

# Water Quality

## *Problem:*

*Impaired groundwater and surface water quality due to improper use and disposal of pollutants.*

The environment's impact on human health is great and protecting the environment is one of the mainstays of public health practice. Exposure to hazardous agents in soil and water contribute to illness, disability, and death, with the greatest impact on people whose health status is already compromised. Groundwater is perhaps Washington County's most valuable natural resource. High quality drinking water, healthy streams, clear lakes, fish habitat, rare plants, and economic vitality all depend on protecting and conserving groundwater resources. Surface water resources are also highly valued as they provide residents many recreational opportunities. Surface waters cover about 10 percent of the county's 423 square miles. The majority of the county's surface waters consist of lakes and wetlands.

## **Groundwater**

Maintaining clean, safe groundwater is critical to human and environmental health and to the economic and social vitality of the communities in Washington County. The type and density of land use and the geologic conditions of an area determine the likelihood of the groundwater quality to be affected. Highly sensitive areas require the greatest constraints on land use. Sources of groundwater contamination include residential, commercial, and industrial waste disposal; landfills; leaking petroleum tanks; septic systems; and fertilizer/pesticide inputs. Problems concerning wetland protection, septic systems, solid and hazardous waste, and well construction can pose significant risks to groundwater but are well regulated and managed.

Groundwater is of high quality throughout much of the county. However, there are locations where contaminants have been found above the established health risk limits. In these areas, there are added financial and social costs to manage the affected water supply. Due to the geologic conditions of the county, most of the groundwater reserves are highly sensitive to contamination. If not protected, they will become unusable as a source of potable (drinkable) water.

Past land use practices have rendered groundwater in some locations unusable as a potential source for drinking or other uses. Washington County has detected contamination in a number of aquifers. The groundwater contamination is generally of two types:

- ◆ Contamination in well advisory areas resulting from volatile organic chemicals and perfluorochemicals leaching from legal and illegal waste disposal and underground storage tanks.
- ◆ Parts of the county where nitrates have been found at levels considered too high for certain populations within the county.



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The Minnesota Department of Health has identified 14 areas in the state that are known to have **water contamination** and where special well construction practices must be imposed to prevent human health exposure to harmful contaminants. As designated by the Minnesota department of Health, there are four Special Well Construction Areas (SWCA) in Washington County (see Figure 1). These include the Baytown/West Lakeland SWCA, Lake Elmo/Oakdale SWCA, Lakeland/Lakeland Shores SWCA, and St. Paul Park/Newport SWCA. The purposes of a Special Well Construction Area are to inform the public of potential health risks in areas of groundwater contamination, provide for the construction of safe water supplies, and prevent the spread of contamination due to the improper drilling of wells or borings. There are number of issues regarding the Special Well Construction Areas and other identified well contamination sites in Washington County. These include the public health issues related to providing safe drinking water and future planned and potential development that may be impacted by groundwater contamination.

**Perfluorochemical (PFC)** containing wastes were disposed of by the 3M Company (3M) at the 3M-Oakdale Disposal Sites in Oakdale, Woodbury, and Cottage Grove and the former Washington County Landfill in Lake Elmo. PFCs were released from the sites resulting in contamination of groundwater and nearby drinking water wells. PFCs have been detected in public and private wells across a wide area of southern Washington County. Exposure to PFCs in community drinking water supplies at levels above health concern is currently being prevented by the operation of carbon filtration systems and by careful management of the community wells and distribution systems. Exposure through drinking water in private wells to levels of PFCs above health concern is being prevented by the connection of private wells to municipal water and by offering bottled water and whole-house activated carbon filters to homes that have been issued a drinking water well advisory by the Minnesota Department of Health. Remedial actions to address the PFCs at the disposal sites are being completed.

