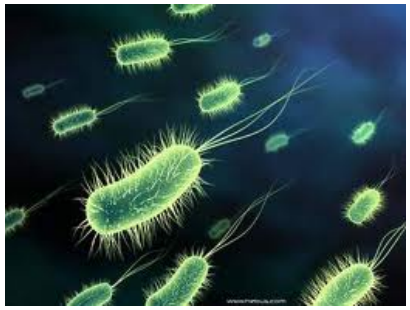
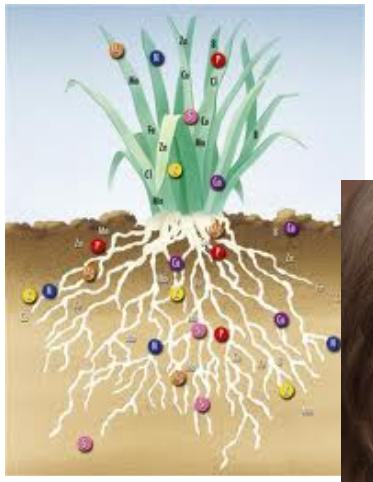
Minnesota's subsurface sewage treatment systems (SSTSs)

- Environmental impacts
- Picture of compliance
- MPCA SSTS enforcement activities
- Addressing noncompliance
- County implementation of the SSTS program

Sewage contains:

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





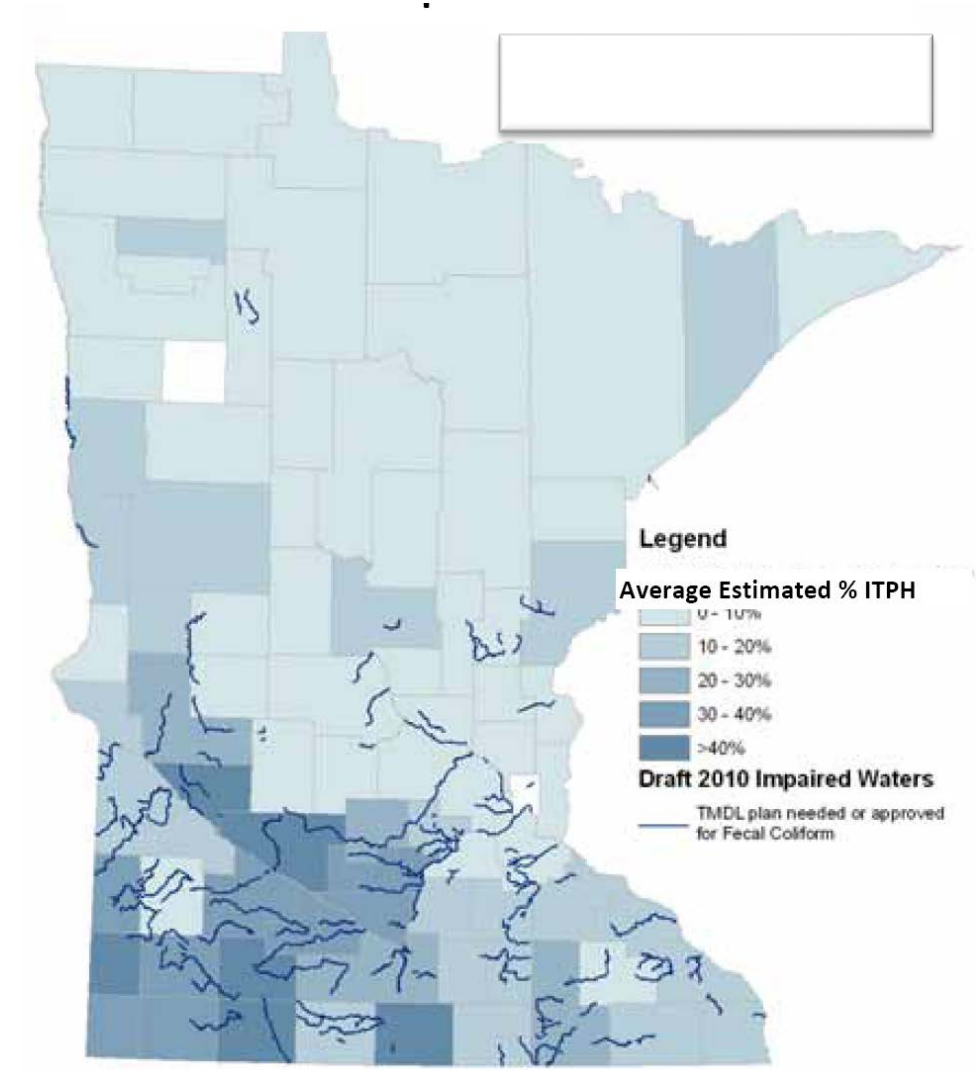
Purpose of SSTS

- 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

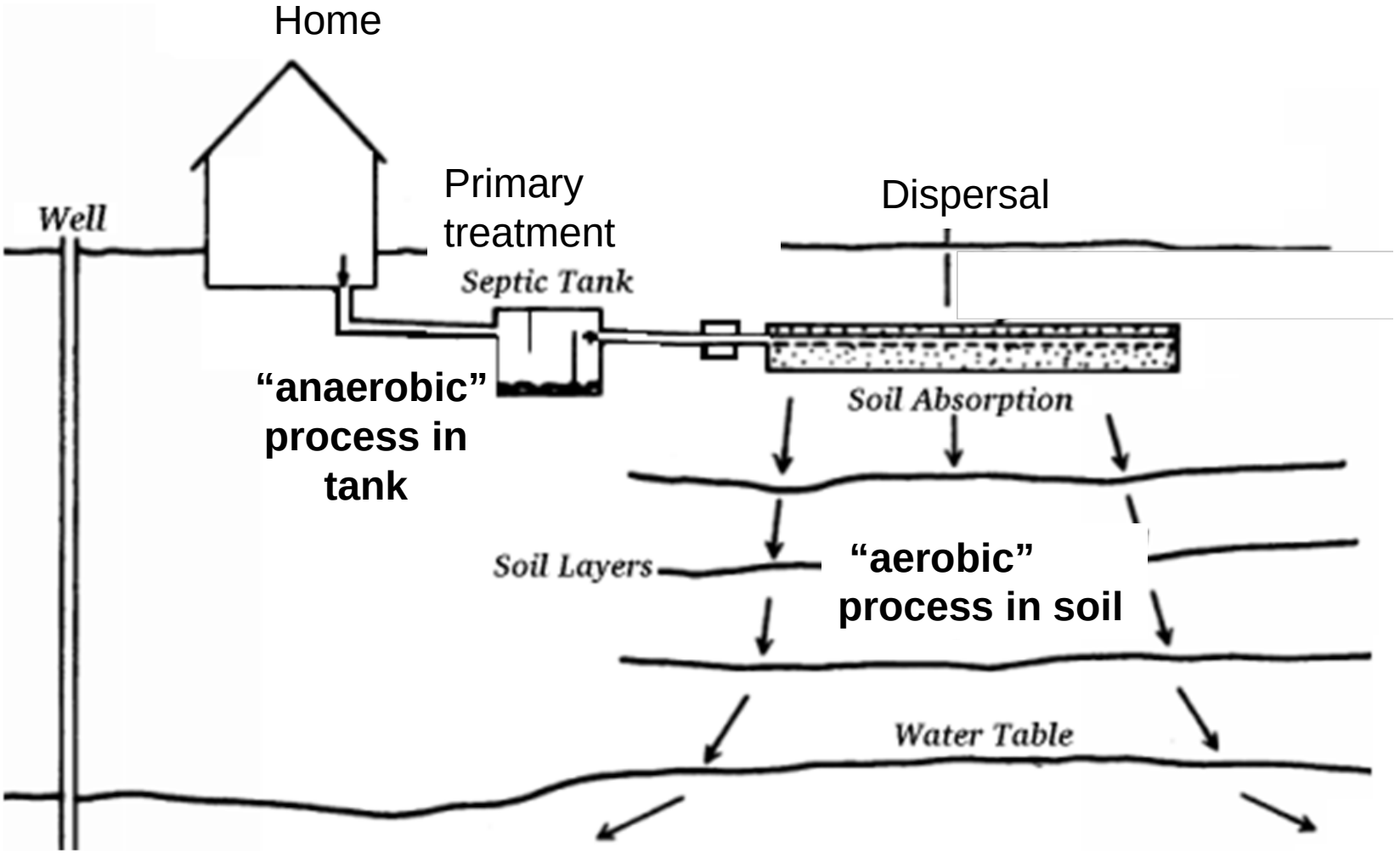
Imminent threat to public health, safety

