

WASTEWATER TREATMENT FAILURE/ WATER SUPPLY CONTAMINATION

Definitions

Wastewater Treatment Failure - Wastewater treatment uses microbes to decompose organic matter in sewage. If too much untreated sewage or other organic matter is added to a lake or stream, dissolved oxygen levels will drop too low to support sensitive species of fish and other aquatic life. Wastewater treatment systems are designed to digest much of the organic matter before the wastewater is released so that this will not occur.

Water Supply Contamination - Water supply contamination is the introduction of point and non-point source pollutants into public ground water and/or surface water supplies. Although minimal, water supply contamination does pose a threat in the county. Microbiological and chemical contaminants can enter water supplies. Chemicals can leach through soils from leaking underground storage tanks, feedlots and waste disposal sites. Human wastes and pesticides can also be carried to lakes and streams during heavy rains or snow melt.

Sibley County Wastewater Treatment Plant Failure/Water Supply Contamination Risk Assessment

Hazard:	Wastewater Treatment Plant Failure/Water Supply Contamination
Location	Countywide, individual cities, point and non-point sources
Historic Events	None on record
Likely to happen now?	Unlikely
How often?	Infrequently
Where would event occur?	Any Sibley County community/municipality that utilizes such facilities
Severity of event?	Water supply of large population of people could be contaminated and rendered unsafe for use/drinking
When would hazard likely occur?	Any time of year
What other hazards could occur at the same time?	Infectious diseases, terrorist attack
Economic impacts	Expense incurred for repair or replacement of systems and provision of safe drinking water during the interim
Loss of life impacts	Depending on amount and type of contamination, could be life-threatening
Risk Level VH – Very High H – High L – Limited M – Minimal	Citizens/People: L Animals/Livestock: L Housing: M Critical Structures: L Infrastructure: L Total: L
<u>Risk Assessment</u>	
Unlikely – 1 Occasional – 2 Likely – 3 Highly Likely – 4	<u>Frequency of Occurrence</u> 1
More than 12 hours – 1	<u>Warning Time</u>

6-12 hours – 2 3-6 hours – 3 Minimal-None – 4	4
Limited – 1 Minor – 2 Substantial – 3 Major – 4	<u>Potential Severity</u> 2
Minimal – 1 Limited – 2 High – 3 Very High – 4	<u>Risk Level</u> 1
(Total divided by 4) Very Low – 1 Low – 2 Moderate – 3 High – 4	<u>Overall Priority</u> 2 Low

Vulnerabilities to Water Treatment Failure

Problems impacting Sibley County water systems could possibly include (but are not limited to) the following:

Inadequate collection systems - Even though they are designed to accommodate additional influx of wastewater - sometimes existing systems can not handle the extra flow. Groundwater, for example, can enter the sewer system through leaking manhole walls, defective piping or sewer connections. Or water runoff from roofs, cellars, parking area drains, cooling water discharges from the plant itself can make the inflow too great for the treatment facility to handle.

Sludge disposal - The end result of a well-designed and operated WWTP is both treated wastewater and a waste sludge. Waste sludge goes through a number of steps - including disinfecting -- prior to disposal in landfills, incinerators, or for re-use (such as composting).

Storage, transporting, handling hazardous chemicals - The disinfecting process for sludge disposal involves the use of many highly toxic and explosive chemicals such as chlorine, sulfur dioxide, and bromine chlorides. Safety measures are critical for wastewater treatment plants.

Storage tanks - Wastewater treatment plants typically maintain gasoline or fuel oil onsite that is stored in aboveground or underground storage tanks. Pumping stations often use drums, aboveground storage tanks and underground storage tanks for chemical storage.