The **Baytown Township Groundwater Contamination** site was first discovered in 1987. Since that time, investigation and response actions by a number of state and local entities have been ongoing. The site is the result of the disposal or spillage of a large quantity of trichloroethylene (trichloroethene or TCE). The site consists of an area of groundwater contamination that is in excess of six square miles, and affects four major groundwater aquifers. Several hundred private water supply wells and one of three existing municipal water supply wells in the city of Bayport have been impacted by the TCE contamination. Exposure to TCE above health-based criteria is currently being prevented by recommending property owners have new private water supply wells constructed to deeper, clean aquifers where possible, and by providing granular activated carbon filtration units for existing private wells and on new private wells where a clean aquifer is not available or feasible and concentrations of TCE exceed health-based criteria.

The residents of **Cottage Grove and surrounding communities** rely on groundwater for drinking water. Based on samples collected by Washington County, nitrate-nitrogen concentrations over the years have increased in the Prairie du Chien and Jordan Aquifers, which are the sources for all the municipal wells and the vast majority of domestic wells in the project area. Studies in the county have correlated the higher nitrate-nitrogen levels in the southern part of the county to geologic fault zones, which relate to the land uses at the surface. It is thought that the contact of the bedrock layers at the fault zones creates a greater permeability for contaminants at the surface to reach the groundwater. Of the nitrate-nitrogen samples collected in Cottage Grove, 15.1% exceeded the Maximum Contaminant Level MCL of 10.0 mg/L. The surrounding areas of Grey Cloud Island and Denmark Township had 12.7% and 10.8% of samples exceeding the MCL respectively.

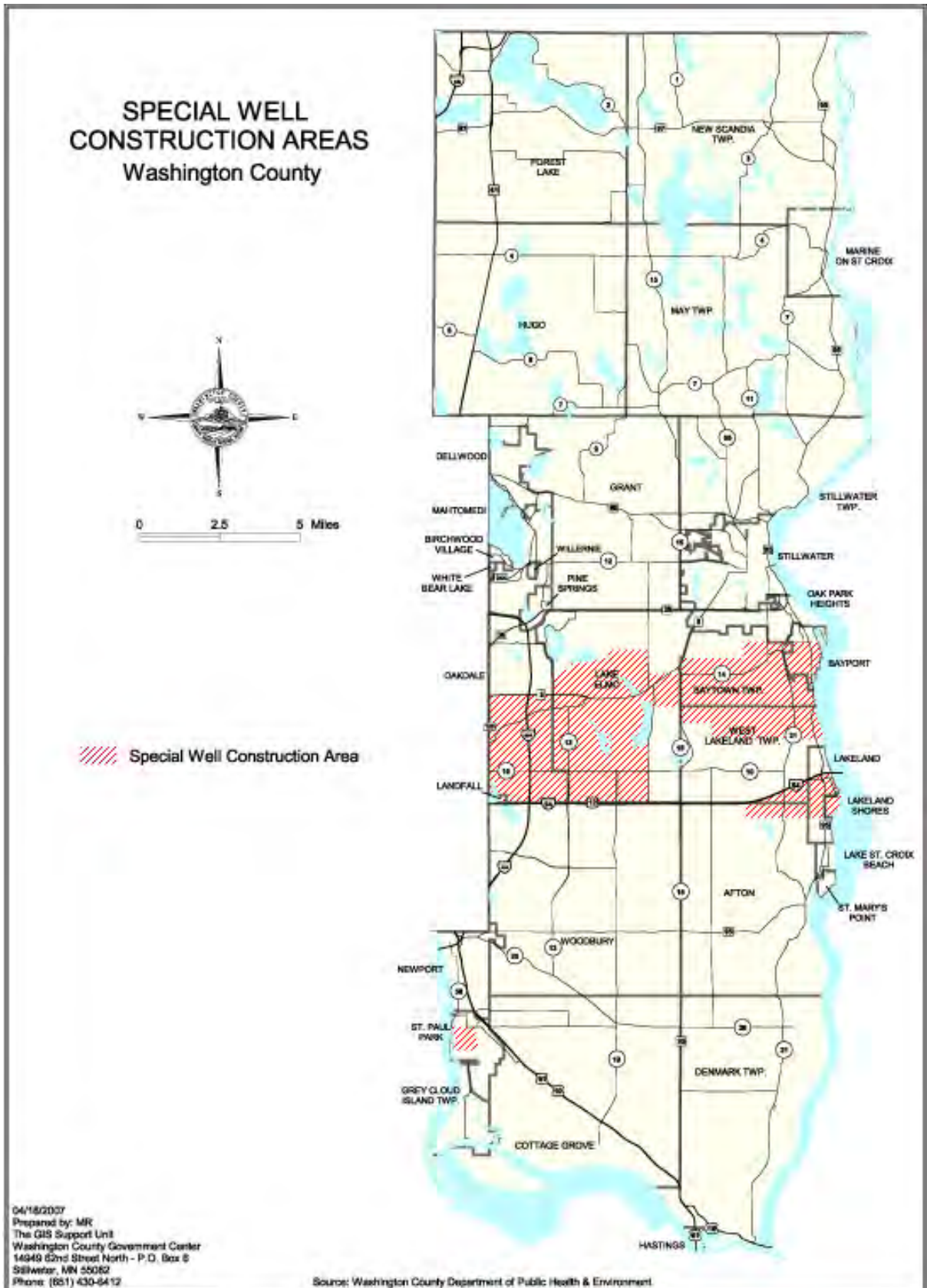
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### Key Data

