Minnesota’s subsurface sewage treatment systems (SSTSSs)

- Environmental impacts
- Picture of compliance
- MPCA SSTSS enforcement activities
- Addressing noncompliance
- County implementation of the SSTSS program
Sewage contains:

- Pathogens
- Nutrients
  - Nitrogen
  - Phosphorus
- Oxygen Demand
- Small amount of chemicals
Purpose of SSTS

- Eliminate human exposure to E. coli, other pathogens
- Minimize impact on groundwater supplies
- Levels of fecal bacteria in sewage can be 2 million organisms per 100 ml
- Minnesota surface water quality standard: under 200 organisms per 100 ml
Imminent threat to public health, safety

- Surfacing to ground
- Discharge to water body
- Sewage backup
- Any thing that immediately and adversely impacts (inspector’s discretion)
- Includes “straight pipes” under MS 115.55 sub 11
- A Public Health Nuisance (under MN Statutes 145A) is determined by local health board
Percent of ITPH septic systems and fecal coliform impaired waters
Basic SSTS design

- **Home**
- **Well**
- **Primary treatment**
  - Septic Tank
- **Dispersal**
  - Soil Absorption
  - Soil Layers
  - Water Table

**“anaerobic” process in tank**

**“aerobic” process in soil**
7 basic SSTS requirements

1. Treatment and disposal below grade
2. Safe systems - no physical injury or harm
3. Sewage must be discharged into an unsaturated zone
4. Fecal organisms are totally removed before entering the saturated zone
5. SSTS must not receive hazardous materials
6. Larger systems must reduce nitrogen
7. Larger systems near lakes must assess for phosphorus
Soil dispersion system types

Trench  |  At- Grade  |  Mound

Periodically saturated soil or Bedrock

Separation may be reduced from three feet to as little as one foot through use of a registered pretreatment device, allowing trenches or at-grade systems as an option where mounds would be required without pretreatment.
Advanced treatment

The 3-foot separation distance can be reduced if an advanced treatment device is used.
History of installations

- SSTS installed in rural areas without access to centralized collection systems
- Surface waters often located nearby, as in the case of lake homes, resorts, farms, etc.
History of installations

Minnesota:

- Wet soils (average seasonally high watertable = 3 feet from ground surface)
- High clay soils
- Flat landscape
- Deep frost

Tough place to treat and disperse sewage
Out-of-date ways of treating septage

- Cesspool
- Seepage pit
- Soil dispersal systems without proper vertical separation distance (3 feet)
History of installations

- Statewide rules new to many areas of Minnesota
- Past – Concern was for disposal, not treatment then disposal
- Driving force for system was gravity disposal
  - Pipe to ditch, low area or water body
  - Hook-up to agricultural drain tile
  - Deep cesspool/seepage pit (in watertable for flushing)
Role of state vs. local programs

State role – lay out design and compliance criteria for systems, establish requirements for local programs, certify individuals and license businesses to do SSTS work, register treatment products

Local programs – review plans, approve permits and inspect new/replacement systems, ensure compliance of systems when Notice of Noncompliance is issued

Responsibility of counties – adopt SSTS ordinances that comply with state rule and cover all of county not covered by city or town ordinance

Options for cities and towns – can choose whether to regulate SSTS or not; if not, falls to county
Compliance estimates and trends

Data received from local units of government
LGUs asked to ‘estimate’ compliance, for most this is not hard data
Estimates have been increasingly accurate for some as work is done to detail areas of noncompliance
Some LGUs do not provide all data requested
Reporting rates are pretty good but not 100%
Recent trend shows compliance (green) increasing while the percentage of imminent threat systems (red) is decreasing.
MN Statute 115.55 and 115.56

- MPCA to develop rules (now promulgated as MR ch 7080, 7081, 7082, 7083)
- County-wide ordinance coverage
- **Local** permitting and inspection program
- **State** licensing program (115.56)
SSTS certification and licensing

Individuals are **Certified**
- Attend training by U of M (special courses)
- Tested by MPCA
- Gain experience under mentors

Businesses are **Licensed**
- Must have:
  - Certified Individual in each discipline
  - Liability insurance (at least $100,000)
  - Bond ($10,000 or $25,000)
Certification

- Certification lasts for three years
- No fee for certification (must pay for U of M classes, no charge for exam or certification)
- Some new entrants into program have trouble finding a mentor; some pay a fee for this service
- Certification is renewed by taking accredited continuing education courses (U of M and other)
  - 12 hours every 3 years for installers, maintainers and service providers
  - 18 hours every 3 years for designers and inspectors
Licenses allow work statewide (no local licensure allowed)

License fee is $200/year for each discipline in which the business is licensed, max = $400/business

