, and nitrate have been detected in routine water well samples, but each chemical has been below the maximum contaminant levels (MCLs) as set by the EPA. In July 1998, the water had a VOC detection of PCE. Total coliform bacteria was detected at the wells and in the distribution system in August 1993 and October 1995. No SOCs have ever been detected in the tested water.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the City of Elk River system, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity), including protection of the well from contamination sources within 50 feet of the wellhead. Also, disinfection practices should be maintained. No chemicals should be stored or applied within the 50-foot radius of the wellhead. The source of the PCE in the water should be investigated and remediated, if necessary. Since much of the designated protection areas are outside the direct jurisdiction of the City of Elk River, collaboration and partnerships with state and local agencies, and industry groups should be established and are critical to the success of source water protection. In addition, the well should maintain sanitary survey standards regarding wellhead protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineation encompasses much urban and residential land uses. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. As there are transportation corridors through the delineations, the Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Lewiston Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR THE CITY OF ELK RIVER, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are attached. The list of significant potential contaminant source categories and their rankings used to develop the assessment is also included.

Background

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

Level of Accuracy and Purpose of the Assessment

Since there are over 2,900 public water sources in Idaho, there is limited time and resources to accomplish the assessments. All assessments must be completed by May 2003. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (DEQ) recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The community public drinking water system for the City of Elk River is comprised of two ground water wells (6" N and 8" S) that serve approximately 165 people through 100 connections. The wells are located in Clearwater County, north of Elk Creek Reservoir at the end of State Highway 8 (Figure 1).

The most significant potential water problem currently affecting the City of Elk River is that of volatile organic contamination. In July 1998, the wells had a detection of tetrachloroethylene (PCE). In addition, total coliform bacteria was detected at the wells and in the distribution system in August 1993 and October 1995. The IOCs barium, fluoride, and nitrate have been detected in routine water samples, but each chemical has been below the maximum contaminant levels (MCLs) as set by the EPA. No SOCs have ever been detected in the tested water.

Defining the Zones of Contribution – Delineation

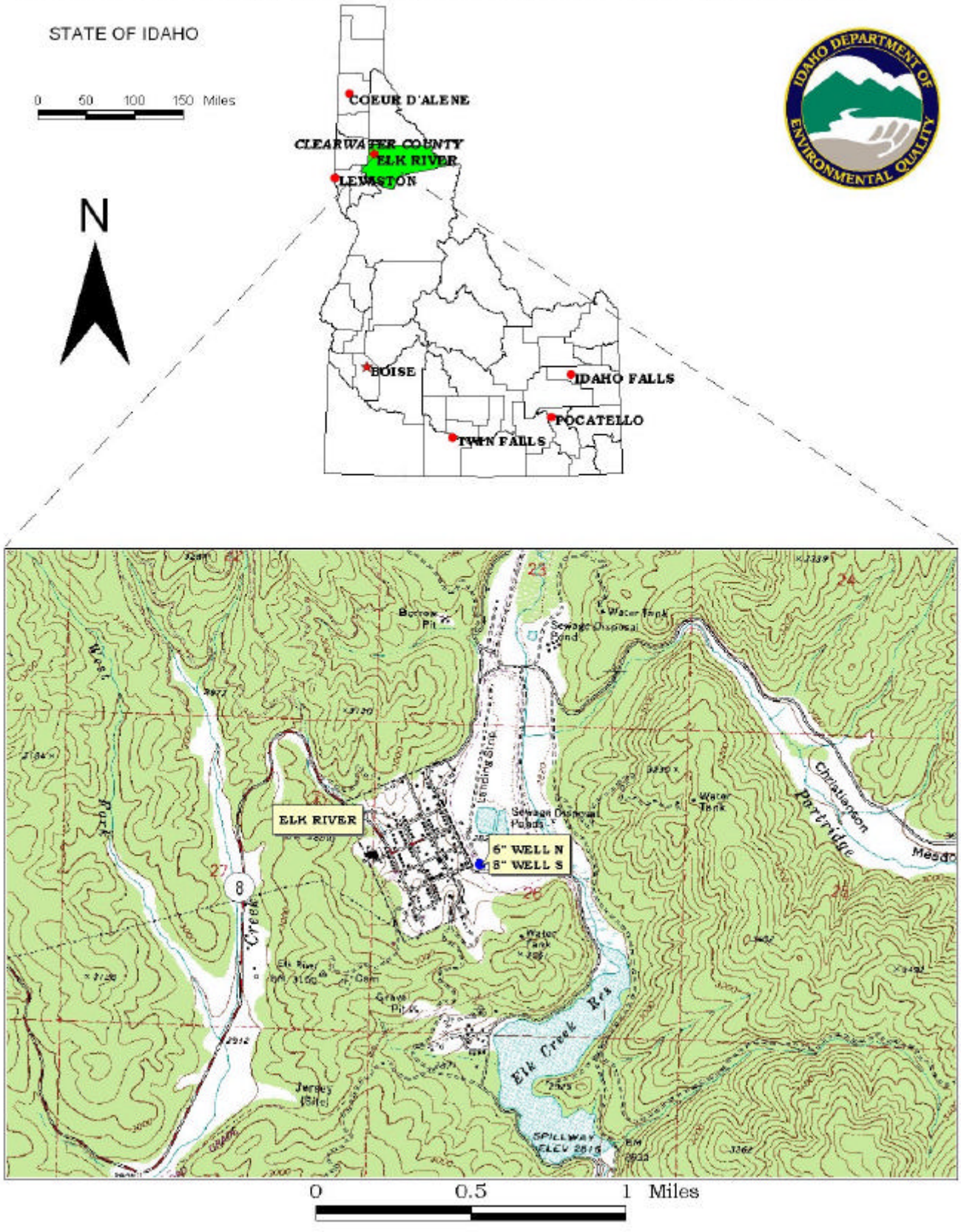
The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a molecule of water to reach a well) for water in the aquifer. DEQ contracted with the University of Idaho to perform the delineations using a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the Clearwater Embayment aquifer of the Clearwater Uplands in the vicinity of the City of Elk River wells. The computer model used site specific data, assimilated by the University of Idaho from a variety of sources including the City of Elk River operator input, local area well logs, and hydrogeologic reports (detailed below).