Figure 1.



# Water Quality

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Since 1972, 15% of 15,370 water samples in Washington County tested positive for coliform bacteria and 3% of 13,880 water samples had nitrate levels exceeding the MCL of 10.0 mg/L.

### **Surface Water**

Bound by the St. Croix River on the east and the Mississippi River on the south, Washington County boasts seventy major lakes, including White Bear Lake, Forest Lake, Big Marine Lake and Lake Elmo. The region is also home to five designated trout streams, including Brown's Creek and Valley Creek, and several smaller ponds, marshes and wetlands. Eight of the ten cleanest lakes in the metro area are in Washington County, and the St. Croix River, a National Scenic and Recreational River, has higher water quality than other major rivers in Minnesota.

According to the Minnesota Pollution Control Agency, the federal Clean Water Act requires states to adopt water-quality standards to protect surface waters from pollution. These standards define how much of a pollutant can be in the water and still allow it to meet designated uses, such as drinking water, fishing, and swimming. The standards are set on a wide range of pollutants, including bacteria, nutrients, turbidity, and mercury. A water body is *impaired* if it fails to meet one or more water quality standards.

The Clean Water Act requires states to take specific steps to address these *impaired waters*, including:

- ◆ Identify and list surface waters that fail to meet applicable water quality standards.
- ◆ Evaluate impaired waters to determine sources of pollution and the amount of reduction needed to restore the waters.
- ◆ Implement corrective measures to meet Total Maximum Daily Load pollutant reduction goals and restore waters to standards.

Unfortunately, many of the lakes, rivers and streams in the county are listed as impaired by the Minnesota Pollution Control agency, meaning that pollution limits fishing, swimming and recreation in these water (see Figure 2). In addition, even the cleanest lakes in our area are susceptible to pollution, especially as the population in the county continues to grow. Some of the more common water pollution problems include excess nutrients, dissolved and suspended sediments, and mercury contamination.

Responsibility for keeping surface water resources healthy resides with individual citizens, businesses, and a number of state and local government agencies, including the Minnesota Pollution Control Agency, Minnesota Department of Natural Resources, Minnesota Department of Agriculture, Board of Water and Soil Resources, counties, cities, soil and water conservation districts, and watershed districts. All of these players must come together to meet the challenge of impaired waters. Coordinating state resources and scientific expertise with local efforts is critical to project success.