- 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



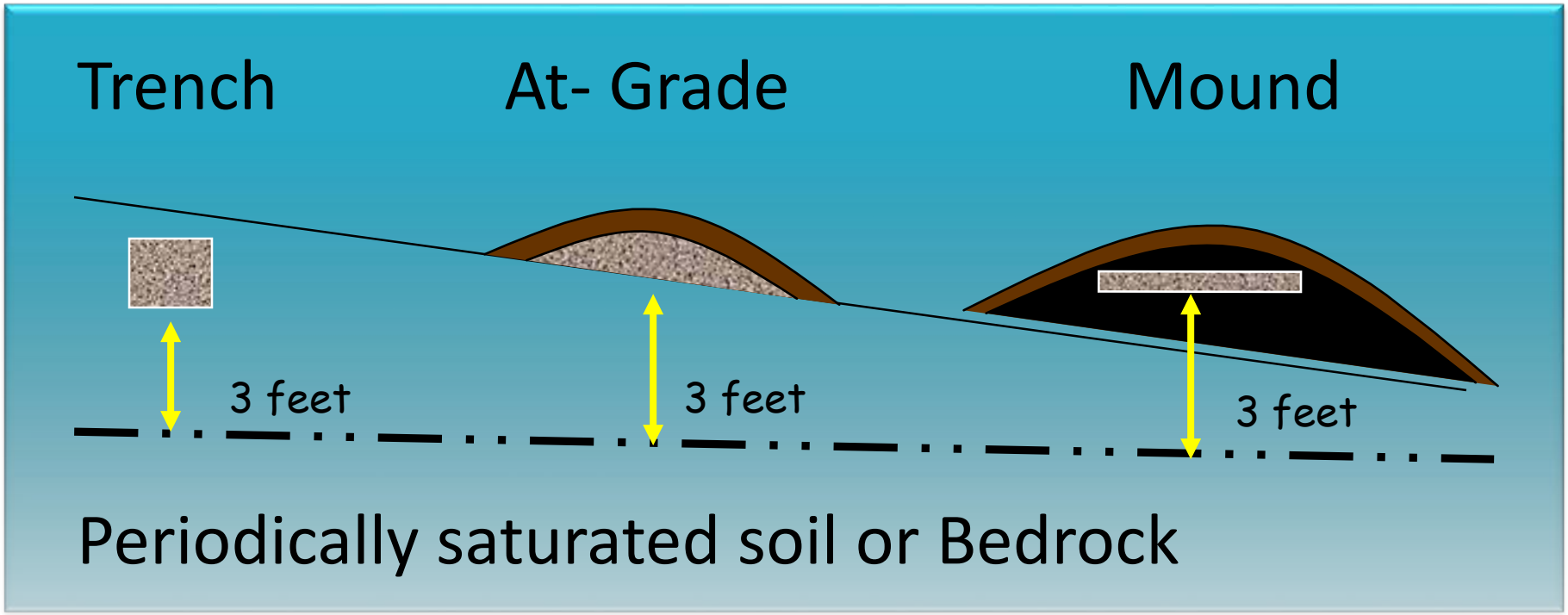
Basic SSTS design



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

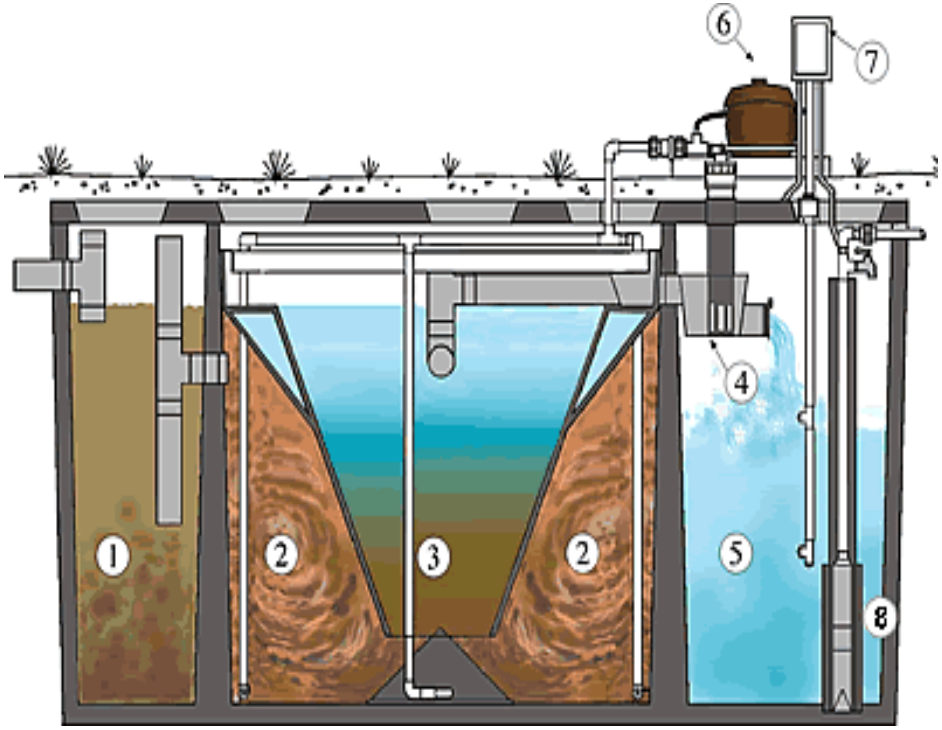
Soil dispersion system types



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.



Minnesota Pollution Control Agency

Treatment Levels:
CBOD$_5$/TSS/Fecal coliform bacteria

A - 15/15/1000 A2 - 15/15
B - 25/30/10000 B2 - 25/30
C - 125/60
TN - 20 mg/L

'At a Glance' Listing of Proprietary Treatment Products for Typical Residential Strength Sewage

Subsurface Sewage Treatment Systems

Proprietary Products Name and Models	Treatment Levels*					
	A	B	A2	B2	C	TN
AdvanTex; AX-20 AX20, AX20-2, AX20-3, AX20-4, and AX20-5			X	X	X	X
AdvanTex; AX-20 AX20, AX20-2, AX20-3, AX20-4, and AX20-5 with Salcor 3G UV disinfection	X	X	X	X	X	X