Elk River is located at the northeastern corner of the Clearwater Embayment – the easternmost extent of the Columbia River Basalt Group (CRBG). Basalt crops out a few hundred feet south and west of the town. The town itself is underlain by pre-Tertiary crystallline granitic rocks. As much as 300 feet of unconsolidated sediments and recent alluvium cover the crystalline rock.

According to RW Engineering (1983), both wells derive ground water from sediments above the crystalline basement rock. The wells are located within 90 feet of each other and it is likely that they are hydraulically connected. The capture zones delineated herein are based on limited data and must be taken as best estimates. If more data become available in the future these delineations should be adjusted based on additional modeling incorporating the new data.

Published geologic maps indicate that the Elk River area is underlain by crystalline rocks. Ground water in the crystalline rocks likely occurs in fracture and weathered zones that may not be hydraulically continuous over long distances. A granite-basalt contact to the south of Elk River is not believed to form a no-flow boundary. The contact is likely to be highly fractured and weathered.

FIGURE 1. Geographic Location of the City of Elk River



A NW-SE trending fault that extends through the City of Elk River is shown on the geologic map by Rember and Bennett (1979). The map scale is such that a determination of the exact location of the fault could not be made. It is possible that it could be the lineament for the creek. Elk Creek Reservoir is believed to be in direct hydraulic connection with the aquifer.

No recharge data are available for the crystalline bedrock aquifers. However, in modeling the basalt aquifers of the Moscow Basin, Lum et al. (1990) assumed recharge occurs primarily through infiltration of precipitation and percolates downward from surficial sediments into deeper aquifers. Lum et al. (1990) estimated approximately four (4) inches per year (in/yr) of recharge to the surficial sediments along the eastern edge of the Moscow Basin near the north Tomer Butte source wells. The City of Elk River is approximately the same elevation as North Tomer Butte and Bovill; both of which were modeled with an estimated 4 in/yr recharge.

