10-Year Plan to Upgrade and Maintain Minnesota's On-site (ISTS) Treatment Systems

REPORT TO THE LEGISLATURE

Minnesota Pollution Control Agency

February 2004

A 10-Year Plan to Correct Onsite (ISTS) Sewage Treatment Problems

A Legislative Report

This report was prepared in response to the Legislature's charge to the Minnesota Pollution Control Agency to provide the 2004 Legislature with a plan to:

1. Identify and upgrade all noncompliant individual sewage treatment systems (ISTSs) within a 10-year period
2. Develop a system that ensures all ISTSs remain in compliance with maintenance requirements of Minnesota Rules, part 7080.0175, by July 1, 2005, and
3. Recommend enhanced funding mechanisms to assist homeowners in making necessary upgrades.

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Summary of 10-Year Plan key findings and recommendations

Debi Moltzan, supervisor of inspections for Becker County, oversees the installation of a new ISTS at a site a few miles south of Detroit Lakes in November 2003.

The following list of activities outlines the work and regulatory changes necessary to upgrade all noncompliant ISTSs within 10 years. It is important to note that while key stakeholder input was sought and helped to shape this report, there is not consensus on specific courses of action.

Identifying unsewered properties

With adequate resources, counties could inventory all improved properties that generate sewage that is not discharged to an MPCA-permitted Publicly Owned Treatment Works (POTW). Developing this inventory is a first step to identifying the locations of septic systems across the state and to ensure proper long-term operation and maintenance.

Improving professional competency

Registration standards are the same for all ISTS professionals, both in private and public practice. Standards for registration of all ISTS professionals could be improved by providing more comprehensive examinations and increased education and experience requirements. Registration renewal requirements would also be strengthened. The MPCA has begun work on the new examinations, and additional courses of study are now being offered by the University of Minnesota's Extension Service.

Additional emphasis is needed in compliance and enforcement. With the increased funding provided by the 2003 Legislature from the $25 ISTS tank installation fee, the MPCA has been able to conduct investigations, provide technical support and enforce compliance with MR 7080. An enforcement response plan being prepared in winter 2003-04 will be thoroughly discussed with local officials before full implementation.

Enhancing baseline county programs

The minimum county program could be expanded in rule and require counties to include the following elements in their programs:

- Conformance to Minn. Rules 7080
- Assurance that local jurisdictions that also administer ISTS programs within the county conform to 7080
- A system to ensure that all ISTSs are maintained regularly

Summary of findings continued

- An inventory database that includes all residences in the county not on city sewer and the compliance and maintenance status of the ISTS on each property
- Accurate reporting to the MPCA, to include the following county program information as well as the information now required in MR 7080:
  - Current county ISTS staff
  - The fee structure for ISTS-related activities
  - Current general funds dedicated to ISTS activities
  - Other ISTS-related sources of revenue, and
  - Other information as necessary to track baseline program implementation.

MPCA assistance to counties could include:
• Providing funding through the Natural Resources Block Grants in proportion to the number of ISTSs within the county
• Providing technical assistance, regulator training, and auditing programs to assure accountability. Differences between metropolitan area counties and non-metropolitan counties would be taken into account when developing rules that expand the county requirements.

Funding

Counties could receive funding through the Board of Water and Soil Resources (BWSR) Natural Resources Block Grants to fund the increased work outlined in the both the baseline county program and the identification/inventory/upgrade program. Funding for comprehensive county baseline programs could be proportional to the number of ISTSs for which the county is the administrative authority. Counties could obtain ISTS upgrade grants and choose how to administer them. Choices include grants to low income residents, countywide incentives or low interest revolving loans. Funding for fixes could be based on the number of problem ISTSs counties identify in their application. Funds for privately-owned ISTSs could be administered through the Ag BMP program administered by the Department of Agriculture or some other mechanism defined by a county. Funds for publicly-owned and managed ISTSs could be administered by the Public Facilities Authority.

Table 1 – Funding Needs

Total cost to fix all failing and ITPHS systems $1,231,000,000 Fix-up funding equal to 5 % of annual need $6.2 million	Total funding to support county programs at $5/ISTS (based on number of residential ISTSs reported by counties and smaller local jurisdictions) $2,345,000/year
Total target funding $8.5 million a year	
Assumptions for target fix-up funding rate of 5 percent of total need: ▪ Most ISTS fixes are privately funded through cash disbursements, home improvement loans or at time of property sale ▪ Available funds can be pooled by local governments to meet the highest priority needs first ▪ Local governments could also provide funds through bonding or other sources to increase funds.	

Table 1 shows the total amount of funds needed annually ($2.35 million) if counties received program funding at a level of $5 per ISTS. The right-hand column in this table shows the total cost of upgrading all problem ISTSs in Minnesota.

The total fix-up funding need (cost to state at proposed funding levels) could be based on the following:

Total cost to fix all the problem ISTSs in Minnesota (based on analysis of the annual reports filed with some assumptions made by MPCA staff where data was missing) is $1,231,000,000 over a 10-year period. Divide this number by 10 to determine annual costs: $123,100,000. Multiply by 5 percent to determine target annual upgrade funding level: $6,155,000.

Stakeholder involvement

A stakeholder advisory group was formed to assist in developing this report.
Members include:

- Kent Sulem and John Dooley, Minnesota Association of Townships
- Nancy Larson, Association of Small Cities
- Dave Weirens, Assoc. of Minn. Counties
- Kris Sigford, Minnesota Center for Environmental Advocacy
- John Tuma, Minnesota Environmental Partnership
- Scott Franzmeier and Lance Bennet, Minnesota Onsite Sewage Treatment Contractors Association
- Jim Anderson, Sara Christopherson and Ken Olson, U of M Extension Service
- Susan Dioury, Minnesota Assoc. of Realtors
- Jack Frost, Metropolitan Council

Additional meetings were held with the following groups:

- Association of Minnesota Counties' Environment and Natural Resources Legislative Committee
- Association of Minnesota Townships general meeting
- Two groups of county ISTS administrators, one in southcentral Minnesota and the other in northwestern Minnesota
- Minnesota Association of County Planning and Zoning Administrators (once to full membership and once to legislative committee)
- Minnesota Onsite Sewage Treatment Contractors

Specific issue meetings were held with numerous other interests during the preparation of this report.

Introduction/background

Wastewater is the spent or used water from homes, communities, farms and businesses that contains enough harmful material to damage groundwater and/or surface water quality. Metals, organic pollutants, sediment, bacteria and viruses may all be found in wastewater. As a result, untreated wastewater can cause serious harm to the environment and threaten human health.

Early settlers did not have running water, and outhouses were the norm. With the advent of indoor plumbing, water use (and the need to treat water contaminated with human waste) increased dramatically.

Early developments discharged wastewater to cesspools, often with outlet pipes leading to ditches and creeks. In the 1930s, the Works Progress Administration built rudimentary wastewater collection and treatment systems in many small Minnesota towns. But most rural residences were left out of this development and continued to discharge untreated wastewater to Minnesota's ground water and increasingly contaminated surface waters.

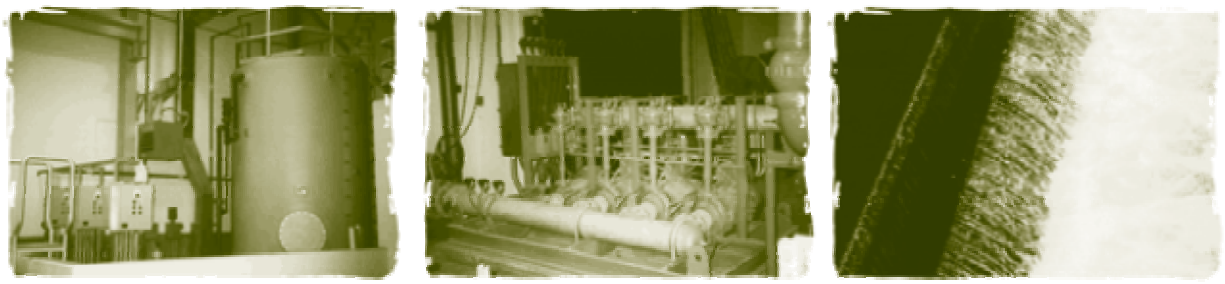
The 1960s brought increased environmental awareness. Wastewater treatment was mandated by the U.S. Congress in the federal Clean Water Act (CWA) of 1972. This act made the goal of "fishable and swimmable" waters a national priority. The CWA was enacted during a time when threats to water quality from "end-of-pipe" or point-source pollution were severe. At the time this landmark law was enacted at the federal level, Minnesota had already established the Water Pollution Control Board – the predecessor to the Minnesota Pollution Control Agency established by the Legislature in 1967 – to control municipal and industrial discharges to waters of the state.

The CWA led to a substantial federal program that directed money to the states to build and maintain municipal sewage treatment plants.

In Minnesota, this program is administered by the MPCA and the Public Facilities Authority. To date, about $1.6 billion in grants and loans have been allocated to help cities treat wastewater prior to discharge. This investment has resulted in greatly improved water quality and today these sources are a much smaller part of the water pollution problem.

At the time the CWA was enacted in 1972, wastewater point-source pollution contributed to more than half of the water pollution problem in Minnesota. Due to the investment in wastewater control over the past 30 years, it is estimated that point sources today contribute approximately 14 percent of the state's water pollution problem and nonpoint sources contribute approximately 86 percent of the problem (from 2000 Section 305(b) report from the MPCA to the U.S. Environmental Protection Agency (EPA).

Nonpoint sources include contaminants in untreated rural sewage and urban and agricultural runoff.



City of Mankato wastewater Web site

Key dates in the history of the Minnesota drinking water program

Source Minnesota Rural Water Association

March 4, 1872

- Minnesota State Board of Health (now the Minn. Depart. of Health) was established as a result of waterborne and food borne diseases. Typhoid fever (waterborne) was taking a large toll of lives at this time. We were the third state (after Massachusetts and California) to establish a board of health.
- The same year the Board of Health was started (1872), Minneapolis Water Works was established for drinking water. It has grown to become the largest water utility in the Upper Midwest with approximately 1,000 miles of pipe in the Minneapolis system.

1910

- In 1881, Minneapolis reported 450 to 600 cases of typhoid and approximately 1 out of 10 cases resulted in death. In 1888, when the population of Minnesota was 1,447,500, the state reported 13,262 deaths from tuberculosis, pneumonia, and typhoid. Minneapolis continued to deal with typhoid outbreaks until 1910 when the city's water system began to chlorinate. Meanwhile, the first great 20th-century epidemic in the state took place in Mankato in 1908 when 4,000 to 6,000 people became sick (with approximately 70 dying) when sewage entered the water supply. The last large epidemic occurred in Minneapolis in 1935 when, because of insufficient chlorination, 175 cases of illness and six deaths were reported.

1970s

- Mandatory fluoridation began in Minnesota for the purpose of enhancing dental protection

1971

- Certification of water operators became mandatory in Minnesota.

2000

- Minnesota was ranked as having the Number 1 Drinking Water Protection Program nationally. The ranking was determined by the National Rural Water Association based on EPA compliance data.

Table 2 - Comparison of contaminants produced by failing ISTSs and Imminent Threats to Public Health systems vs. municipal wastewater treatment plants

Failing ISTSs and Imminent Threat ISTSs are those without soil treatment systems to accomplish wastewater treatment and attenuate pollutants. The wastewater that flows from these is basically untreated septic tank effluent.

Pollutant	Untreated Septic Tank Effluent vs. WWTP	Potential Harmful Effects
Total Suspended Solids (TSS) (mg/l)	Levels generally 10 times higher than WWTP.	TSS can absorb light and lead to higher water temps and less dissolved oxygen. Other pollutants can attach themselves to suspended solids.
5-Day Biochemical Oxygen Demand (BOD5). Measured in milligrams per liter (mg/l).	Levels generally 20 times higher than WWTP.	High BOD5 levels in surface waters reduce levels of available oxygen and make waters more susceptible to fish kills.
Nitrates (NO_3)	Levels can range from 50 to 100 times higher than WWTP.	Consuming high levels of nitrate-contaminated water can result in potentially fatal alterations in hemoglobin of infants and very young children, a condition known as “blue baby syndrome.”
Fecal matter. Measured in number of bacterial colonies per .1 liter	Levels can range up to tens of thousands of times higher than WWTP. One home with a faulty ISTS can easily contribute more bacteria than a WWTP treating water from thousands of homes.	Can cause mild to serious infections through recreational (swimming) contact. Results from consuming contaminated water range from mild to potentially fatal conditions.