Some licensees purchase joint bond that covers both plumbing and SSTS work (streamlining)
SSTS industry in Minnesota

Number of Licensed Businesses

Maintainers 411
Installers 1133
Service Providers 64
Inspectors 382 (Includes AI)
Designers 746 (Includes AD)
Adv Designers (AD) 35
Adv Inspectors (AI) 22

Total 1,487
## SSTS industry in Minnesota

### Number of Certified Individuals

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintainers</td>
<td>591</td>
</tr>
<tr>
<td>Installers</td>
<td>1873</td>
</tr>
<tr>
<td>Service Providers</td>
<td>119</td>
</tr>
<tr>
<td>Inspectors (Includes AI)</td>
<td>895</td>
</tr>
<tr>
<td>Designers (Includes AD)</td>
<td>1184</td>
</tr>
<tr>
<td>Adv Designers (AD)</td>
<td>61</td>
</tr>
<tr>
<td>Adv Inspectors (AI)</td>
<td>55</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,831</strong></td>
</tr>
</tbody>
</table>

SSTS in Minnesota – October 2011
Compliance and enforcement

State role
- Enforcement relating to licensure
- Enforcement of straight pipe law on request
- Local government oversight
- Assistance, training

Local role
- Individual system compliance
  - Ensure systems are built to standards
  - Upgrades within established period
## Compliance activities – state FY11

<table>
<thead>
<tr>
<th>Action</th>
<th>Number of Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistance Calls</td>
<td>2066</td>
</tr>
<tr>
<td>Inspections</td>
<td>41</td>
</tr>
<tr>
<td>Complaints Referred to LGU</td>
<td>98</td>
</tr>
<tr>
<td>Complaints investigated by MPCA</td>
<td>109</td>
</tr>
<tr>
<td>Ordinance Reviews</td>
<td>15</td>
</tr>
</tbody>
</table>

SSTS in Minnesota – October 2011
<table>
<thead>
<tr>
<th>Action</th>
<th>Total</th>
<th>Penalties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Letter of Warning</td>
<td>3</td>
<td>No penalties with this type of action</td>
</tr>
<tr>
<td>Notice of Violation</td>
<td>9</td>
<td>No penalties/precursors to APOs, Stips</td>
</tr>
<tr>
<td>Alleged Violation</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Administrative Penalty Order (APO)</td>
<td>28</td>
<td>Up to $10,000; average $2,000 to $3,000</td>
</tr>
<tr>
<td>Stipulation Agreement (Stip)</td>
<td>1</td>
<td>$5,500</td>
</tr>
<tr>
<td>Order of Sanctions</td>
<td>1</td>
<td>License revocation</td>
</tr>
</tbody>
</table>
Straight pipe enforcement

Total straight pipe cases tracked = 378

- Cases resolved w/o enforcement action
- Cases not resolved but still in 10-month window for replacement
- Cases subject to MPCA enforcement action, paid
- Cases issued enforcement action; resolution pending
Small community wastewater needs in Minn.

Final Report
June 2008

http://www.pca.state.mn.us/publications/wq-wwtp1-06.pdf
Plan to Address Small Community Wastewater Needs in Minnesota

- List of accomplishments past 12 years
- Updated list of small community wastewater needs (survey to counties)
- Identify barriers, priorities, and strategy to work proactively with communities
# Improvements 1996-2007

<table>
<thead>
<tr>
<th>MPCA Region</th>
<th>Number of Communities</th>
<th>Estimated Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southwest</td>
<td>26 (26*)</td>
<td>4,106</td>
</tr>
<tr>
<td>Southeast</td>
<td>46 (12*)</td>
<td>12,176</td>
</tr>
<tr>
<td>North Central</td>
<td>10</td>
<td>3,131</td>
</tr>
<tr>
<td>Northwest</td>
<td>10 (few type #2)</td>
<td>1,584</td>
</tr>
<tr>
<td>Northeast</td>
<td>19</td>
<td>10,957</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>111</strong></td>
<td><strong>31,954</strong></td>
</tr>
</tbody>
</table>
County survey

- 75 of 87 counties responded
- SSTS staff participated
- **Suspected** ‘types of problems’ (known or suspected)
  1 = community straight pipe
  2 = individual straight pipe
  3 = surfacing in yard
  4 = poor soils
  5 = small lots
  6 = other reasons (i.e. old systems)
  7 = unknown and development pressures
## Survey results