The delineated source water assessment area for the City of Elk River wells can best be described as three nearly concentric circles: the inner (3-year TOT) circle having a diameter of approximately 1,000 feet and the outer (10-year TOT) circle having a diameter of approximately 1,700 feet (Figure 2). The actual data used by the University of Idaho in determining the source water assessment delineation areas are available from DEQ upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of groundwater contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

Land use within the immediate area of the City of Elk River wellheads consists of sewage disposal ponds, horse pasture, and State Highway 8. To the west of the wells is predominantly urban land uses, while east and south of the wells is mostly undeveloped.

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in July 2002. The first phase involved identifying and documenting potential contaminant sources within the City of Elk River source water assessment areas (Figure 2) through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to check the accuracy of the identified sources. The identified horse pasture (DEQ, 1993) has since been moved to provide the wells with the required 50-foot buffer.

The delineated source water areas encompass circular areas of land between the well sites and points within 1,700 feet. The wells (Table 1, Figure 2) have two potential contaminant sites, both of which are underground storage tanks (USTs). In addition, the delineation crosses State Highway 8 in all TOT zones and the city sewage disposal ponds in the 6- and 10-year TOTs. In the unlikely event of a spill, all types of contaminants could be added to the aquifer.

Table 1. City of Elk River, Potential Contaminant Inventory

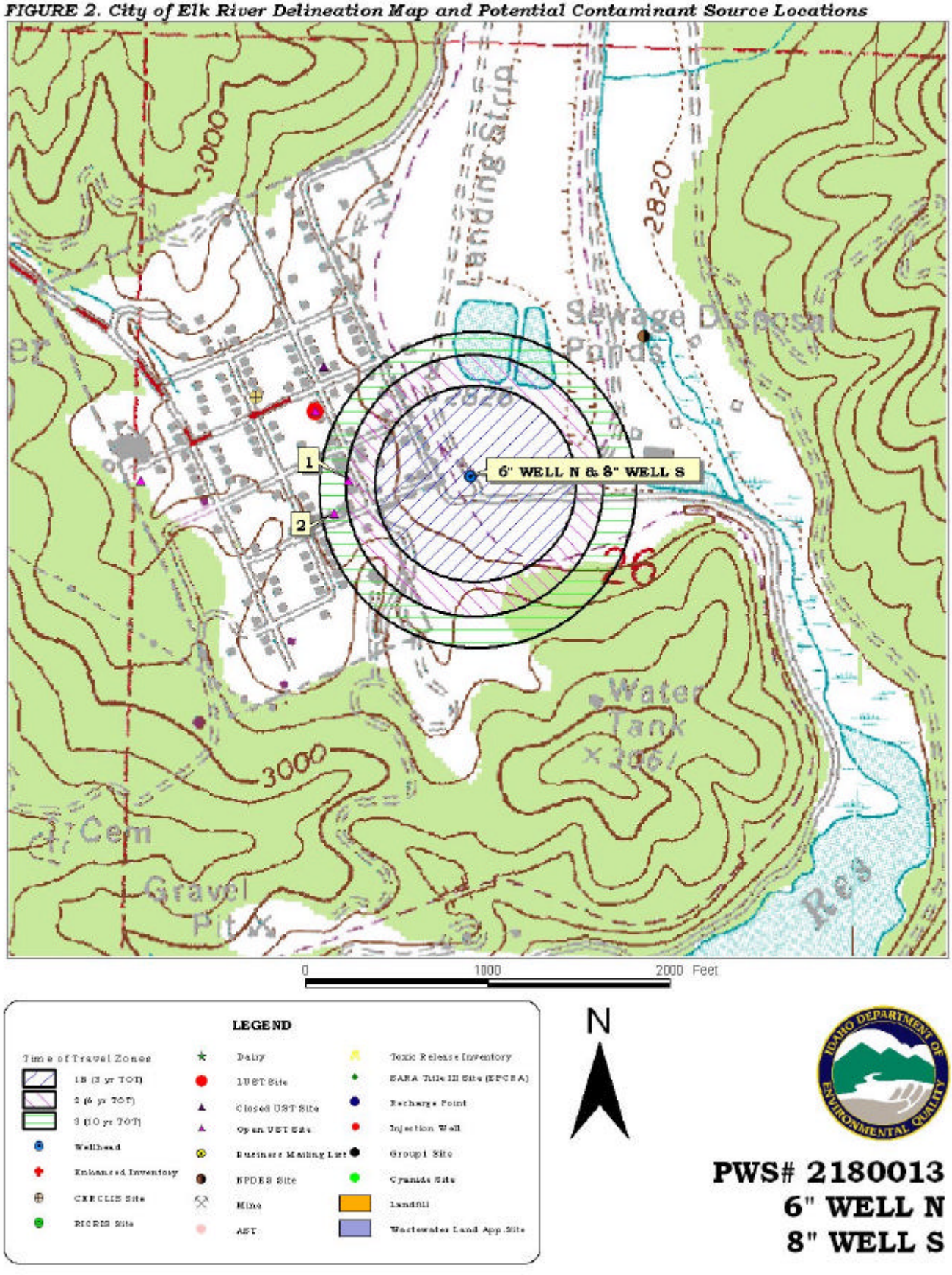
Site #	Source Description[1]	TOT ZONE[2]	Source of Information	Potential Contaminants[3]
	State Highway 8	0-10	GIS Map	IOC, VOC, SOC, Microbes
1	UST site - open; Gas station	3-6	Database Search	VOC, SOC
2	UST site - open	6-10	Database Search	VOC, SOC
	Sewage disposal ponds	3-10	GIS Map	IOC