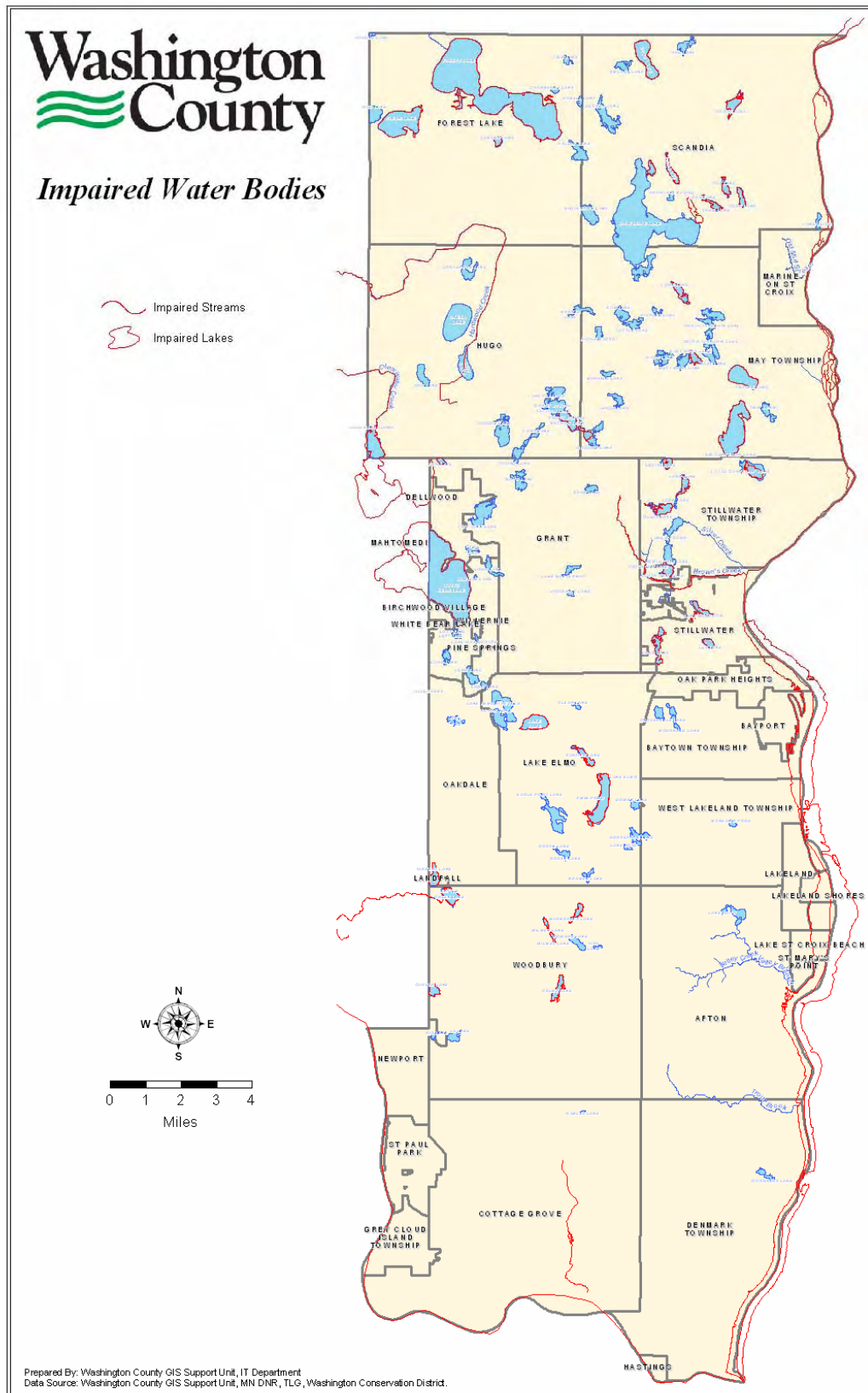
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### Key Data

Figure 2.



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The issue of groundwater contamination and *impaired* surface water bodies is not just a problem for Washington County. Reduced groundwater and surface water quality has been found in other areas of the Twin Cities Metropolitan Area and the State of Minnesota. It is also a problem that is occurring throughout the nation. Addressing water quality impairment is a priority because it affects the health of residents and the growth of communities in Washington County and throughout Minnesota.