Much of state served by onsite sewage treatment systems

Percentage of "failing" and imminent threat systems high

Approximately 450,000 Minnesota homes, 75,000 cabins, and 10,000 businesses (resorts, commercial & industrial buildings) are outside areas served by city sewer systems. Most of these use an Individual (onsite) Sewage Treatment System (ISTS) or have illicit systems that discharge untreated sewage into field drainage tile lines, ditches, streams, rivers and groundwater. A recent trend in suburban development is the use of cluster ISTSs – an ISTS that serves two or more homes. Some small, existing towns use this same cluster ISTS concept to resolve their sewage problems.

Table 3 - Minnesota On-site Sewage Treatment at a Glance

Number of homes with on-site systems	535,000 (86 % full-time residents)
Estimated "failing" ISTSs	144,000 (27 percent)
Estimated Imminent Threats to Public Health and Safety	64,000 (12 percent)
Estimated total failing and imminent threat systems	208,000 (39 percent)

Based on data from the annual reports that local governments file with the MPCA, there are an estimated 64,000 Imminent Threat to Public Health and Safety (ITPHS) systems in Minnesota. This represents approximately 12 percent of the 535,000 locations that should have a functioning ISTS. An "ITPHS" is any situation that could cause acute harm to people. These situations include:

- Sewage backing up into the home
- Sewage discharging to the ground surface, and/or
- Sewage discharging to surface water bodies such as ditches, streams or lakes.

In some cases, an ITPHS is a sewage disposal system that was never designed to adequately treat sewage. For example, a home that does not have a soil treatment system and discharges sewage to field drainage tile lines or other surface water bodies is an "imminent threat to public health," even if the sewage does go through a septic tank before discharge.

In other cases, an ITPHS is an ISTS that at one time did adequately treat sewage but now no longer works properly, leading to one of the situations listed above.

Where ITPHS systems are found, Minnesota Statute 115.55 requires them to be corrected within 10 months of identification. Most local governments do not actively seek out ITPHS situations and only deal with them based on complaints registered or incidental observations.

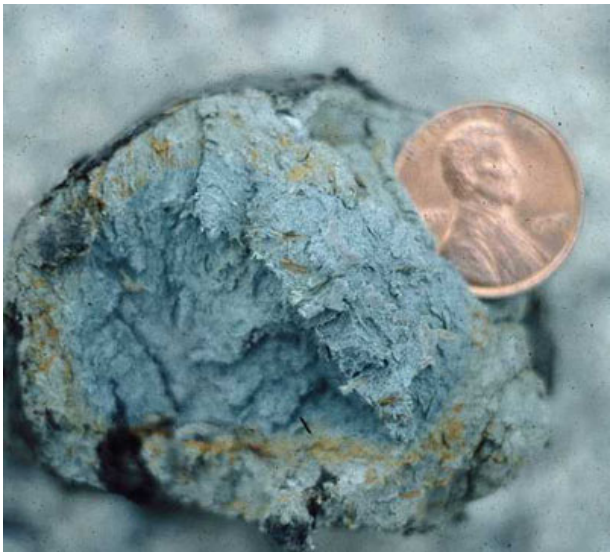
The other common type of sewage disposal system in the state that causes environmental problems is the "failing" ISTS – one that discharges untreated or partially treated sewage too close to the water table and may cause ground water contamination. For example, a failing system may have a functioning, intact tank and a soil absorption system, but fails to protect ground water because there is not a sufficient amount of unsaturated soil (treatment zone) between where the sewage is discharged and the ground water or bedrock. If the problem becomes severe enough, a failing ISTS can become an imminent threat.

This is a serious problem because many Minnesotans with an ISTS also have their own, or a neighbor's, private well in close proximity to their ISTS.

Sufficient unsaturated soil layer critical

The water table in Minnesota varies in depth throughout the state. The depth also varies over time, both by season and by year. Water tables are generally highest in the early spring, after the snow has melted and the ground thawed, and before the plants begin to grow and use the water. Because ISTSs must operate safely at all times of the year, they must be designed to provide effective sewage treatment when the water table is at its highest level.

Methods of determining water table depths have been a controversial element of ISTS regulation in Minnesota. The MPCA-approved method calls for examining seasonally saturated soil for something called "redoximorphic features" (also known as "mottling"), which are **rusty or gray stains** left behind when the water table has been at that level for a prolonged period of time. The designer then develops an ISTS design that provides at least three feet of unsaturated soil between the bottom of the soil absorption system and the soil mottling. Having sufficient unsaturated soil is critical because most of the sewage treatment occurs in this soil layer, not in the septic tank or distribution system.



Redoximorphic features (mottling) indicating soil that has been saturated for an extended length of time.

Environmental impacts of untreated sewage

Drinking water treatment (primarily chlorination) has virtually eliminated the threat of typhoid epidemics in the United States. Still, the following information from the U.S. EPA reveals that sewage-contaminated discharges to ground and surface waters continue to pose serious potential threats to health and the environment.

1. Effect on water bodies

Along with bacteria and other pathogenic (disease-causing) organisms, untreated sewage contains significant levels of nutrients that can hasten the "aging" of water bodies, or eutrophication. These nutrients enhance the growth of algae and other aquatic plants, and result in less water clarity. The water becomes less suitable for recreational use. It's estimated ISTSs contribute 7-15 percent of the annual nutrient load to many Minnesota lakes. Plants and animals are also affected by the changes, and whole aquatic communities can be irreversibly altered by discharges of untreated sewage.

Photo Natural Resources Conservation Service

2. Effect on recreation

There is evidence of minor and temporary effects associated with exposure to pathogens while swimming. These include sore throats, ear infections and diarrhea. But more severe, even fatal, outcomes have occurred. Waterborne microbes can cause meningitis, encephalitis, and severe gastroenteritis. The number of cases may be underreported because people may not link common symptoms with exposure to contaminated recreational waters and, unless symptoms are debilitating, do not seek medical attention. Additional research and information are needed to improve understanding of the types and extent of health effects associated with swimming in contaminated waters.

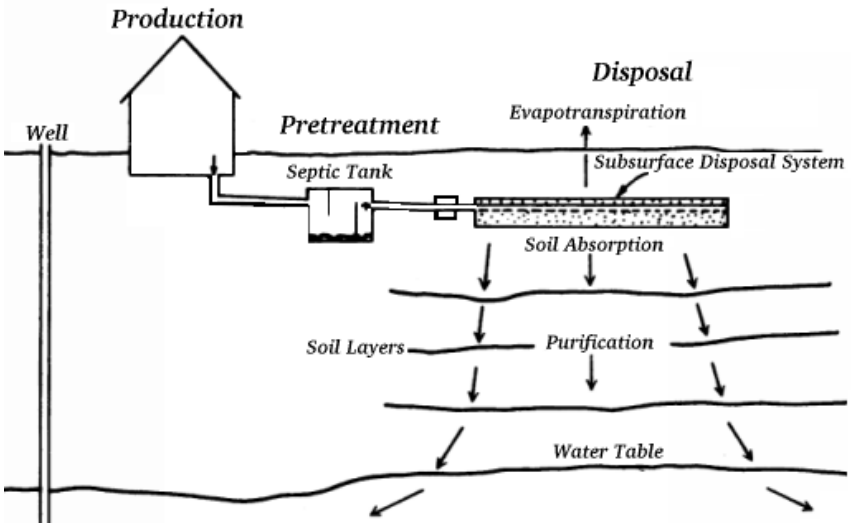
3. Effect on public drinking water

The potential health effects of consuming contaminated drinking water range from minor to fatal. The consequences of consuming water contaminated with pathogens can include gastrointestinal illnesses that cause stomach pain, diarrhea, headache, vomiting, and fever. In addition to these acute problems, chronic exposure to contaminated water is also harmful. High levels of nitrates can cause potentially fatal alterations in the hemoglobin (the iron-containing pigment in red blood cells) of infants and very young children, called "blue baby" syndrome.

Since 1971, the U.S. Centers for Disease Control and Prevention (CDC), EPA, and the Council of State and Territorial Epidemiologists have maintained a collaborative surveillance system for the occurrences and causes of waterborne disease outbreaks with a focus on acute illness. The system does not address chronic illnesses such as cancer, reproductive, or developmental effects.

Between 1971 and 2000, there were 751 reported waterborne disease outbreaks associated with drinking water from individual, non-community systems, and community water systems in the United States. During 1999-2000, a total of 44 outbreaks (18 from private wells, 14 from non-community systems, and 12 from community systems) associated with drinking water were reported by 25 states.

This system under reports the true number of outbreaks because of the multiple steps required before an outbreak is identified and investigated.



Regulatory history and framework (ISTS statutes and rules)

The MPCA first developed an ISTS rule in 1974 as advisory guidelines for local regulatory programs. This rule was adopted as written by some local governments and modified by others. Some local governments required local licensure of ISTS contractors, but this was not a widespread practice. Many local governments did not regulate ISTSs at all. As a result, ISTS construction varied in quality significantly across Minnesota.

University of Minnesota

In 1974 the University of Minnesota began training programs for ISTS professionals, and in 1976 the MPCA initiated a voluntary certification program for ISTS professionals. Both programs used the MPCA ISTS guidelines as their standard curriculum. This was the beginning of a more standardized statewide approach to ISTS regulation; however, it was voluntary in nature and not universally adopted.

In 1994, legislation passed that led to the development of minimum state-wide standards for ISTSs and a licensing program for ISTS professionals. This statute was amended in 1997 to institute a system of local government regulation statewide. MPCA rules governing ISTSs were amended to meet these requirements in 1995 and 1998. The state licensing program went into effect in 1996.

MPCA develops ISTS rules; local governments implement them

The basis for the regulatory framework is found in Minnesota Statutes 115.55 and 115.56. These statutes establish a regulatory framework in which the MPCA promulgates minimum standards for ISTSs and licenses ISTS professionals. The statutes made regulation of individual ISTSs primarily the responsibility of local governments.

Subsequently, the MPCA develops ISTS rules and local governments are to ensure installers and other ISTS professionals follow those rules.

These two statutes are reproduced in Appendix A of this report.

Minnesota Statutes 115.55 does the following:

- Defines specific terms relating to ISTSs
- Authorizes the MPCA to establish minimum standards in rule for design, location, installation, use and maintenance of ISTSs
- Sets requirements for local ISTS programs
- Requires counties to adopt ordinances that meet state standards or vary from them within certain parameters
- Requires counties to regulate ISTSs countywide, except where cities and townships opt to regulate ISTSs
- Allows counties to adopt ISTS standards that are less restrictive than state standards providing those less restrictive standards can be proven to provide a similar level of environmental protection
- Requires cities and townships to meet or exceed the county standards for ISTSs
- Allows counties and other ISTS regulators to pursue civil penalties from ISTS professionals who fail to follow local requirements.

- Sets requirements for inspection of ISTSs at the time of installation for a new or replacement ISTS
- Requires that ISTSs meet or exceed standards before a permit for a bedroom addition can be added
- Provides detailed information on inspection criteria to be met
- Requires that certain ISTS information be given to home buyers at the time of sale
- Allows some manufacturers of ISTS products to bypass MPCA approvals by warranting their products in a separate procedure to the exclusion of all other manufacturers.

Minnesota Statutes 115.56 requires the MPCA to establish a licensing program that ensures both local government regulators and ISTS contractors are appropriately trained and have sufficient experience to build ISTSs. The MPCA is authorized to enforce the licensing requirements and to charge a fee of $100 per license.