### 75 counties

<table>
<thead>
<tr>
<th></th>
<th>Metro Area</th>
<th>South East</th>
<th>South West</th>
<th>North East</th>
<th>North West</th>
<th>North Central</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Number</strong></td>
<td>136</td>
<td>130</td>
<td>78</td>
<td>108</td>
<td>378</td>
<td>195</td>
<td>1,025</td>
</tr>
<tr>
<td><strong>Incorporated Areas</strong></td>
<td>31</td>
<td>14</td>
<td>17</td>
<td>5</td>
<td>15</td>
<td>21</td>
<td>103</td>
</tr>
<tr>
<td><strong>Unincorporated Areas</strong></td>
<td>105</td>
<td>116</td>
<td>61</td>
<td>103</td>
<td>363</td>
<td>174</td>
<td>922</td>
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<tr>
<td><strong>Suspect Community Straight-Pipes #1</strong></td>
<td>1</td>
<td>18</td>
<td>13</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>33</td>
</tr>
<tr>
<td><strong>Suspect Individual Straight-Pipes #2</strong></td>
<td>6</td>
<td>11</td>
<td>27</td>
<td>4</td>
<td>1</td>
<td>24</td>
<td>73</td>
</tr>
</tbody>
</table>
### 2008 distribution of straight pipe communities

<table>
<thead>
<tr>
<th>Region</th>
<th>No. of Communities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southwest</td>
<td>40</td>
</tr>
<tr>
<td>Southeast</td>
<td>29</td>
</tr>
<tr>
<td>North Central</td>
<td>24</td>
</tr>
<tr>
<td>Metro Area</td>
<td>7</td>
</tr>
<tr>
<td>Northeast</td>
<td>5</td>
</tr>
<tr>
<td>Northwest</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>106</strong></td>
</tr>
</tbody>
</table>
Small communities in the southwest with wastewater needs: 2008 survey
Priorities

- 33 - Number of communities with suspected common straight pipes discharging to surface waters
- 73 - Number of communities with suspected individual straight pipes discharging to surface waters or ground surface
- 688 - Number of lake communities with suspected problem site conditions for modern septic systems
Overall straight-pipe goal

- Eliminate discharges of raw or partially settled sewage into surface waters or onto the ground surface from community straight-pipes and individual straight pipes
- Timeline: Get all problem areas on the road to compliance by the end of 2014 (~14 communities per year)
Odin straight pipe discharge

- May 2008
- Pam Meyer collecting sample
- Validating straight pipe
Surface discharges of sewage
**Straight-pipe progress**

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of communities with straight pipes reported *</th>
<th>Number Fixed in 2007-08</th>
<th>Number Remaining 2008</th>
<th>Number Fixed in 2009</th>
<th>Number Remaining 2009</th>
<th>Number Fixed in 2010</th>
<th>Number Remaining 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metro</td>
<td>7</td>
<td>1</td>
<td>6</td>
<td>0</td>
<td>6</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Southwest</td>
<td>40</td>
<td>2</td>
<td>38</td>
<td>4</td>
<td>34</td>
<td>5</td>
<td>29</td>
</tr>
<tr>
<td>Southeast</td>
<td>29</td>
<td>6</td>
<td>23</td>
<td>0</td>
<td>23</td>
<td>8</td>
<td>14**</td>
</tr>
<tr>
<td>Northeast</td>
<td>5</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Northwest</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>North central</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>84</strong></td>
<td><strong>10</strong></td>
<td><strong>74</strong></td>
<td><strong>6</strong></td>
<td><strong>68</strong></td>
<td><strong>15</strong></td>
<td><strong>52</strong></td>
</tr>
</tbody>
</table>

*The original calendar year 2007 estimate was 106 communities in the 2008 report; this estimate was reduced after Todd County confirmed no known use of straight pipes. Systems are being upgraded through various trigger mechanisms (i.e. building permit).*

** Andyville (west) upgraded their SSTS; Andyville (east) is planning for a collection system to Lansing Township’s wastewater ponds.

(Updated 10/10/11)
**Straight pipe progress**

* Per 2008 Small Community Wastewater Needs Report.

** The original estimate for Todd County was revised from 24 areas to ‘no straight pipes’. Todd County originally identified 24 areas with wastewater needs; systems are upgraded, as needed, through various trigger mechanisms (i.e. building permits).
Untreated Sewage Status CY10 (gallons/year)

- Surface discharges (#1 and #2) estimated per the 2008 Small Community Needs Report
- Gal/year of unsewered discharges eliminated 2007 to 2010 is estimated at 96.3 million gallons.
The Straight Pipe Law appears to be an effective mechanism in helping to correct ITPH that LGUs have identified.