Land use practices are the most important influences on water quality and should be regulated in order to prevent groundwater and surface water contamination in the future. Land use regulations that incorporate susceptibility of water to contamination are the most effective methods to protect water quality. By regulating land uses, the county and local communities can make considerable progress toward protecting water resources. Modifying land use practices is the most direct method of reducing nonpoint source pollution and improving water quality.

## Community Feedback

Concern about groundwater and surface water quality was expressed in the majority of focus groups and surveys conducted for the 2008 Community Health Assessment. Results of the on-line survey indicated that 90% of respondents had a major concern or some concern about drinking water quality. Concerning surface water quality, 88% of respondents expressed a major concern or some concern.

Other highlights of community feedback include:

- ◆ Water quality was one of the top ten concerns expressed by senior citizens when asked about their primary health and environmental concerns.
- ◆ Community partners with expertise in water quality issues cited impaired waters, the impact of sediments on streams, plants and animals; and groundwater contamination, as key concerns related to water.
- ◆ Many comments from focus groups focused on uncertainty about the quality of tap water in the county and confusion about what to do to address contamination concerns.
- ◆ In the Youth Environmental Survey, approximately 12% (or 72 out of 591) of middle school students indicated that drinking water and surface water quality were the most serious environmental issues in the county.

In the 2008 Residential Survey conducted by the Washington County Department of Administration, 55% of respondents indicated that soil and water contamination was a major or moderate problem.

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## Community Assets

- ◆ In 2003 Washington County adopted a Groundwater Plan that provides a county-wide framework for the protection and conservation of groundwater resources. The Groundwater Plan “ownership” and implementation falls to every community, watershed organization and state agency with a vested interest in protecting Washington County’s groundwater resources.
- ◆ Washington County works closely with local watershed management organizations to protect groundwater and surface water resources through the Washington County Water Consortium. The watersheds have the ability to develop and implement rules that protect water resources during development.
- ◆ The Minnesota Pollution Control Agency (MPCA) provides the county with information and assistance on environmental issues, including use of pollution prevention practices to ensure compliance with state and federal regulations involving impaired surface waters and groundwater quality in groundwater contamination areas.
- ◆ The Minnesota Department of Health, along with the MPCA, serves as the lead agencies in dealing with Special Well Construction Areas and groundwater contamination issues.
- ◆ Washington County regulates solid and hazardous waste operations and installation of subsurface sewage treatment systems with the goal of protecting water quality.
- ◆ Demonstrated high level of community concern about water quality.

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## Community Gaps and Risks

- ◆ There is lack of coordinated leadership efforts statewide to address the issue of impaired waters and groundwater resources.
- ◆ Minimal public education and outreach efforts exist to change human impact on water resources.
- ◆ Regulation and oversight of the use of chemicals and its impact on water resources is not widespread throughout the county.

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## Summary

The state, counties, cities, and townships are charged with the protection of groundwater and surface water resources. Groundwater contamination will continue to be a concern for residents in Washington County. This includes the public health issues related to providing safe drinking water and future planned and potential development that may be impacted by groundwater contamination. Maintaining clean, safe groundwater is critical to human and environmental health and to the economic and social vitality of the communities in Washington County.

As Washington County continues to grow, there will be major changes to the landscape. Suburban areas will take over farmland and wildlife habitat as they increase in size and the loss of this land will send untreated runoff water into rivers and lakes. It will be important to begin to clean up impaired waters so they meet beneficial uses and also to prevent water bodies from becoming impaired in the future.

The goal of the Washington County Groundwater Plan is to: **“Protect the economic and environmental values groundwater provides through coordinated, intergovernmental efforts in research and assessment; policies; political influence; regulation; education; and consultation and technical assistance.”**

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## Glossary

PCBs: Polychlorinated biphenyls (PCBs) belong to a broad family of man-made organic chemicals known as chlorinated hydrocarbons.

PFOS: Perfluorooctane sulfates (PFOS) are a chemical in the perfluorochemical (PFC) family.