[1] UST = underground storage tank

[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead

[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

FIGURE 2. City of Elk River Delineation Map and Potential Contaminant Source Locations



Section 3. Susceptibility Analyses

Each well's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Attachment A contains the susceptibility analysis worksheets for the system. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: the surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

Hydrologic sensitivity is moderate for both wells (Table 2). Regional soils data within the entire area of the delineations show that the soils are considered to be in the moderate to well-drained class, which doesn't provide as much protection. However, both well logs show greater than 50 feet of low permeability clay layers between the surface and the producing zones. The static water tables are at 15 feet below ground surface (bgs) [6" N] and 97 feet bgs [8" S]. The vadose zones identified on the well logs suggest that silty clays dominate the area where the wells were drilled.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced.

The 6" N well has a moderate system construction score. The well, drilled in 1974, is 356 feet deep. There is 0.270-inch thick, 12-inch diameter casing from above the ground surface to 213 feet bgs. Additionally, there is 0.250-inch thick, 10- and 8-inch diameter casing from 200 feet bgs to 290 feet bgs. The well is perforated from 250 feet to 290 feet bgs and has a screen installed from 270 feet to 330 feet bgs. The annular seal is placed to 65 feet bgs into a "brown silt" layer of low permeability. The production zones are greater than 100 feet below static water level. There was insufficient information available to determine if the wellhead and surface seal is in compliance with regulations, or if the well is protected from surface flooding.

The 8" S well has a moderate system construction score. The well, drilled in 1983, is 356 feet deep. There is 0.500-inch thick, 20-inch diameter casing from the ground surface to 63 feet bgs. Additionally, there is 0.312-inch thick, 14-inch diameter casing from the ground surface to 195 feet bgs and 0.279-inch thick, 10-inch diameter casing from above ground surface to 198 feet bgs. Finally, there is 0.250-inch thick, 8-inch casing from 198 feet to 348 feet bgs into "hard granite with quartz." The well has a screen installed from 215 feet to 225 feet bgs, 299 feet to 304 feet bgs, and 323 feet to 328 feet bgs. The annular seal is placed to 80 feet bgs into a "gray silty clay" layer of low permeability. The production zones are greater than 100 feet below static water level. The *Drinking Water Supply Report* (DEQ, 1989) states that the well casing is vented, and the wellhead and surface seal are in compliance. However, a more recent field survey (DEQ, 1993) shows that there is swampy ground within 15 feet of the wellhead, so it was determined that the well is not sufficiently protected from surface flooding.

A determination was made as to whether current public water system (PWS) construction standards are being met. Though the wells may have been in compliance with standards when they were completed, current PWS well construction standards are more stringent. The Idaho Department of Water Resources *Well Construction Standards Rules* (1993) require all PWSs to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works* (1997) during construction. These standards include provisions for well screens, pumping tests, and casing thicknesses to name a few. Table 1 of the *Recommended Standards for Water Works* (1997) lists the required steel casing thickness for various diameter wells. Ten-inch diameter wells require a casing thickness of at least 0.365-inches and 12-inch diameter and larger casing requires 0.375-inch thick casing. The wells were assessed an additional point in the system construction rating.