Rules in chapter 7080 provide details to local governments, ISTS professionals

The rules developed by the MPCA are found in Minnesota Rules chapter 7080. These rules are much more specific than the statutes, and provide a level of detail needed for local ISTS regulators and contractors. The rules can be found at this Web address: http://www.pca.state.mn.us/programs/ists/index.html

Of Minnesota's 87 counties, two (Koochiching and Stevens) have not yet enacted ISTS ordinances as required. In addition, 122 cities and townships (38 percent) have also adopted ISTS ordinances and report annual ISTS data to the MPCA. Appendix B of this report is a table that summarizes, by local jurisdiction, some of the annual report data, including the local jurisdictions that have adopted local standards that are not as strict as MPCA requirements. The MPCA's Web site provides links to many local ordinances: http://www.pca.state.mn.us/programs/ists/localgovernment.html

A 10-year Plan to Correct Onsite Sewage Treatment Problems

A Legislative Report

The 2003 Legislature passed legislation requiring the MPCA to develop a 10-year plan to identify and upgrade all inadequate individual sewage treatment systems and establish a maintenance oversight system that ensures ISTSs perform to standards over time. The legislation also includes a requirement to identify potential funding options and mechanisms to assist homeowners in making upgrades. The language enacted in 2003 sates:

Chapter 128 (Special Session, 2003)
Sec. 164. [INDIVIDUAL SEWAGE TREATMENT SYSTEM STUDY.] The commissioner of the pollution control agency, with input from stakeholders, must develop and report back to the house and senate environment and natural resources policy and finance committees by February 1, 2004, a ten-year plan to:
(1) locate systems that are imminent threats to public health and safety, and those with less than two feet of soil separation;
(2) upgrade the systems identified in clause (1); and
(3) institute a system to oversee compliance with individual sewage treatment maintenance requirements of Minnesota Rules, part 7080.0175, by July 1, 2005.
The ten-year plan must include funding options for clauses (1), (2), and (3) and shall recommend enhanced funding mechanisms for low-interest loans to homeowners for system upgrades.

Current requirements in MS 155.55 contain ISTS upgrade triggers. MPCA staff estimate these existing triggers will address most problem ISTSs within 25 years.
These triggers are:

- Any system found to pose an imminent threat to public health, either during a required maintenance inspection or at any other time, must be upgraded within 10 months;
- Property owners must disclose the operational status of their ISTS to a buyer when the property is sold. This disclosure must include a description of the system in use, including the legal description of the property and a map showing the location of the system, and any information known about any abandoned ISTS on the property, including a map showing its location;
- Building permits for adding a bedroom (indicating there will be an increase in demand on the ISTS) require an inspection and possible upgrade of the ISTS; and
- Shoreland areas must achieve upgrades through such means as requiring systematic ISTS inventories and tying upgrades to building permits, especially for bedroom additions that indicate an increased need for septic capacity.

Identifying unsewered properties

Counties could identify and document through an inventory system all improved properties that generate sewage not discharged to an MPCA-permitted Publicly Owned Treatment Works (POTW). Developing this inventory is a necessary step to identifying the locations of septic systems across the state in order to ensure their proper operation and maintenance. Also, if the recommendations of the impaired waters stakeholder process are enacted, this information would be essential for implementation of a so-called Water Protection Fee, which could also provide funding for implementation of this 10-year plan. The legislative report on the impaired waters stakeholder process will be available in February 2004.

Improving professional competency

Registration standards are the same for all public and private ISTS professionals. Standards for registration of all ISTS professionals could be improved with more comprehensive examinations and increased education requirements, both for initial registration and renewals. The MPCA has begun work on the new examinations and additional courses are now being offered by the University of Minnesota's Extension Service for ISTS professionals. Rule amendments could make the increased training mandatory.

In addition to more comprehensive education and higher standards, additional emphasis could be placed on compliance and enforcement activities. With the increased funding provided by the 2003 legislature from the $25 ISTS tank installation fee, the MPCA has been able to conduct investigations, provide technical support and enforce compliance with MR 7080. An enforcement response plan being prepared in winter 2003-04 will be thoroughly discussed with local officials before full implementation.

Enhancing county ISTS programs

The minimum county program could be expanded in rule and require counties to include the following elements in their programs:

- Conformance to Minn. Rules Chapter 7080
- Assurance that local jurisdictions that also administer ISTS programs within the county conform to Chapter 7080
- A system to ensure that all ISTSs are maintained
- An inventory that includes all residences in the county not on city sewer and the functional status of the ISTS on each property.
- Accurate reporting to the MPCA, to include the following county program information, in addition to the information now required in Chapter 7080:
  - Current county ISTS staff
  - The fee structure for ISTS-related activities
  - Current general funds dedicated to ISTS activities
  - Other ISTS-related sources of revenue, and
  - Other information as necessary to track baseline program implementation.

The MPCA could work with counties to implement successful programs. Assistance could include:

- Funding through the Natural Resources Block Grants in proportion to the number of ISTSs within the county
- Technical assistance, regulator training and auditing programs to assure accountability.

Tables 4-6: ISTS upgrade triggers, inventory, maintenance plan

Accelerating and documenting the upgrading of ISTSs will require three things:
• Establishing upgrade triggers
• Developing an ISTS inventory database and
• Creating a system that ensures ongoing maintenance.

Table 4 lists options for establishing triggers that would ensure all ISTSs would be upgraded within a 10-year timeframe. Each of these are currently used somewhere in the state. Options 1-4 are currently in law. Options 5 - 6 are being implemented by some local governments and could be expanded.

	Table 4: Upgrade Trigger Options			
	1. Listed in Inventory	**2. Bedroom Addition**	**3. Any Permit**	**4. Disclosure at Time of Sale**
Description	If inventory/inspection identifies imminent threat, it must be corrected within 10 months. Failing systems must be corrected within the timeframe established by local government.	ISTS must be proven to be in compliance before permit for bedroom addition can be issued.	Similar to the Bedroom Addition option, but inspection and possible upgrade would be triggered by any building permit request. (Farm and outbuildings are frequently exempted)	ISTS must be inspected prior to the sales agreement. Upgrade of ISTS would occur within 10 months if imminent threat or according to locally established timeframes.
Now in Place?	Yes.	Yes, where building permits are required.	Required in shoreland areas. Some LUGs apply it throughout the jurisdiction.	Statewide in limited form, with disclosure of some information (but no inspection) required in statute. 38% of local governments require inspections. Some mortgage companies also require this.
Who would do?	Local government. Generally, homeowners work with private contractors to do the work.	Homeowner initiates action and is responsible for upgrade. Local government sets timeframe for upgrade. Permit issued only when compliance is attained.	Homeowner initiates action and is responsible for upgrade. Local government sets timeframe for upgrade and issues permit only when compliance is attained.	Homeowner or buyer is responsible for inspection and possible upgrade. Realtors have role in informing homeowners of responsibility. County recorders need to ensure process is followed.

Table 4 continued: Additional Upgrade Trigger Options		
	5. Maintenance Stop (when tank is pumped for routine maintenance)	**6. ISTS Inspections Occur With Other Inspections on the Property**
Description	ISTS would be inspected for Imminent Threat characteristics (leaky tank, surface discharge, etc) when the pumper maintains the system.	ISTS is inspected when an inspection is being done on the property for other purpose(s).
Now in place?	In some jurisdictions, local governments require this. Minn. Rules 7080 requires that pumper report problems to homeowner, not LGU.	Yes, but not widespread. Fillmore County inspects ISTSs during feedlot inspections.
Who would do?	Pumper is responsible for imminent threat inspection and reporting of problems. Local government must track and require upgrades. Homeowner must initiate process by scheduling a maintenance stop. May neglect maintenance for fear of inspection.	Inspector must be qualified to do ISTS work along with other program. Local government must track and require upgrades

ISTS inventory

An inventory could be developed to manage all of the ISTS information in Minnesota. This database could be used to track design compliance and maintenance, and to charge fees. If this plan were implemented, a decision will have to me made as to how data is managed. These are options discussed in the course of preparing this report.

Since 1999, local governments have been required to permit ISTSs and ensure that the state standards (or alternative local standards) are met. Therefore, all systems built since 1999 should be recorded at local offices and an inventory of these systems can be created from existing records. Some local governments have records dating back prior to 1999, but this varies from place to place. Some method could be found to consolidate information not only about these fairly recent systems, but also all other ISTSs serving Minnesota homes, cabins and businesses. Options are discussed in Table 5.

Table 5: Options for Creating an ISTS Inventory Database

	Each local government builds/ maintains an inventory.	State government builds/maintains inventory.	Private enterprise builds/maintains inventory.	Non-profit enterprise builds/maintains inventory.
Current status of options.	Many local governments currently manage data with computerized systems. However, there is no statewide consistency. Older ISTS systems generally are not in the database.	Currently, no state tracking of ISTS systems.	There are several vendors with software for tracking ISTS. Some service providers have independent data bases.	Currently, none have a system for tracking ISTSs. One organization has discussed it. (Minnesota Onsite Sewage Treatment Contractors Association - MOSTCA)
What would be required to adopt option	Require all local governments to maintain certain information in a searchable database to provide certain outcomes.	Local government would need to share information with state on newer systems and help state identify likely ISTS parcels.	Local government would need to share information with vendor on newer systems and help vendor identify likely ISTS parcels.	Local government would need to share information with vendor on newer systems and help vendor identify likely ISTS parcels.
Other pros/ cons	Keeps ISTS regulation at the local level.	Adds a new level of regulation to ISTS, and is a new role and cost for state government. Costs would be incurred for local governments as well.	Would require contracts, fees, etc. Costs would be incurred for local governments as well.	Would require contracts, fees, etc. Costs would be incurred for local governments as well. Could be U of M or other higher ed institution.

Maintenance

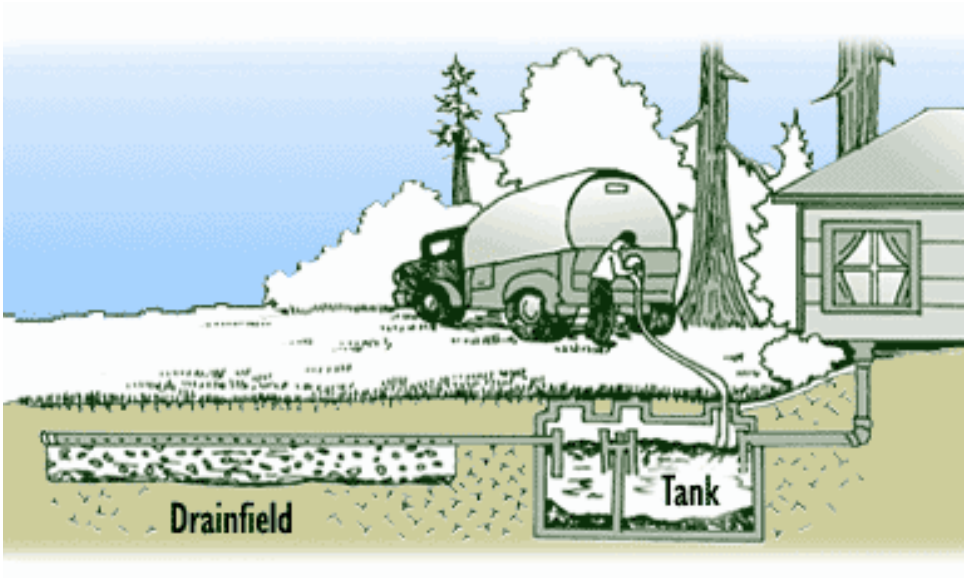
Successful long-term treatment of sewage depends on a system capable of providing adequate treatment *and* effective on-going operation and maintenance. In the 1997 *Response to Congress On Use Of Decentralized Wastewater Treatment Systems*, the EPA states that ISTSs are very effective in treating sewage in low density areas *if* they are properly managed – operated and maintained. Maintenance is important to prevent future problems such as contamination or costly premature failure and need for repair or replacement.