Ecoflo Biofilter; Closed Bottom, STB Models with: Fiberglass shell • STB-500, STB-500-2, STB-650, STB-650-2, STB-650-3 Concrete shell (gravity discharge) • STB-650B, STB-650B-2, STB-650B-3 Concrete shell (pump discharge) • STB-650BR, STB-650BR-2, STB-650BR-3	X	X	X	X	X	
Ecopod E50, E60, E75, E100, E150, E200, E250, and E300			X	X	X	X
Ecopod E50, E60, E75, E100, E150, E200, E250, and E300 with Salcor 3G UV disinfection	X	X	X	X	X	X
Enviro-Guard (non-modular) ENV-0.75			X	X	X	
Enviro-Guard (non-modular) ENV-0.750 with Salcor 3G UV disinfection	X	X	X	X	X	
Enviro-Guard (modular) ENV-0.75M			X	X	X	
Enviro-Guard (modular) ENV-0.750M with Salcor 3G UV disinfection	X	X	X	X	X	
Fusion ZF-450, ZF-600, and ZF-800				X	X	
Hoot H-Series H-500, H-600, H-750, and H-1000		X	X	X	X	
Hoot H-Series H-500, H-600, H-750, and H-1000 with Salcor 3G UV disinfection	X	X	X	X	X	
Hydro-Action AP-500, AP-600, AP-750, AP-1000, and AP-1500				X	X	
Hydro-Action AP-500, AP-600, AP-750, AP-1000, and AP-1500 with Salcor 3G UV disinfection		X		X	X	