An estimated 22 million gallons of sewage (annually) now properly treated through this local unit of government/state coordinated enforcement effort.
Partnerships needed to address #1

- MPCA: enforcement on common straight pipes
- Community: addressing their needs
- Hiring a consultant: MAP, regional, U, Rural Development, others
- County: Assist unincorporated in addressing their problems
  - Working with local representatives
  - Creating Subordinate Use Districts to finance
- Cities & sanitary sewer districts: Providing sewer service (within and outside of limits)
- Funding assistance: PFA, Rural Development, BWSR, Counties and others
Minnesota is making progress in eliminating the illegal discharge of sewage onto the surface and into surface waters.

From 1996 – 2007 the illegal discharges from roughly 40 small communities have been eliminated.

Over past four years, 32 small communities have eliminated illegal surface discharge.

Estimated 119 million gallons/year eliminated (96.3 million gallons from 32 small communities + 22.5 million gallons from 330 individual homes from straight pipe referrals).

Of 106 suspected straight-pipe communities identified in 2007, 52 suspected straight-pipe communities remain.

Of the 52, 23 currently working towards eliminating these discharges.
County SSTS program implementation

Requirements

- Adopt and enforce ordinance based on state rules
- Administer permitting and inspection program
- Enforce compliance for systems that don’t meet standards according to upgrade timeline
- Have sufficient staff to administer the program (can contract for services)
- File annual reports with MPCA documenting:
  - Permits issued, by type
  - Tanks installed, by installer
  - Other data to demonstrate program scope and progress
Ordinance adoption progress

- All have adopted some form of MR 7080
- 36 counties have adopted MR 7080 and 7081

Legend

- Updated Ordinance to MPCA Rule
  - Adopted ordinance based on 1999-2006 rule
  - Adopted ordinance based on 2008/2011 rule
  - In process of adopting updated ordinance
Events that trigger a compliance inspection can include:

- An inventory of systems in a specific area
- A program under which systems are routinely inspected in a specific period of time
- Addition of a bedroom, where the local government issues permits for this (MN Statute 115.55)
- Issuance of a local permit, variance or other land use action where this trigger is included in the local ordinance (may be only in certain districts within the jurisdiction, or jurisdiction-wide)
- Sale of a property, or when the buyer, lender or local government requires an inspection
SSTS inspection triggers

Compliance Triggers
Counties with SSTS requirements for permits

Compliance Triggers
Counties with SSTS checks at property transfer

SSTS checks for permits
- No information
- No
- Yes

SSTS checks at property transfer
- No information
- No
- Yes
SSTS inventories (state, locally funded)
County SSTS permitting activities
New, replacement permits 2010

- Metro
- Southwest
- Southeast
- Northwest
- North Central
- Northeast

- # All Replacement Construction Permits
- # All New Construction Permits
**Trigger Effectiveness**

Local program administrators were asked to rank the following triggers as to how effective they would be in getting problem SSTS upgraded in their jurisdiction and 85 answered this question. **Figure 19** shows their responses. The most votes in each category are indicated in red.

**Figure 19 - Trigger effectiveness**

<table>
<thead>
<tr>
<th>A county wide inventory effort</th>
<th>Most effective</th>
<th>Second most effective</th>
<th>Third most effective</th>
<th>Fourth most effective</th>
<th>Fifth most effective</th>
<th>Least effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>8</td>
<td>10</td>
<td>7</td>
<td>11</td>
<td></td>
<td>31</td>
</tr>
<tr>
<td>14</td>
<td>15</td>
<td>10</td>
<td>8</td>
<td>23</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td><strong>43</strong></td>
<td><strong>18</strong></td>
<td><strong>9</strong></td>
<td><strong>8</strong></td>
<td><strong>2</strong></td>
<td></td>
<td><strong>5</strong></td>
</tr>
<tr>
<td>Requiring upgrade at the time of point of sale</td>
<td>17</td>
<td>31</td>
<td>11</td>
<td>10</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Requiring upgrade at the time of issuing building permits</td>
<td>7</td>
<td>6</td>
<td><strong>23</strong></td>
<td>12</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>Requiring upgrade at the time of issuing variances</td>
<td>15</td>
<td>10</td>
<td>11</td>
<td><strong>24</strong></td>
<td>10</td>
<td>15</td>
</tr>
</tbody>
</table>
SSTS upgrade triggers

Regional Percentage of Counties With Point of Sale 2010

- Northeast: 57%
- North Central: 82%
- Northwest: 26%
- Southeast: 75%
- Southwest: 69%
- Metro: 50%
Recent trend shows compliance (green) increasing while the percentage of imminent threat systems (red) is decreasing.
June 29, 2011, letter from Duane Bakke, AMC President to Commissioner Paul Aasen:

AMC requested member counties to comment on SSTS program in May, 2011

Comments varied throughout the state

Common thread:

- Counties would like to see more flexibility offered
- Counties are concerned about increased costs to both the county and to their residents
Thank you!

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http://Septic.umn.edu (U of M)