One of the legislative requirements in this 10-year plan is to "institute a system to oversee compliance with ISTS maintenance requirements of Minnesota Rules, part 7080.0175, by July 1, 2005." Those rules require Minnesota ISTS owners to perform a minimum level of ISTS maintenance every three years. This consists of an inspection by a qualified professional for signs of imminent threat and whether solids need to be pumped from the septic tank. Counties would be required to develop a system to ensure maintenance as part of the expanded baseline county program.

Table 6 provides options for realizing greater ISTS maintenance oversight by July 1, 2005.

	Table 6: ISTS Maintenance Oversight Options				
	Operating Permits	**Management Plan**	**Government Tracking**	**Management by Local Governmental Unit (LGU).**	**Management by Sewer Dist. or other Regional Entity**
Description	LGU would issue 3-year permits to ISTS owner. Permits would require management plan owners must follow.	Would require each ISTS to have a management plan signed by the owner and approved by the local govt.	Government (or contractor to government) maintains ISTS inventory, sends out reminders when maintenance is due.	LGUs assume responsibility for maintenance. Supported by ISTS owner fees. Fees could also be used to subsidize loans, other incentives.	Similar to LGU option, but work would be done by a special purpose governmental entity, not by general purpose government.
Currently in place?	Limited application in performance systems in some areas.	Required for certain types of ISTS, but not universally.	Some local governments do this now (primarily in the metro area).	No.	Yes, in some areas, but limited in scope.
Who would do?	LGUs would issue permits, track compliance.	ISTS designer or installer would develop plan and review periodically.	LGUs track compliance.	LGU would be responsible for fee collection and maintenance. Could contract to private firm or other govern-mental unit.	Sewer district, subordinate services district, utility, other. Could contract out services to private firm or other LGU.
Other Consider-ations	Differs from Management Plan in that it would be mandatory.	May or may not be mandatory. Spot checks by LGU.	Enforcement and/or incentives could make it more effective.		Has been successful in some areas where it has been tried.

Any of the options could increase maintenance compliance levels and thus the amount of septage (the material pumped out of septic tanks) that would need to be managed. This would create additional challenges in areas where land application space is tight, soil conditions are difficult or the availability of sewage plants that accept sewage is limited.



Counties could develop a system for ensuring that maintenance occurs as part of an expanded baseline county ISTS program. Counties could choose from these options or develop other effective approaches.

A recent survey of more than 1400 homeowners in 11 southeastern Minnesota counties indicated 51 percent of the residents pump their septic tank every 1 to 3 years. Another 22 percent pump every 4 to 10 years. Twenty percent report never pumping their tank because they "haven't had any problems," "didn't know they were supposed to," or "don't consider it important."

Evaluations of homeowner education classes taught by the University of Minnesota Extension Service indicate a very high rate of "best management practice" adoption once owners are provided with operation and maintenance information. Follow-up surveys to Isanti County residents receiving University of Minnesota printed materials show favorable results. Some local governments and industry professionals provide similar information as do some community organizations. In addition, some local governments and private service providers maintain customer data bases and send maintenance reminders to owners.

Septage disposal a growing issue

Currently, the proper disposal of septage pumped from the ISTS during maintenance is problematic in many areas of Minnesota. In the metropolitan area, pumpers have been able to dispose septage into the Metropolitan Council Environmental Service's sewer system at special dump stations in the metropolitan area. This has resulted in problems for MCES. They are now studying the problem and will probably make changes during the next two years in how septage is to be handled. One option would be to require pumpers to haul septage into Council's sewage treatment plants, increasing the time required as well as costs.

Outside the metro area, there is concern about the improper disposal of septage. Smaller wastewater treatment plants may not have the capacity to accept septage. Most septage (outside of Duluth and Grand Rapids) is land applied on sites owned or leased by pumpers. These sites are not approved or monitored by either local or state governments, and citizen complaints on pumpers' septage management practices are not uncommon. Additional pumping of septage as discussed in this plan may exacerbate these problems.

Funding ISTS upgrades

The third major element required by the Legislature in the 10-year plan is funding. Specifically, the legislation requires, "…the 10-year plan must include funding options … and shall recommend enhanced funding mechanisms for low-interest loans to homeowners for system upgrades."

Public money has been funding sewage treatment in cities for years. The Works Progress Administration built many sewage treatment facilities during the Depression. In the 1970s, the Clean Water Act provided a framework for funding large sewage treatment projects, and much public money went into building these projects in that and the next decade. Recently, the focus has shifted from public grants to loans, which most municipalities find necessary to capitalize sewage treatment projects.

In Minnesota, these grants and loans at the state level are distributed through the Public Facilities Authority. The Federal government provides some limited funding through the U.S. Department of Agriculture's Rural Development grants program. Congress also approves grants to communities in specific areas that are administered by the U.S. Army Corps of Engineers. Any of these funding sources may be used for publicly-owned treatment works (including cluster ISTSs), but not for individually-owned ISTSs on private property.

There are several considerations associated with funding of ISTS upgrades. First, determining the number of ISTSs that need to be upgraded. Below are the statistics presented earlier in the plan.

Owners of substandard systems are confronted with having to hire a licensed ISTS designer to develop a system design and a licensed ISTS installer to build the system. Frequently, but not in all cases, contractors provide both services. Designs generally cost between $250 and $500. The cost of a replacement ISTS can vary widely, depending on location and the size and type of system that is needed to meet site considerations.

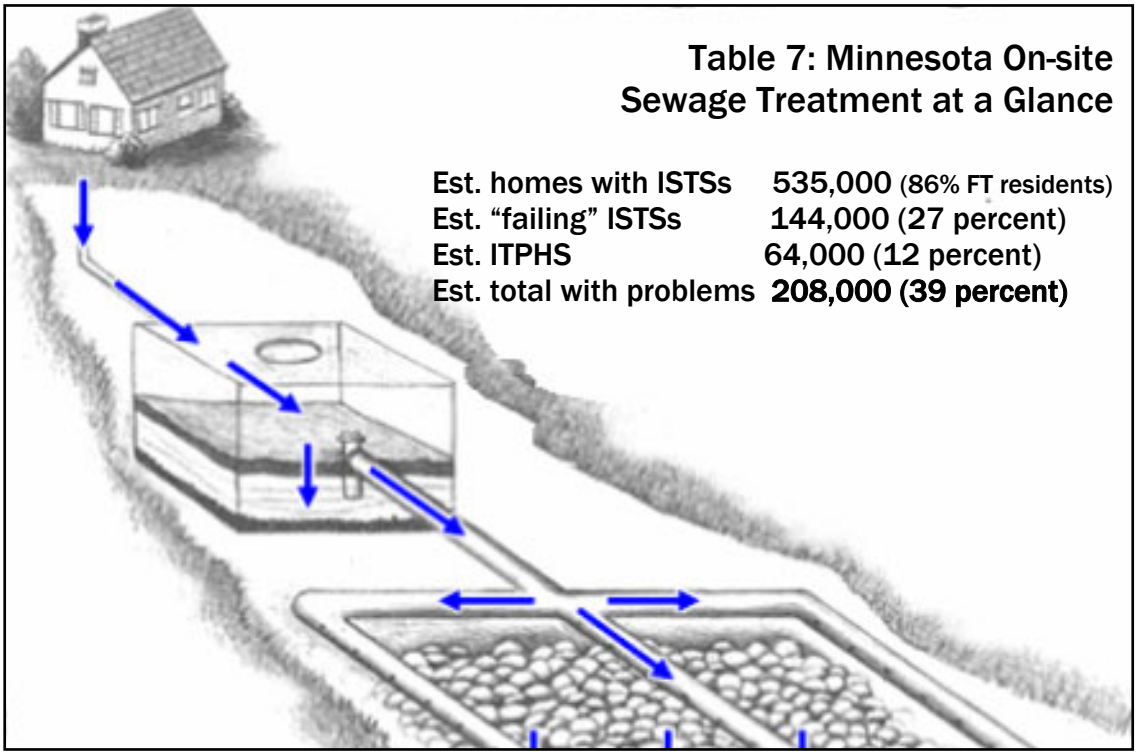


Table 7: Minnesota On-site Sewage Treatment at a Glance

Est. homes with ISTSs	535,000 (86% FT residents)
Est. "failing" ISTSs	144,000 (27 percent)
Est. ITPHS	64,000 (12 percent)
Est. total with problems	208,000 (39 percent)

A complete ISTS installation can range from about $4000 for a trench system that operates on gravity (water flows downhill) to as much as $6,500 to $12,000 or more for a mound system with pumps in metropolitan areas. Systems involving a combination of technologies (often referred to as 'separation technology,' for example: a composting toilet, or other pre-treatment process, combined with an ISTS) are more expensive, and may be necessary in certain situations where standard treatment cannot be used.

For purposes of this discussion, $6300 for the average upgrade, including the cost of design, will be used. This figure is within the range of many other home improvements such as new roofs, siding, furnace upgrade or driveway. Many homeowners use the equity in their homes to finance these improvements, either through mortgages or lines of credit from banks. The number of people who finance improvements in this way is considerable, but exact figures are not available.

In the southeastern Minnesota homeowner survey (cited earlier), 53 percent of respondents indicated they would pay for ISTS system repairs and replacement from savings or a home equity loan. Eighty eight percent indicated they thought low interest loans should be available through their local government for this purpose. Thirty three percent said they would need a low interest loan to be able to afford repairs and replacement.

According to the survey, the most important motivators to repair or replace their ISTS were: "just knowing it's not working," "concern about drinking water quality," "to protect or preserve property value," and "concern about direct contact with untreated wastewater."

Pending projects and related funding sources

A few local governments have established low interest loan programs using local tax revenues, bonding or other sources to fund ISTS upgrades. State and federal funds have also been used for ISTS-type upgrades in limited cases. The following information was provided by staff of the Department of Employment and Economic Development (DEED).

The current Project Priority List (PPL) has 81 unsewered area projects that propose some type of centralized treatment. Of the 81 projects, there are cost estimates and household numbers for 70. These 70 projects propose to serve approximately 13,500 households (including estimates for non-residential equivalents). The total proposed cost for these projects is $258 million, averaging $19,000 per household.

Last year, 68 unsewered area projects were funded from the 2003 PPL through the combined efforts of the following agencies: USDA Rural Development, DEED, Small Cities Development Program, the Corps of Engineers, and the Public Facilities Authority (PFA) through the State Revolving Fund (SRF) and Wastewater Infrastructure Fund (WIF). These projects represent approximately 1300 households, costing an average of $20,400 per household.

In 15 years, the SRF has provided more than $81 million in loans to correct problems in unsewered areas, with some type of centralized treatment alternative. The most significant funding years were fiscal years 2000-2002 when $50.5 million in loans were made to unsewered area projects. These years were also the largest for matching WIF grants to these unsewered areas.

10-Year Plan (funding) continued

Individual ISTS upgrades may also be funded through the Minnesota Department of Agriculture's Ag BMP program. To date, $12 million has been loaned out through this program, fueling upgrades of 2,269 ISTSs.

In recent years MPCA, PFA and USDA Rural Development have been concerned about the high costs associated with wastewater project solutions in unsewered areas. Many of these concerns centered around the fact that individual systems were being replaced with large centralized collection and treatment systems when it seemed more economical to use equally effective ISTS (individual and cluster) systems managed by qualified operation and maintenance professionals. In a February 2003 report to the Minnesota Legislature, the MPCA suggested a new hierarchy for unsewered areas:

1. Replace existing ISTSs with new ISTSs with centralized management to provide assured monitoring, operation and maintenance.
2. Decentralized wastewater systems that combine localized failed ISTSs into multi-household, soil-based systems with centralized management.
3. Connect the failed unsewered area to an existing wastewater treatment facility with available capacity.
4. Connect the failed unsewered area to an existing wastewater treatment facility, which requires additional capacity through an expansion.
5. Develop new wastewater collection-and-treatment facilities.

In some jurisdictions, local government programs also fund ISTS upgrades.