History of installations

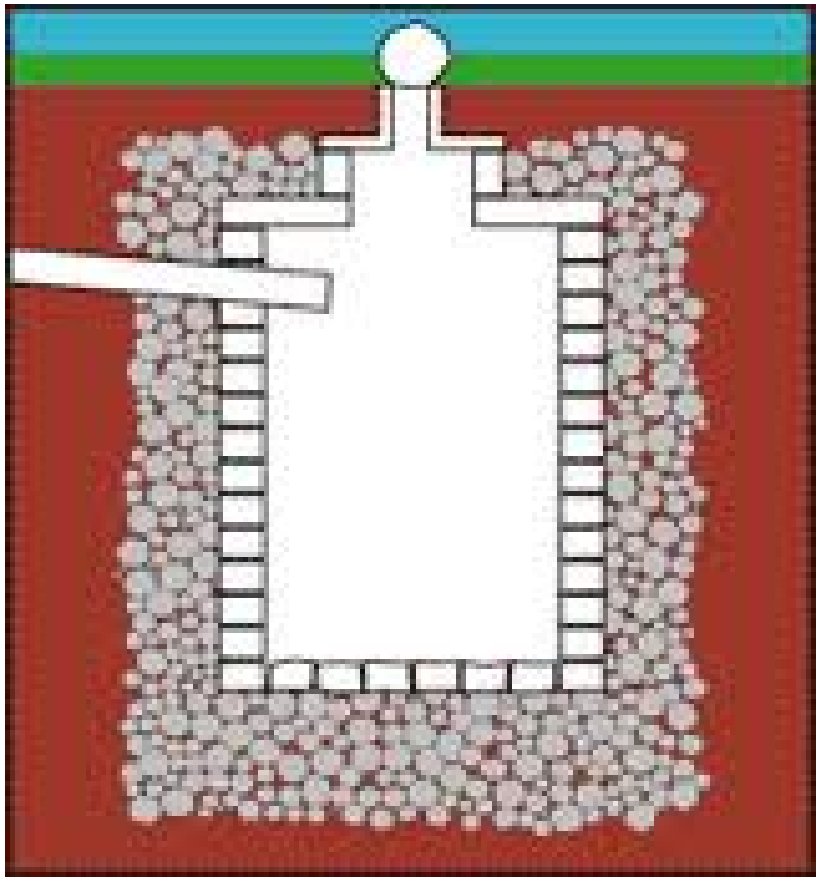
- SSTS installed in rural areas without access to centralized collection systems
- Surface waters often located nearby, as in the case of lake homes, resorts, farms, etc.

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)