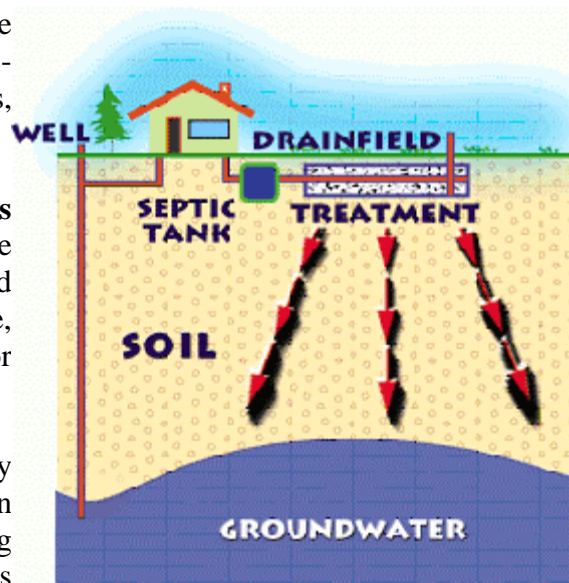


Image courtesy of the US EPA
www.epa.gov/safewater/dwa/electronic/swp.septic.pdf

On-Site Individual Sewage Treatment Systems - Homeowners living in unincorporated Sibley County without access to municipal water treatment systems must rely on their own "mini-treatment plant" to meet wastewater disposal needs. When properly constructed and maintained, on-site wastewater treatment systems can provide years of safe, reliable service for rural homeowners.

Vulnerability to Water Supply Contamination

The sources of drinking water include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial Contaminants such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations or wildlife.

Inorganic Contaminants such as salts and metals, which can be naturally occurring or as a result from urban storm water run-off, industrial or domestic wastewater discharges, oil and gas production, mining or farming.

Organic Chemical Contaminants including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and may come from gas stations, urban storm water run-off or septic systems.

Pesticides and Herbicides which may come from a variety of sources such as agriculture, urban storm water run-off or residential uses.

Some people are more vulnerable to contaminants in drinking water than the general population. Immune-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections.

Potential Impacts and Cascading Effects

Potential impacts of wastewater treatment facility failure or contamination include the loss of water supply or a reduced water supply capacity, and the possible loss of life or sickness caused by contaminated water. Sanitary sewer systems may also backup, and physical damage may occur to treatment facilities and water towers, possibly necessitating repair or replacement and forcing the jurisdiction to absorb these associated costs.

Water-Related Concerns

The table below outlines reported water-related concerns for Sibley County communities.

JURISDICTION	RISK ASSESSMENT (PROBABILITY)	IMPACT ASSESSMENT	TOP THREE PRIORITY?
Green Isle	Low	Low	Yes
Winthrop	Medium	High	Yes
SIBLEY COUNTY	LOW TO MEDIUM	LOW TO HIGH	NO

Probability: High – Annually to 2yrs, Medium - 5yrs, Low – 10yrs

Impact: High – Loss of life and \$500,000 plus property damage, Medium – bodily injuries and \$250,000 property damage, and Low – bodily discomfort and less than \$100,000 in property damage

Water-Related Gaps and Deficiencies

- Green Isle reports that their water facilities may not be secure enough and, because of the bulk storage of chlorine, it may be important to improve security.
- Winthrop reports unprotected city wells exist in the community, creating the possibility of contamination by vandals or by accident.

ACTIONABLE MITIGATION STEPS:

Actionable Mitigation Steps are more elaborately explained with project, timeframe, responsible jurisdictions/staff, possible funding sources, and priority level in the Action Plan section of this document.

1. Secure Water Systems and Eliminate Windows (Green Isle and Winthrop) – City public works and police chief will assess water system safety and implement measures to maintain safety, including elimination of low windows, lighting, fencing, and locking mechanism improvements around well houses
2. New and Safe Structures (Green Isle and Winthrop) - City administrator will work with engineer to develop measures to build newer and safer water towers, wells, and treatment systems to replace low capacity ones with approval of the city councils, as they are deemed in need of repair, upgrades, or replacement.
3. Education and Training (Countywide) - While this area was not prioritized it's a prevalent issue in most communities. Strategies such as ensuring staff remain trained in planning techniques to mitigate hazards, working with professional engineering companies during planning and ordinance development and incorporating measures to mitigate these hazards (i.e. capping wells, setbacks, and filtering systems) are critical.
4. Ensure Appropriate Use and Preservation of Wetlands (Countywide) – Ensuring that wetlands do not dry up or develop permits the better filtration of water runoff. Such a filtering system also increases the cleanliness of the Minnesota River. The county Soil and Water district, along with county planning and zoning staff will work with local jurisdictions on development standards. The county will also review development in the unincorporated areas to ensure wetlands are maintained and preserved.

5. Require Certified Operators and Inspections (Countywide) – The Minnesota Pollution Control Agency (MPCA) requires routine inspection of all public wastewater systems. Operators of such systems are required to have state training to maintain their certified operator status. All jurisdictions should monitor their facilities to ensure these requirements are being met.