Counties surveyed on funding practices

Through an email network, the MPCA surveyed counties to determine whether they provide loan financing to ISTS owners for upgrades. Eighteen counties responded in the affirmative and listed the means they employ. The most common sources of funding are Ag BMP loans, administered by the Minnesota Department of Agriculture. Loans under the Clean Water Partnership program are also common. Two counties reported providing loan funds through the Housing Redevelopment Authority (HRA).
Three counties use their own reserve funds for this purpose. All these programs provide loans, not grants.

Funding ISTS programs and upgrades

The recommendation for a revenue source to provide ISTS program funding could be through the so-called Water Protection Fee identified by the impaired waters stakeholder process.

Funding for comprehensive, baseline county programs could be based on the total number of residential ISTSs (both permanent and seasonal residences). Table 5 shows the total amount of funding that would be required annually if counties received funding at a level of $5 per ISTS. This funding could be provided to counties through BWSR Natural Resources Block Grants.

Funding for upgrades could be based on the number of problem ISTSs identified by counties in their applications. Funds for privately-owned ISTSs could be made available through the Ag BMP program administered by the Department of Agriculture. Funds for publicly-owned and managed ISTSs could be administered by the Public Facilities Authority.

The total funding needed for fixing problem ISTSs could be based on the following:

Estimated total cost of upgrading all problem ISTSs in Minnesota (based on analysis of the annual reports filed with some assumptions made by MPCA staff where data was missing) is $1,230,660,349.

This translates into an estimated annual cost of $123 million for 10 years.

If the state were to provide upgrade support funding of 5 percent (see table below), the resulting annual funding target amount would be $6,153,302.

The outlined county ISTS enhancements could result in an annual program cost of $2,344,710, plus the annual upgrade grants of $6,153,302, for a total program cost of **$8,498,012.**

Table 8: Total Target Funding Levels for Upgrades and County Program Support

Total fix-up costs for all problem ISTSs $1,230,660,349 ($123 million annual) Annual upgrade funding target option: **$6,153,000** (5 percent of $123 million*)	**Estimated funding required to support county ISTS programs at $5 per ISTS** Annual county program support funding target option: **$2,344,710**
Total $8,498,000 a year	

***Assumptions going into the target rate of 5 percent:**

- Most ISTS fixes are privately funded through cash on hand, home improvement loans or at time of property sale.
- Available funds could be pooled by local governments to meet the highest priority needs first.
- Local governments may also provide funds through bonding or other sources.

Conclusion

This report highlights a plan to identify, upgrade and ensure the maintenance of all underperforming onsite (ISTS) sewage treatment systems in Minnesota within a 10-year period, and to enhance funding mechanisms for needed upgrades.

The success of this proposal will depend on the continued close communication and cooperation between the MPCA, local governments and other stakeholders, and the Legislature. The MPCA looks forward to working with our stakeholders and the Legislature to address ISTS problems and concerns.

ISTS glossary of terms and systems

(Source University of Minnesota Extension Service publication "Septic System Owner's Guide")

Individual sewage treatment system

An ISTS is a sewage treatment device that operates independently of a public wastewater treatment plant. The most common ISTS is found at a single-family home or cabin in rural or unsewered suburban Minnesota but more homes are now connecting to small group "cluster" soil-based treatment systems. An ISTS typically consists of one or more water-tight tanks and a soil treatment/dispersal unit. Sewage is collected by plumbing in the home and delivered to one or more water-tight 'septic' tanks, where the heavy solids sink to the bottom and the fats and greases float to the top. *Anaerobic* bacteria (those that live in a non-oxygen environment) break down the organic solids and a more clear liquid (effluent) moves to the soil treatment system.

In the soil unit, *aerobic* bacteria (those that live in an oxygen-rich environment) destroy pathogens and consume dissolved organics (those that create a biological oxygen demand or BOD), the soil filters out many of the nutrients and water evaporates or returns into the soil. Soil treatment units are typically in-ground trenches, at-grade beds or elevated 'mounds' using a variety of distribution methods.

In recent years new technologies have introduced additional methods of 'pre-treatment' (in between the septic tank and soil unit) and/or effluent dispersal. Examples include sand, peat or fabric media filters, man-made wetlands, aerobic tanks, and drip dispersal.

Failing ISTS

A failing ISTS is one that does not provide adequate treatment and may contaminate ground or surface water. For example, a failing system may have a functioning, intact tank and a soil absorption system, but fails to protect ground water by providing a less than sufficient amount of unsaturated soil (treatment zone) between where the sewage is discharged and the ground water or bedrock. If the problem becomes severe enough, a failing ISTS can become an Imminent Threat to Public Health or ITPHS.

Imminent Threat to Public Health and Safety ISTS

Any situation that could cause acute harm to people is considered an imminent threat to public health or safety. These situations include:

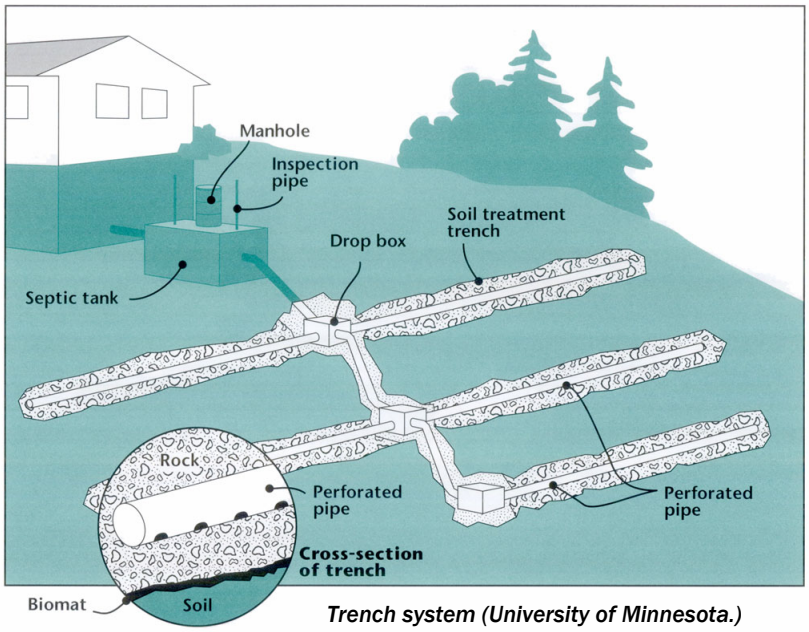
- Sewage backing up into the home
- Sewage discharging to the ground surface, and/or
- Sewage discharging to surface water bodies such as ditches, streams or lakes.

In some cases, an ITPHS is a sewage disposal system that was never designed to adequately treat sewage. For example, a home that does not have a soil treatment system and discharges sewage to field drainage tile lines or other surface water bodies is an "imminent threat to public health," even if the sewage does go through a septic tank before discharge.

In other cases, an ITPH is an ISTS that at one time adequately treated sewage but now no longer works properly, leading to one of the situations listed above.

In-ground systems

The soil treatment unit provides the final treatment and disposal of sewage tank effluent. A properly designed and installed soil treatment unit will filter out disease-causing bacteria and fine solids contained in sewage tank effluent. The nutrient phosphorus will be adsorbed by (attached to) fine soil particles and the nutrient nitrate-nitrogen will move with the water.



Trench system (University of Minnesota.)

In summer, a shallow drainfield trench supplies water (and nutrients) to grass and trees. Nitrates that remain in downward percolating water will be either changed to nitrogen gas by soil bacteria or diluted by precipitation. Nitrates are rarely a health problem when the soil treatment unit is a drainfield trench system or when the well is deeper than 50 feet.

Drainfield trenches

The two types of soil treatment units commonly used are drainfield trenches and seepage beds. Drainfield trenches perform a better job of treating sewage tank effluent than seepage beds and should be used whenever possible.

As shown in the figure, a drainfield trench is constructed by making a level excavation 18 to 36 inches wide. The bottom of the trench must be level, as must the top of the rock in the trench.

Clean rock is placed in the bottom of the excavation; then a four-inch diameter perforated distribution pipe; a layer of permeable synthetic fabric; and soil backfill to a depth of six to 12 inches above the rock.

Pathogens and fine sewage solids are removed by the development of the biomat, a layer of bacteria and slime, which spreads the effluent across the soil surfaces of the trench and maintains aerobic conditions outside the trench.

Soil must be neither too coarse nor too fine. A coarse soil may not adequately filter pathogens, and a fine soil may be too tight to allow water to pass through.

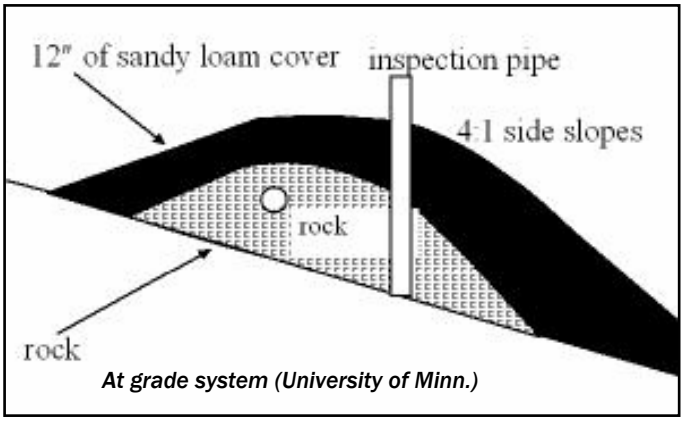
All soil treatment systems located on slopes greater than 1 percent must have a diversion constructed immediately upslope from the system to divert runoff away from the system.

Seepage beds

The construction of a seepage bed is essentially the same as that for a trench, except the bed is wider. Seepage beds are only allowed in locations where the slope is less than 6 percent.

At-grade systems

The at-grade system is an alternative to consider when there is exactly three feet to the water table, or when there are soils, such as clay, where it may be desirable to avoid excavation.



At grade system (University of Minn.)

One of the advantages of using an at-grade system is the potential cost savings in regard to material. The material used to cover the rock bed should be a sandy material, but it does not need to be the same clean sand used below the rock in the construction of a mound.

The other advantage of this system is that spreading it out across the slope offers better potential treatment of the nutrients and other contaminants found in the effluent. At-grade systems cannot be used if the distance to the water table is less than three feet.

Mound systems

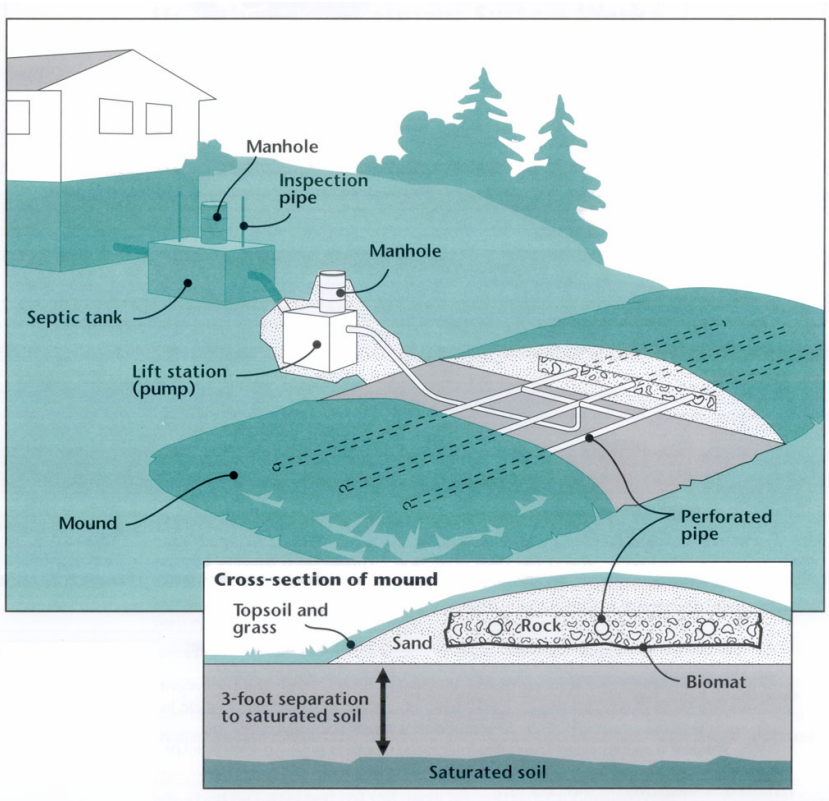
A sewage treatment mound is a seepage bed elevated by clean sand fill to provide an adequate separation distance between the rock layer in the mound and a barrier layer, such as saturated soil conditions or bedrock. The mound must be carefully constructed to provide adequate sewage treatment. Mound failures are usually traced to improper design and construction practices.