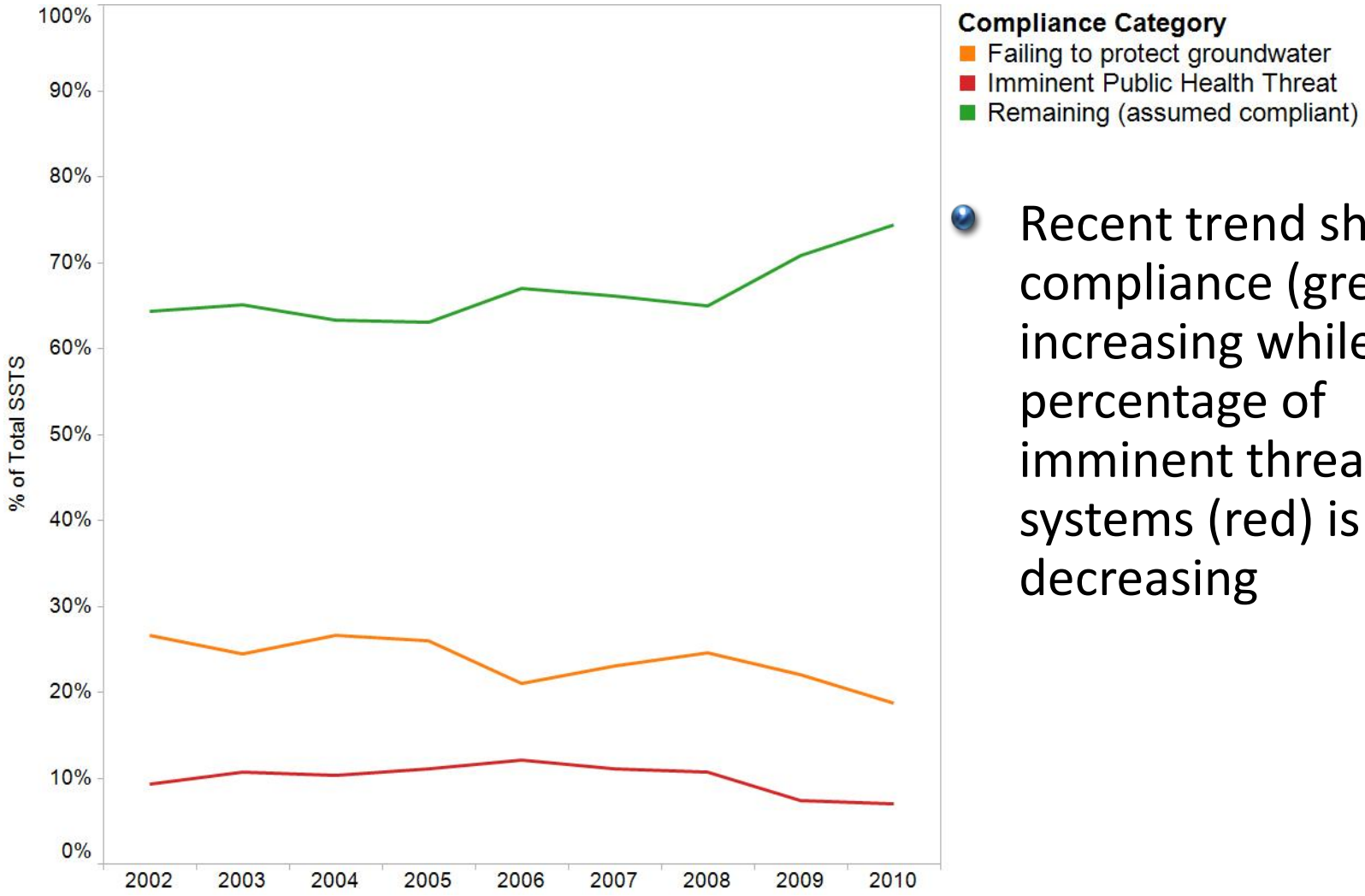
Role of state vs. local programs

- **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%

Compliance trends 2002-2010



- Recent trend shows compliance (green) increasing while the percentage of imminent threat systems (red) is decreasing