Potential Contaminant Source and Land Use

The 6" N well and the 8" S well share the same delineation and have the same land use scores as follows: low land use for IOCs (i.e. nitrates, arsenic), VOCs (i.e. petroleum products, chlorinated solvents), SOCs (i.e. pesticides), and microbial contaminants (i.e. bacteria). The lack of significant agricultural land or multiple sources in the 3-year TOT contributed to these scores.

Final Susceptibility Ranking

An IOC detection above a drinking water standard MCL, any detection of a VOC or SOC, or a detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. Additionally, if there are contaminant sources located within 50 feet of the source then the wellhead will automatically get a high susceptibility rating. In this case, the wells automatically rated high for VOCs due to the detection of PCE at the wellhead in July 1998. In addition, the wells automatically rated high for microbial contaminants due to the total coliform detections in August 1993 and October 1995. Hydrologic sensitivity and system construction scores are heavily weighted in the

final scores. Having multiple potential contaminant sources in the 0 to 3-year time of travel zone (Zone 1B) and agricultural land contribute greatly to the overall ranking. In terms of total susceptibility, the wells rate moderate for all categories, except as noted above.

Table 2. Summary of City of Elk River Susceptibility Evaluation

Well	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
6" N	M	L	L	L	L	M	M	H*	M	H*
8" S	M	L	L	L	L	M	M	H*	M	H*

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
H* = Well scores automatically high due to VOC detection of PCE and microbial detections of total coliform

Susceptibility Summary

Overall, the wells rate moderate for IOCs and SOCs, and automatically high for VOCs and microbial contaminants.

The most significant potential water problem currently affecting the City of Elk River is that of volatile organic contamination. In July 1998, the wells had a detection of tetrachloroethylene (PCE). In addition, total coliform bacteria was detected at the wells and in the distribution system in August 1993 and October 1995. The IOCs barium, fluoride, and nitrate have been detected in routine water well samples, but each chemical has been below the MCLs as set by the EPA. No SOCs have ever been detected in the tested water.

Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For the City of Elk River system, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey, including protection of the well from contamination sources within 50 feet of the wellhead. Also, disinfection practices should be maintained. No chemicals should be stored or applied within the 50-foot radius of the wellhead.

Since much of the designated protection areas are outside the direct jurisdiction of the City of Elk River, collaboration and partnerships with state and local agencies, and industry groups should be established and are critical to the success of source water protection. In addition, the well should maintain sanitary survey standards regarding wellhead protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineation encompasses much urban and residential land uses. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. As there are transportation corridors through the delineations, the Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Lewiston Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Lewiston Regional DEQ Office (208) 799-4370

State DEQ Office (208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Ms. Melinda Harper, Idaho Rural Water Association, at 208-343-7001 (mharper@idahoruralwater.com) for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund@ is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5 mg/L.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

References Cited

Fetter, C.W., 1988. Applied Hydrogeology. Merrill Publishing Co. Columbus, Ohio. 592 pages.

Freeze, R.A. and J.A. Cherry. 1979. Groundwater. Prentice Hall. Englewood Cliffs, N.J. 604 pages.

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers. 1997. "Recommended Standards for Water Works."

Idaho Department of Agriculture. 1998. Unpublished Data.

Idaho Department of Environmental Quality. 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Water Resources. 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Idaho Division of Environmental Quality. 1993. Ground Water Under Direct Influence (GWUDI) Field Survey for PWS #2180013. September 1993.

Idaho Division of Environmental Quality. 1989. Drinking Water Supply Report for PWS #2180013. July 1989.

Lum, W.E., Smoot, J.L., and D.L. Ralston. 1990. Geohydrology and Numerical Analysis of Ground-Water Flow in the Pullman-Moscow Area. Washington and Idaho. U.S. Geological Survey Water-Resources Investigation Report 89-4103. 73 pages.