Research at the Small-Scale Waste Management Project indicates that residential mounds utilizing pressure distribution will have 44 percent fewer nitrates percolating downward than a standard subsurface trench system.

Enough mounds have been installed in Minnesota and elsewhere to prove the mound system is a standard technology. There are more than 8,000 single-family mounds successfully treating sewage in Minnesota.

Mounds should be located on slopes whenever possible, because as slope increases, the ability of the topsoil to accept and treat wastewater increases.

Mound system (University of Minn.)



Advanced treatment systems

Various advanced treatment systems are now available. These systems are described in detail at the University of Minnesota Extension Service Web site: http://septic.coafes.umn.edu/SystemOptions/index.html

Why ISTSs fail

Source "Understanding Your Septic System," University of Minnesota Extension Publication FO-7439, 1999)

A typical ISTS when properly designed, installed, operated and maintained often could function from 25 to 40 years or more. However, systems may last from less than 5 years to well over 50 years. Early failure generally occurs due to at least one of the following:

1. Improper design or installation

This may be the result of mistakes made by the professionals when the system was designed or installed. It is also possible that the wrong system was chosen for the site and soil conditions (for example, high water table, shallow bedrock) or that the residence has been modified to house more people or to use fixtures or appliances that the system was not designed for or sized to handle.

2. Overuse of water (hydraulic failure)

The typical Minnesota resident (man, woman, or child) uses from 50 to 100 gallons of water per day. Systems are sized for typical water use, but abnormally high water use or accidental overuse (such as from leaky fixtures) can quickly overload the system. A system partially damaged from improper maintenance in the past may not be able to treat even typical volumes of water. Hydraulic failure may also be the result of leaking tanks or lines that allow ground water to enter the system.

3. Improper maintenance

The solids that accumulate in the septic tank must be removed regularly. If excessive scum or sludge builds up, it will begin to enter the soil treatment area and over time will plug it. It is recommended that a septic tank be cleaned (pumped) through the manhole every one to three years to remove all solids. Minnesota codes require pumping or an inspection a minimum of every three years. Cleaning frequency depends on several factors, including the number of people in the home, the size of the tank, and the use of a garbage disposal.

"Failure" of a septic system means that untreated or under-treated wastewater may be allowed to come in contact with people or enter the natural environmen. Common indicators of a failing or failed septic system may include one or more of the following:

- Sewage backup into the house.
- Water or sewage surfacing in the yard or a ditch.
- Sewage odors indoors or outdoors.
- High levels of nitrates or coliform bacteria in well water tests.
- Alarms sounding/flashing on the system.
- Frozen pipes or soil treatment areas.
- Frequent intestinal disorders.
- Algae blooms and excessive plant growth in nearby ponds or lakes.

University of Minnesota resources available

The University of Minnesota Onsite Sewage Treatment Program has created a range of resources for ISTS owners as well as professionals that are available through the University's Web site: http://septic.umn.edu/index.html

The U of M Extension Service has produced a printed resource called the "Septic System Owner's Guide," (cost $4) which can be ordered by phone: 612-624-4900 or 1-800-876-8636; or online, www.extension.umn.edu/units/dc/ The guide describes various types of ISTSs, their use and operation, maintenance and care, and troubleshooting.

Appendices

A. Minnesota Statutes 115.55 and 115.56
B. 2002 ISTS Annual Report from counties

Appendix A
Statutes 115.55 (ISTS) and 115.56 (mandatory licensing)

Minnesota Statute 115.55 Individual sewage treatment systems.

Subdivision 1. Definitions. (a) The definitions in this subdivision apply to sections 115.55 to 115.56.

(b) "Advisory committee" means the Advisory Committee on Individual Sewage Treatment Systems established under the individual sewage treatment system rules. The advisory committee must be appointed to ensure geographic representation of the state and include elected public officials.

(c) "Applicable requirements" means:

(1) local ordinances that comply with the individual sewage treatment system rules, as required in subdivision 2; or

(2) in areas not subject to the ordinances described in clause (1), the individual sewage treatment system rules.

(d) "City" means a statutory or home rule charter city.

(e) "Commissioner" means the commissioner of the Pollution Control Agency.

(f) "Dwelling" means a building or place used or intended to be used by human occupants as a single-family or two-family unit.

(g) "Individual sewage treatment system" or "system" means a sewage treatment system, or part thereof, serving a dwelling, other establishment, or group thereof, that uses subsurface soil treatment and disposal.

(h) "Individual sewage treatment system professional" means an inspector, installer, site evaluator or designer, or pumper.

(i) "Individual sewage treatment system rules" means rules adopted by the agency that establish minimum standards and criteria for the design, location, installation, use, and maintenance of individual sewage treatment systems.

(j) "Inspector" means a person who inspects individual sewage treatment systems for compliance with the applicable requirements.

(k) "Installer" means a person who constructs or repairs individual sewage treatment systems.

(l) "Local unit of government" means a township, city, or county.

(m) "Pumper" means a person who maintains components of individual sewage treatment systems including, but not limited to, septic, aerobic, and holding tanks.

(n) "Seasonal dwelling" means a dwelling that is occupied or used for less than 180 days per year and less than 120 consecutive days.

(o) "Septic system tank" means any covered receptacle designed, constructed, and installed as part of an individual sewage treatment system.

(p) "Site evaluator or designer" means a person who:

(1) investigates soils and site characteristics to determine suitability, limitations, and sizing requirements; and

(2) designs individual sewage treatment systems.

Subd. 2. Local ordinances. (a) All counties that did not adopt ordinances by May 7, 1994, or that do not have ordinances, must adopt ordinances that comply with individual sewage treatment system rules by January 1, 1999, unless all towns and cities in the county have adopted such ordinances. County ordinances must apply to all areas of the county other than cities or towns that have adopted ordinances that comply with this section and are as strict as the applicable county ordinances. Any ordinance adopted by a local unit of government before May 7, 1994, to regulate individual sewage treatment systems must be in compliance with the individual sewage treatment system rules by January 1, 1998.

(b) A copy of each ordinance adopted under this subdivision must be submitted to the commissioner upon adoption.

(c) A local unit of government must make available to the public upon request a written list of any differences between its ordinances and rules adopted under this section.

Subd. 3. Rules. (a) The agency shall adopt rules containing minimum standards and criteria for the design, location, installation, use, and maintenance of individual sewage treatment systems. The rules must include:

(1) how the agency will ensure compliance under subdivision 2;

(2) how local units of government shall enforce ordinances under subdivision 2, including requirements for permits and inspection programs;

(3) how the advisory committee will participate in review and implementation of the rules;

(4) provisions for alternative systems;

(5) provisions for handling and disposal of effluent;

(6) provisions for system abandonment; and

(7) procedures for variances, including the consideration of variances based on cost and variances that take into account proximity of a system to other systems.

(b) The agency shall consult with the advisory committee before adopting rules under this subdivision.

(c) Notwithstanding the repeal of the agency rule under which the commissioner has established a list of warrantied individual sewage treatment systems, the warranties for all systems so listed as of the effective date of the repeal shall continue to be valid for the remainder of the warranty period.

Subd. 4. Compliance with rules required; enforcement.

Section: 115.55 Continued

(a) A person who designs, installs, alters, repairs, maintains, pumps, or inspects all or part of an individual sewage treatment system shall comply with the applicable requirements.

(b) Local units of government may enforce, under section 115.071, subdivisions 3 and 4, ordinances that are applicable requirements.

Subd. 5. Inspection. (a) An inspection shall be required for all new construction or replacement of a system to determine compliance with agency rule or local standards. The manner and timing of inspection may be determined by the applicable local ordinance. The inspection requirement may be satisfied by a review by the designated local official of video, electronic, photographic, or other evidence of compliance provided by the installer.

(b) Except as provided in subdivision 5b, paragraph (b), a local unit of government may not issue a building permit or variance for the addition of a bedroom on property served by a system unless the system is in compliance with the applicable requirements, as evidenced by a certificate of compliance issued by a licensed inspector or site evaluator or designer. A local unit of government may temporarily waive the certificate of compliance requirement for a building permit or variance for which application is made during the period from November 1 to April 30, provided that an inspection of the system is performed
by the following June 1 and the applicant submits a certificate of compliance by the following September 30. This paragraph does not apply if the local unit of government does not have an ordinance requiring a building permit to add a bedroom.

(c) A certificate of compliance for an existing system is

valid for three years from the date of issuance unless the local unit of government finds evidence of an imminent threat to public health or safety requiring removal and abatement under section 145A.04, subdivision 8.

(d) A certificate of compliance for a new system is valid for five years from the date of issuance unless the local unit of government finds evidence of an imminent threat to public health or safety requiring removal and abatement under section 145A.04, subdivision 8.

(e) A licensed inspector who inspects an existing system may subsequently design and install a new system for that property, provided the inspector is licensed to install individual sewage treatment systems.

Subd. 5a. Inspection criteria for existing systems. (a) An inspection of an existing system must evaluate the criteria in paragraphs (b) to (j).

(b) If the inspector finds one or more of the following conditions:

(1) sewage discharge to surface water;

(2) sewage discharge to ground surface;

(3) sewage backup; or

(4) any other situation with the potential to immediately and adversely affect or threaten public health or safety, then the system constitutes an imminent threat to public health or safety and, if not repaired, must be upgraded, replaced, or its use discontinued within ten months of receipt of the notice described in subdivision 5b, or within a shorter period of time if required by local ordinance.

(c) An existing system that has none of the conditions in paragraph (b), and has at least two feet of soil separation need not be upgraded, repaired, replaced, or its use discontinued, notwithstanding any local ordinance that is more restrictive.

(d) Paragraph (c) does not apply to systems in shoreland areas regulated under sections 103F.201 to 103F.221, wellhead protection areas as defined in section 103I.005, or those used in connection with food, beverage, and lodging establishments regulated under chapter 157.

(e) If the local unit of government with jurisdiction over the system has adopted an ordinance containing local standards pursuant to subdivision 7, the existing system must comply with the ordinance. If the system does not comply with the ordinance, it must be upgraded, replaced, or its use discontinued according to the ordinance.

(f) If a seepage pit, drywell, cesspool, or leaching pit exists and the local unit of government with jurisdiction over the system has not adopted local standards to the contrary, the system is failing and must be upgraded, replaced, or its use discontinued within the time required by subdivision 3 or local ordinance.

(g) If the system fails to provide sufficient groundwater protection, then the local unit of government or its agent shall order that the system be upgraded, replaced, or its use discontinued within the time required by rule or the local ordinance.

(h) The authority to find a threat to public health under section 145A.04, subdivision 8, is in addition to the authority to make a finding under paragraphs (b) to (d).

(i) Local inspectors must use the standard inspection form provided by the agency. The inspection information required by local ordinance may be included as an attachment to the standard form. The following language must appear on the standard form: "If an existing system is not failing as defined in law, and has at least two feet of design soil separation, then the system need not be upgraded, repaired, replaced, or its use discontinued, notwithstanding any local ordinance that is more strict. This does not apply to systems in shoreland areas, wellhead protection areas, or those used in connection with food, beverage, and lodging establishments as defined in law."

(j) For the purposes of this subdivision, an "existing system" means a functioning system installed prior to April 1, 1996.