SSTS regulation

- 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

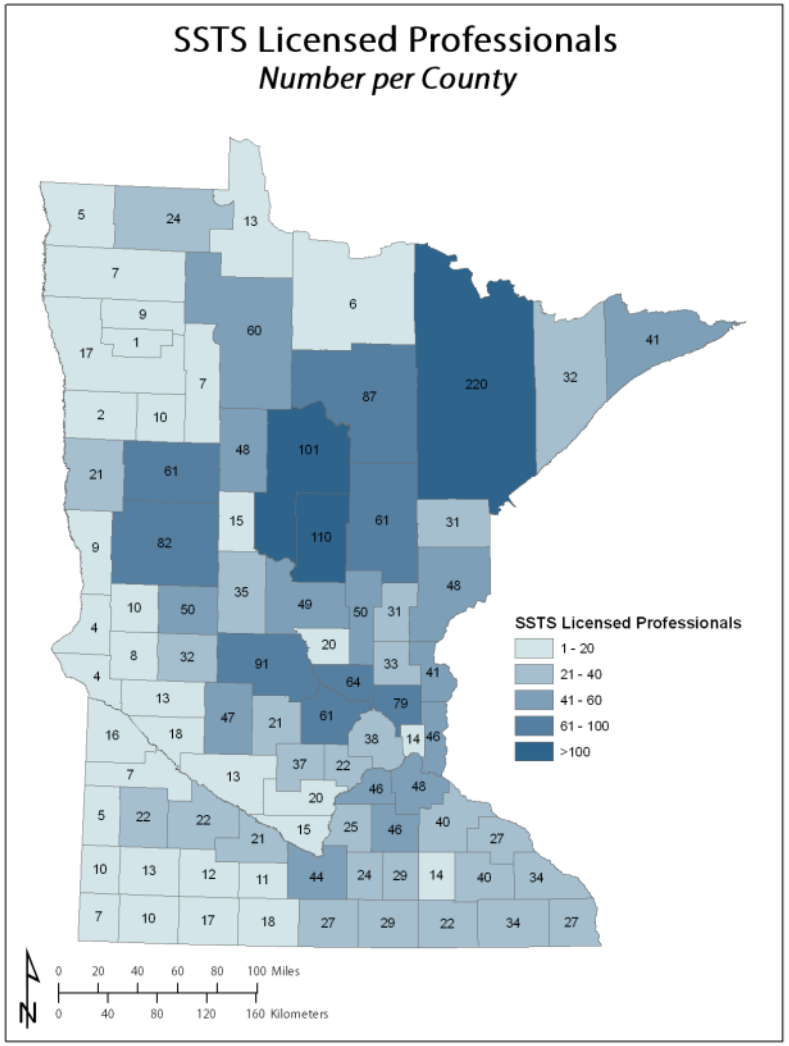
- Individuals are **Certified**
  - Attend training by U of M (special courses)
  - Tested by MPCA
  - Gain experience under mentors
- Businesses are **Licensed**
  - Must have:
    - Certified Individual in each discipline
    - Liability insurance (at least $100,000)
    - Bond ($10,000 or $25,000)

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 provides
  - 18 hours every 3 years for designers and inspectors

Licensure

- 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
Maintainers	591
Installers	1873
Service Providers	119
Inspectors	895 (Includes AI)
Designers	1184 (Includes AD)
Adv Designers (AD)	61
Adv Inspectors (AI)	55
Total	**2,831**