RW Engineering. 1983. Engineering Report for the Development of a Producing Well for Elk River, Idaho.

Rember, W.C. and E.H. Bennett. 1979. Geologic Map of the Pull Quadrangle, Idaho. Idaho Bureau of Mines and Geology. Moscow, Idaho.

Williams, B., Nimmer, R., Osiensky, J., Owen, A., and J. McKenna. 2002. Clearwater Uplands Source Water Assessment: Capture Zone Delineations for Source Wells at Elk River. University of Idaho Water Resources Research Institute.

Attachment A

City of Elk River
Susceptibility Analysis
Worksheets

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report Public Water System Name : CITY OF ELK RIVER Well# : 6″ WELL N
Public Water System Number 2180013 09/15/2002 2:17:29 PM

1. System Construction		SCORE			
Drill Date	09/03/1974				
Driller Log Available	YES				
Sanitary Survey (if yes, indicate date of last survey)	YES	1998			
Well meets IDWR construction standards	NO	1			
Wellhead and surface seal maintained	NO	2			
Casing and annular seal extend to low permeability unit	YES	0			
Highest production 100 feet below static water level	YES	0			
Well located outside the 100 year flood plain	YES	0			
Total System Construction Score		3			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	NO	2			
Vadose zone composed of gravel, fractured rock or unknown	NO	0			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	YES	0			
Total Hydrologic Score		3			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	URBAN/COMMERCIAL	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	NO	YES	NO	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	1	1	1	1
(Score = # Sources X 2) 8 Points Maximum		2	2	2	2
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
4 Points Maximum		1	1	1	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		3	3	3	2
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		3	3	3	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		2	2	2	0
Cumulative Potential Contaminant / Land Use Score		10	10	10	4
4. Final Susceptibility Source Score		8	8	8	8
5. Final Well Ranking		Moderate	High*	Moderate	High*

Ground Water Susceptibility Report Public Water System Name : CITY OF ELK RIVER Well# : 8″ WELL S
Public Water System Number 2180013 09/15/2002 2:17:29 PM

1. System Construction		SCORE				
Drill Date	11/14/1983					
Driller Log Available	YES					
Sanitary Survey (if yes, indicate date of last survey)	YES	1998				
Well meets IDWR construction standards	NO	1				
Wellhead and surface seal maintained	YES	0				
Casing and annular seal extend to low permeability unit	YES	0				
Highest production 100 feet below static water level	YES	0				
Well located outside the 100 year flood plain	NO	1				
Total System Construction Score		2				
2. Hydrologic Sensitivity						
Soils are poorly to moderately drained	NO	2				
Vadose zone composed of gravel, fractured rock or unknown	NO	0				
Depth to first water > 300 feet	NO	1				
Aquitard present with > 50 feet cumulative thickness	YES	0				
Total Hydrologic Score		3				
3. Potential Contaminant / Land Use - ZONE 1A			IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	URBAN/COMMERCIAL		2	2	2	2
Farm chemical use high	NO		0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES		NO	YES	NO	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A			2	2	2	2
Potential Contaminant / Land Use - ZONE 1B						
Contaminant sources present (Number of Sources)	YES		1	1	1	1
(Score = # Sources X 2) 8 Points Maximum			2	2	2	2
Sources of Class II or III leacheable contaminants or	YES		1	1	1	
4 Points Maximum			1	1	1	
Zone 1B contains or intercepts a Group 1 Area	NO		0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land		0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B			3	3	3	2
Potential Contaminant / Land Use - ZONE II						
Contaminant Sources Present	YES		2	2	2	
Sources of Class II or III leacheable contaminants or	YES		1	1	1	
Land Use Zone II	Less than 25% Agricultural Land		0	0	0	
Potential Contaminant Source / Land Use Score - Zone II			3	3	3	0
Potential Contaminant / Land Use - ZONE III						
Contaminant Source Present	YES		1	1	1	
Sources of Class II or III leacheable contaminants or	YES		1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	NO		0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III			2	2	2	0
Cumulative Potential Contaminant / Land Use Score			10	10	10	4
4. Final Susceptibility Source Score			7	7	7	7
5. Final Well Ranking			Moderate	High*	Moderate	High*