Subd. 5b. Compliance notice. (a) If a system inspected under subdivision 5 is required to be upgraded, replaced, or its use discontinued under subdivision 5a, the inspector or site evaluator or

designer must issue a notice of noncompliance to the property owner and must provide a copy of the notice to the unit of government with jurisdiction. The notice of noncompliance must specify why the system must be upgraded, replaced, or its use discontinued. A local unit of government must specify the upgrade time period in its ordinance.

(b) Except as provided in subdivision 5a, paragraphs (b) to (d), if a system installed between May 27, 1989, and January 23, 1996, does not comply with applicable requirements, the property owner has five years from the date of the bedroom building permit to bring the system into compliance.

Subd. 6. Disclosure of individual sewage treatment system to buyer. (a) Before signing an agreement to sell or transfer real property, the seller or transferor must disclose in writing to the buyer or transferee information on how sewage generated at the property is managed. The disclosure must be made by delivering a statement to the buyer or transferee that either:

(1) the sewage goes to a facility permitted by the agency; or

(2) the sewage does not go to a permitted facility, is therefore subject to applicable requirements, and describes the system in use, including the legal description of the property, the county in which the property is located, and a map drawn from available information showing the location of the system on the property to the extent practicable. If the seller or transferor has knowledge that an abandoned individual sewage treatment system exists on the property, the disclosure must include a map showing its location. In the disclosure statement the seller or transferor must indicate whether the individual sewage treatment system is in use and, to the seller's or transferor's knowledge, in compliance with applicable sewage treatment laws and rules.

(b) Unless the buyer or transferee and seller or transferor agree to the contrary in writing before the closing of the sale, a seller or transferor who fails to disclose the existence or known status of an individual sewage treatment system at the time of sale, and who knew or had reason to know of the existence or known status of the system, is liable to the buyer or transferee for costs relating to bringing the system into compliance with the individual sewage treatment system rules and for reasonable attorney fees for collection of costs from the seller or transferor. An action under this subdivision must be commenced within two years after the date on which the buyer or transferee closed the purchase or transfer of the real property where the system is located.

Subd. 7. Local standards. (a) Existing systems. Counties may adopt by ordinance local standards that are less restrictive than the agency's rules in order to define an acceptable existing system. The local standards may include soil separation, soil classification, vegetation, system use, localized well placement and construction, localized density of systems and wells, extent of area to be covered by local standards, groundwater flow patterns, and existing natural or artificial drainage systems. The local standards and criteria

shall be submitted to the commissioner for comment prior to adoption to demonstrate that, based on local circumstances in that jurisdiction, they adequately protect public health and the environment.

(b) New or replacement systems. Counties, after providing documentation of conditions listed in this paragraph to the commissioner, may adopt by ordinance local standards that are less restrictive than the agency's rules for new system construction or replacement in areas of sustained and projected low population density where conditions render conformance to applicable requirements difficult or otherwise inappropriate. Documentation may include a map delineating the area of the county to be served by the local standards, a description of the hardship that would result from strict adherence to the agency's rules, and evidence of sustained and projected low population density. The local standards must protect human health and the environment and be based on considerations that may include, but need not be limited to, soil separation, soil classification, vegetation, system use, localized well placement and construction, localized density of systems and wells, extent of area to be covered by local standards, groundwater flow patterns, and existing natural or artificial drainage systems. The local standards must provide cost-effective and long-term treatment alternatives. The draft ordinance incorporating the local standards must be submitted to the local water planning advisory committee, created under section 103B.321, subdivision 3, and then submitted with justification to the commissioner 30 days before adoption for review and comment.

(c) New or replacement systems; local ordinances. A local unit of government may adopt and enforce ordinances or rules affecting new or replacement individual sewage treatment systems that are more restrictive than the agency's rules. A local unit of government may not adopt or enforce an ordinance or rule if its effect is to prevent or delay recording with the county recorder or registrar of titles of a deed or other instrument that is otherwise entitled to be recorded.

(d) Local standards; conflict with state law. Local standards adopted under paragraph (a) or (b) must not conflict with any requirements under other state laws or rules or local ordinances, including, but not limited to, requirements for:

(1) systems in shoreland areas, regulated under sections 103F.201 to 103F.221;

(2) well construction and location, regulated under chapter 103I; and

(3) systems used in connection with food, beverage, and lodging establishments, regulated under chapter 157.

The local standards must include references to applicable requirements under other state laws or rules or local ordinances.

Subd. 8. Repealed, 1Sp2001 c 2 s 162

Subd. 9. Warrantied systems. (a) An individual sewage treatment system may

be installed provided that it meets all local ordinance requirements and provided the requirements of paragraphs (b) to (d) are met.

(b) The manufacturer shall provide to the commissioner:

(1) documentation that the manufacturer's system was designated by the agency as a warrantied system as of June 30, 2001, and the system meets the size requirements or other requirements that were the basis for the warrantied system classification;

(2) documentation showing that a minimum of 50 of the manufacturer's systems have been installed and operated and are under normal use across all major soil classifications for a minimum of three years;

(3) documentation that the system manufacturer or designer will provide full warranty effective for at least five years from the time of installation, covering design, labor, and material costs to remedy failure to meet performance expectations for systems used and installed in accordance with the manufacturer's or designer's instructions; and

(4) a commonly accepted financial assurance document or documentation of the manufacturer's or designer's financial ability to cover potential replacement and upgrades necessitated by failure of the system to meet the performance expectations for the duration of the warranty period.

(c) The manufacturer shall reimburse the agency an amount of $1,000 for staff services needed to review the information submitted pursuant to paragraph (b). Reimbursements accepted by the agency shall be deposited in the environmental fund and are appropriated to the agency for the purpose of reviewing information submitted. Reimbursement by the manufacturer shall precede, not be contingent upon, and shall not affect the agency's decision on whether the submittal meets the requirements of paragraph (b).

(d) The manufacturer shall provide to the local unit of government reasonable assurance of performance of the manufacturer's system, engineering design of the manufacturer's system, a monitoring plan that will be provided to system owners, and a mitigation plan that will be provided to system owners describing actions to be taken if the system fails.

(e) The commissioner may prohibit an individual sewage treatment system from qualifying for installation under this subdivision upon a finding of fraud, system failure, failure to meet warranty conditions, or failure to meet the requirements of this subdivision or other matters that fail to meet with the intent and purpose of this subdivision. Prohibition of installation of a system by the commissioner does not alter or end warranty obligations for systems already installed. Subd. 10. System classification. The agency is not required to add, remove, or reclassify individual sewage treatment system technologies, designs, or system components through rulemaking or pursuant to existing rules until July 1, 2003. The agency is not required to review, assess, advise, or make regulatory determinations on an

individual sewage treatment system technology, design, or system component during this period. Chambered systems, as defined in Minnesota Rules, part 7080.0020, that are installed before July 1, 2003, with smaller than standard soil sizing, but which otherwise conform with Minnesota Rules, part 7080.0178, are not required to have flow measuring devices installed and monitored unless required by local ordinance.

Minnesota Statute 115.56 Mandatory licensing program for ISTS professionals.

Subdivision 1. Rules. (a) Pursuant to section 115.03, subdivision 1, by January 1, 1996, the agency shall adopt rules containing standards of licensure applicable to all individual sewage treatment system professionals. The rules must include but are not limited to:

(1) training requirements that include both classroom and fieldwork components;

(2) examination content requirements and testing procedures;

(3) continuing education requirements;

(4) equivalent experience provisions;

(5) bonding and insurance requirements;

(6) schedules for submitting fees; and

(7) license revocation and suspension and other enforcement requirements.

(b) The agency shall consult with the advisory committee before proposing any rules under this subdivision.

Subd. 2. License required. (a) Except as provided in paragraph (b), after March 31, 1996, a person may not design, install, maintain, pump, or inspect an individual sewage treatment system without a license issued by the commissioner.

(b) A license is not required for a person who complies with the applicable requirements if the person is:

(1) a qualified employee of state or local government who has passed the examination described in paragraph (d) or a similar examination;

(2) an individual who constructs an individual sewage treatment system on land that is owned or leased by the individual and functions solely as the individual's dwelling or seasonal dwelling;

(3) a farmer who pumps and disposes of sewage waste from individual sewage treatment systems, holding tanks, and privies on land that is owned or leased by the farmer; or

(4) an individual who performs labor or services for a person licensed under this section in connection with the design, installation, maintenance, pumping, or inspection of an individual sewage treatment system at the direction and under the personal supervision of a person licensed under this section.

Section: 115.56 (mandatory licensing) continued

under clause (2) must consult with a site evaluator or designer before beginning construction. In addition, the system must be inspected before being covered and a compliance report must be provided to the local unit of government after the inspection.

(c) The commissioner, in conjunction with the University of Minnesota extension service or another higher education institution, shall ensure adequate training exists for individual sewage treatment system professionals.

(d) The commissioner shall conduct examinations to test the knowledge of applicants for licensing and shall issue documentation of licensing.

(e) Licenses may be issued only upon successful completion of the required examination and submission of proof of sufficient experience, proof of general liability insurance, and a corporate surety bond in the amount of at least $10,000.

(f) Notwithstanding paragraph (e), the examination and proof of experience are not required for an individual sewage treatment system professional who, on the effective date of the rules adopted under subdivision 1, holds a certification attained by examination and experience under a voluntary certification program administered by the agency.

(g) Local units of government may not require additional local licenses for individual sewage treatment system professionals.

(h) A pumper whose annual gross revenue from pumping systems is $9,000 or less and whose gross revenue from pumping systems during the year ending May 11, 1994, was at least $1,000 is not subject to training requirements in rules adopted under subdivision 1, except for any training required for initial licensure.

Subd. 2a. Temporary license. The agency may issue, for a fee of $100, a temporary license for an activity listed in subdivision 1, paragraph (a), to a person who:

(1) has submitted to the agency proof of sufficient experience, as determined by the agency, in the activity for which the license is sought; and

(2) has completed training under a voluntary certification program administered by the agency.

A temporary license issued under this subdivision is effective until August 15, 1996.

Subd. 3. Enforcement. (a) The commissioner may deny, suspend, or revoke a license, or use any lesser remedy against

an individual sewage treatment system professional, for any of the following reasons:

(1) failure to meet the requirements for a license;

(2) incompetence, negligence, or inappropriate conduct in the performance of the duties of an individual sewage treatment system professional;

Section: 115.56 (mandatory licensing) continued

(3) failure to comply with applicable requirements; or

(4) submission of false or misleading information or credentials in order to obtain or renew a license.

(b) Upon receiving a signed written complaint that alleges the existence of a ground for enforcement action against a person under paragraph (a), the commissioner shall initiate an investigation. Revocation, suspension, or other enforcement action may not be taken before written notice is given to the
person and an opportunity is provided for a contested case hearing complying with the provisions of chapter 14.

Subd. 4. License fee. The fee for a license required under subdivision 2 is $100 per year. Revenue from the fees must be credited to the environmental fund and is exempt from section 16A.1285.

Appendix B
County ISTS
Annual Report follows

2002 County Annual Report

LUG	*LGU Type 1 = county 2 = city 3 = township 4 = Other*	Maintenance/ Pumping Program 1 = yes	Number of Full Time Residences with ISTS	Number of Seasonal Residences with ISTS	Number of Other Establishments with ISTS	% Failing Systems	Total Failing Systems	% Imminent Threat to Public Health and Safety	Total Imminent Threat to Public Health and Safety
Aitkin	1		8,195	6,407	298	39	5,695	3	438
Anoka	1				90		0		0
Becker	1		388			6	23	1	4
Beltrami	1		14,437			20	2,887	20	2,887
Benton	1	1	5,125	143	236	44	2,318	10	527
Big Stone	1		900	300	5	20	240	30	360
Blue Earth	1		5,500	150	175	50	2,825	25	1,413
Brown County	1		2,400	10	25	15	362	65	1,567
Carlton	1		4,167	1,371	50	33	1,828	10	554
Carver County	1	1	4,192			50	2,096	15	629
Cass	1	1	7,000	7,000	450	35	4,900	20	2,800
Chippewa	1		2,200			7	154	55	1,210
Chisago	1		7,275				0		0
Clay	1		95	5		45	45	15	15
Clearwater	1		1,300	300	5	15	240	5	80
Cook	1		1,323	2,213	132	35	1,238	4	141
Cottonwood	1		1,440			10	144	57	821
Crow Wing	1	1	15,400			18	2,772	4	616
Dakota	1	1	2,000			40	800	10	200
Dodge	1	1	2,582			40	1,033	10	258
Douglas	1		6,000	4,000	100	60	6,000	10	1,000
Faribault	1	1	2,350		50		0	72	1,692
Filmore	1		90	10		5	5		0
Freeborn	1	1	2,500			16	400	12	300
Goodhue	1	1	323			40	129	20	65
Grant	1		700	300		50	500	40	400
Hennepin	1	1	1,800			25	450	5	90
Houston	1		3,100	0		25	775	25	775
Hubbard	1		4,000	5,000	1,000	35	3,150	5	450
Isanti	1		8,800	1,400	50	20	2,040	5	510
Itasca	1	1	13,790			55	7,585	5	690

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Jackson	1		3,000	150	40	10	315	65	2,048
Kanabec	1		3,000	400	10	25	850	5	170
Kandiyohi	1		4,866	1,216	50	45	2,737	15	912
Kittson	1		1,100			10	110	0	0
Koochiching	1		5,000	1,000	20	50	3,000	10	600
Lac qui Parle	1		1,516	116	0	20	326	40	653
Lake	1	1	3,113	1,830	30	15	741	15	741
Lake of the Woods	1	1	1,500	500	20	20	400	1	20
LeSueur	1	1	4,125	563			0		0
Lincoln	1	1	1,150	150	10	60	780	40	520
Lyon	1		2,350			45	1,058	10	235
Mahnomen	1	1	3,471	905	124		0		0
Marshall	1		2,800			10	280	0	0
Martin	1		4,500			50	2,250	28	1,260
McLeod	1		13,950	1,000	50	20	2,990	30	4,485
Meeker	1		3,500	700	50	10	420	5	210
Mille Lacs	1	1	3,630	1,630		40	2,104	3	158
Morrison	1		3,000		1,000	15	450	15	450
Mower	1		3,800			50	1,900	20	760
Murray	1		1,803			38	685	40	721
Nicollet	1		2,275	150	35	20	485	45	1,091
Nobles	1		2,400	6	12		0		0
Norman	1		1,380			10	138	5	69
Olmsted	1		3,775			50	1,888		0
Otter Tail	1	1	12,600	7,120	700	50	9,860	15	2,958
Pennington	1		1,200			5	60	0	0
Pine	1		2,047	1,331	35	20	676	3	101
Pipestone	1		1,100	70	20	90	1,053	10	117
Polk	1		2,770	1,880	50	25	1,163	10	465
Pope	1	1	71	31	7	20	20	10	10
Red Lake	1		1,117			40	447	40	447

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Redwood	1	1	2,200	10	10		0		0
Renville	1		2,486			14	348	65	1,616
Rice	1	1	6,700	500	20	6	432	7	504
Rock	1		1,200			40	480	25	300
Roseau	1						0		0
Scott	1		3,750	100	15	40	1,540	40	1,540
Sherburne	1		13,400			10	1,340	1	134
Sibley	1		4,000	20	10	20	804	60	2,412
St. Louis	1		3,600	8,900	3,000	50	6,250	3	375
Stearns	1		13,000	2,000		30	4,500	2	300
Steele	1		2,900			40	1,160	20	580
Stevens	1		1,159			10	116	30	348
Swift	1	1	3,800	100		85	3,315	5	195
Todd	1		8,500			37	3,145	12	1,020
Traverse	1	1	1,000			35	350	20	200
Wabasha	1						0		0
Wadena	1	1	3,000	1,000	50	10	400	5	200
Waseca	1	1	1,375	100	25	31	457	31	457
Washington	1	1	12,300	1,400	300		0	1	137
Watonwon	1		1,300	30	5	5	67	40	532
Wilken	1		1,200	30	5	50	615	25	308
Winona	1		4,100	100	300	32	1,344	12	504
Wright	1					35	0	5	0
Yellow Medicine	1		1,661	3	1	20	333	20	333
Afton	2	1	1,132			20	226		0
Andover	2	1	3,263			0	0	0	0
Annandale	2		25				0		0
Apple Valley	2	1	83	0	0	0	0	0	0
Atrura	2						0		0
Barrett	2		7	1		0	0	0	0
Baxter	2		1,000			50	500	25	250

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Becker	2						0		0
Bemidji	2						0		0
Benson	2						0		0
Big Lake	2		58				0		0
Bingham Lake	2						0		0
Blaine	2		807			6	48	10	81
Bloomington	2	1	70			95	67	0	0
Brainerd	2		25	0	0	25	6	0	0
Breezy Point	2		490	292	9	1	4	1	4
Burnsville	2	1	242		8	0	0	0	0
Cambridge	2		98	0	0	0	0	0	0
Center City	2						0		0
Chanhassen	2		360	5	10	5	18	1	4
Climax	2						0		0
Cloquet	2		1,500	0			0		0
Coates	2	1	51		8		0		0
Cohasset	2	1	843				0		0
Corcoran	2	1	1,719	0	82		0		0
Crosby	2						0		0
Crosslake	2						0		0
Dassel	2		6			0	0	0	0
Dayton	2						0		0
Deer Creek	2						0		0
Dellwood	2	1	377		3	100	377	0	0
East Bethel	2	1	3,575	150	50	25	931	3	112
East Gull Lake	2		110	250	1	0	0	0	0
Eden Praire	2						0		0
Elbow Lake	2						0		0
Elk River	2	1	2,250			1	23	1	23
Elmore	2	1	3			0	0	0	0
Emily	2						0		0

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Faribault	2						0		0
Fergus Falls	2		35		10	0	0	0	0
Fergus Falls	2		35		10	0	0	0	0
Fertile	2						0		0
Fifty Lakes	2	1	400	1,000	4	1	14	0	0
Foley	2	1	4	1		0	0	0	0
Foreston	2						0		0
Fosston	2						0		0
Frazee	2		12	0	0	0	0	0	0
Garrison	2						0		0
Gem Lake	2		125	1	0	2	3	0	0
Glenwood	2						0		0
Greenfield	2	1	820	10	25	35	291	35	291
Ham Lake	2	1	4,598			20	920	10	460
Hanover	2		316		8	9	28	0	0
Harris	2	1	300		25	10	30	0	0
Hastings	2		20		1	1	0	0	0
Independence	2	1	1,206		5	30	362	4	48
Inver Grove Heights	2	1	1,492	88			0		0
Isanti	2		25			10	3	0	0
Isanti	2						0		0
Isle	2		52		3	10	5	0	0
Ivanhoe	2						0		0
Jeffers	2						0		0
Jenkins	2	1	95	5	40	40	40	40	40
Lake Benton	2						0		0
Lake Elmo	2	1	1,915			1	19	0	0
Lake Park	2						0		0
Lake Shore	2	1	600		3	29	174	0	0
Lakeville	2	1	511	0	11	20	102	10	51
Laporte	2						0		0

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Lindstrom	2						0		0
Lino Lakes	2	1	2,256			1	16	0	0
Litchfield	2		150	75		20	45	5	11
Little Canada	2		10			0	0	0	0
Maple Grove	2	1	370			0	0	0	0
Medina	2	1	700				0		0
Mentor	2						0		0
Milaca	2						0		0
Minnesota City	2						0		0
Monticello	2						0		0
Mora	2		36			11	4		0
Morristown	2		14			0	0	0	0
Nerstrand	2						0		0
New Hope	2						0		0
New Trier	2	1	39	0	4	0	0	0	0
Nimrod	2		20	5			0		0
Nisswa	2	1	350	170	30	1	3	0	0
North Branch	2	1	2,000			0	0	0	0
North Oaks	2	1	1,257		4		0		0
Northfield	2		33	0	1	6	2	0	0
Northfield	2						0		0
Oak Grove	2	1	2,000	100	5	6	126	1	21
Onamia	2		8				0		0
Orono	2	1	1,000	30	5	30	309	2	21
Orono	2	1	1,000	30		30	309	2	21
Otsego	2	1	2,000			10	200	5	100
Ottertail	2	1	140	62	54	0	0	5	10
Park Rapids	2						0		
Pease	2						0		
Peqout Lakes	2						0		
Pequot Lakes	2						0		

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Ponsford	2						0		
Princeton	2						0		
Ramsey	2	1	3,825		40	10	383	1	38
Rice	2	1	8	0	0	0	0	0	
Richfield	2	1					0		
Riverton	2						0		
Rockford	2		6	0	0		0		0
Rogers	2		37			1	0		0
Ronneby	2						0		
Rosemount	2	1	729		36		0		0
Royalton	2						0		
Shoreview	2	1	45			50	23	0	0
St. Charles	2						0		
St. Cloud	2		400			25	100	10	40
St. Francis	2						0		0
St. Louis Park	2		3	0	1	0	0		0
St. Michael	2		100			10	10	1	1
St. Paul	2	1	139		2	25	35	21	29
Stillwater	2	1	95	0	0	50	48	0	0
Stockton	2	1	165	0	6	0	0	0	0
Storden	2						0		
Sturgeon Lake	2		113	14	1	3	4	1	1
Taylors Falls	2						0		
Tonka Bay	2		0				0		0
Trammald	2	1	35	2		0	0	0	0
Tyler	2						0		
Vadnais Heights	2	1	24				0		0
Verndale	2		19			5	1	5	1
Wabasha	2		96	1		20	19	0	0
Wahkon	2						0		
Waubun	2						0		

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Wayzata	2	1	17			0	0	0	0
Westbrook	2						0		
White Bear Lake	2		41		1		0	0	0
Windom	2						0		
Winger	2		100	0	0	0	0	0	
Woodland	2						0		
Wright	2						0		0
Wyoming	2	1	6	0	0	0	0	0	0
Zimmerman	2		100	0		0	0	0	0
Arlone	3		127	27	1	7	11	1	2
Arna	3	1	50	40	0	10	9	0	0
Arthur	3						0		0
Barry	3		185	15	0	5	10	2	4
Bruce	3						0		0
Burns	3	1	1,200		10	0	0	0	0
Clover	3						0		0
Columbus	3		1,383			0	0	0	0
Crosby	3		35	15	0	7	4	2	1
Danforth	3		29	28	0	7	4	2	1
Dell Grove	3		240	38	0	5	14	1	3
Farmington	3		152	0	0	10	15	2	3
Fisher	3		590				0		0
Fleming	3		41	51	1	10	9	2	2
Hassan	3		940		15	9	85	0	0
Hinckley	3		290	19		8	25		0
Kettle River	3		150	38		3	6	1	2
Linwood	3	1	1,252	11	7	3	38	2	25
New Dorsey	3		34	56		10	9	2	2
New Haven	3		433			5	22	5	22
Ninninger	3	1					0		0
Norman	3		93	34	8		0	2	3

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Northern	3		1,800	125	75	10	193	1	19
Ogema	3		80	40	9		0	2	2
Osage	3						0		
Partridge	3		186	26		9	19	2	4
Princeton	3						0		
Sandstone	3		256	38		8	24	2	6
Stowe Prairie	3	1	208				0		0
Sturgeon Lake	3		99	9		9	10	2	2
Thomson	3				8	50	0	25	0
Township Cooperative Planning Assoc.	3					20	0	2	0
White Bear	3	1	137		9		0		0
Wilma	3		30	22	1	8	4	2	1
Windemere	3		1,200	50	50	5	63	10	125
Wyoming	3		1,905	19	41	5	96	1	19
Ottertail Water Mgt District	4						0		0
	Totals	**79**	**387,178**	**66,643**	**9,411**		**121,306**		**53,590**
White Earth							0		
		38%	**85%**	**15%**			**27%**		**12%**
			total residential ISTS		**453,821**				