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

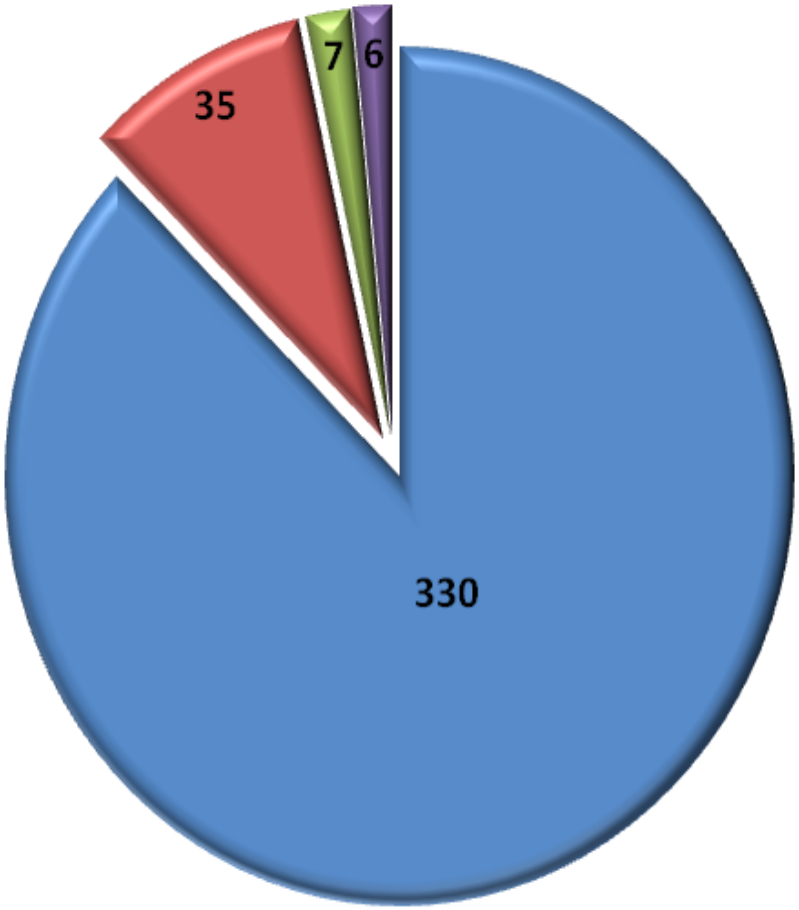
Action	Number of Occurrences
Assistance Calls	2066
Inspections	41
Complaints Referred to LGU	98
Complaints investigated by MPCA	109
Ordinance Reviews	15

Enforcement activities – state FY11

Action	Total	Penalties
Letter of Warning	3	No penalties with this type of action
Notice of Violation Alleged Violation	9 20	No penalties/precursors to APOs, Stips
Administrative Penalty Order (APO)	28	Up to $10,000; average $2,000 to $3,000
Stipulation Agreement (Stip)	1	$5,500
Order of Sanctions	1	License revocation

Straight pipe enforcement

Total straight pipe cases tracked = 378



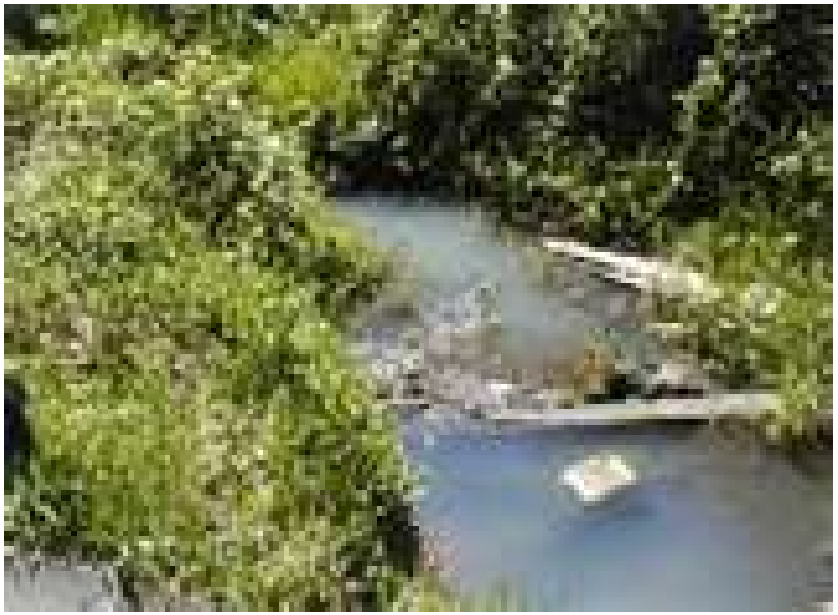
Small community wastewater needs in Minn.

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

MPCA Region	Number of Communities	Estimated Population
Southwest	26 (26*)	4,106
Southeast	46 (12*)	12,176
North Central	10	3,131
Northwest	10 (few type #2)	1,584
Northeast	19	10,957
Total	**111**	**31,954**

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

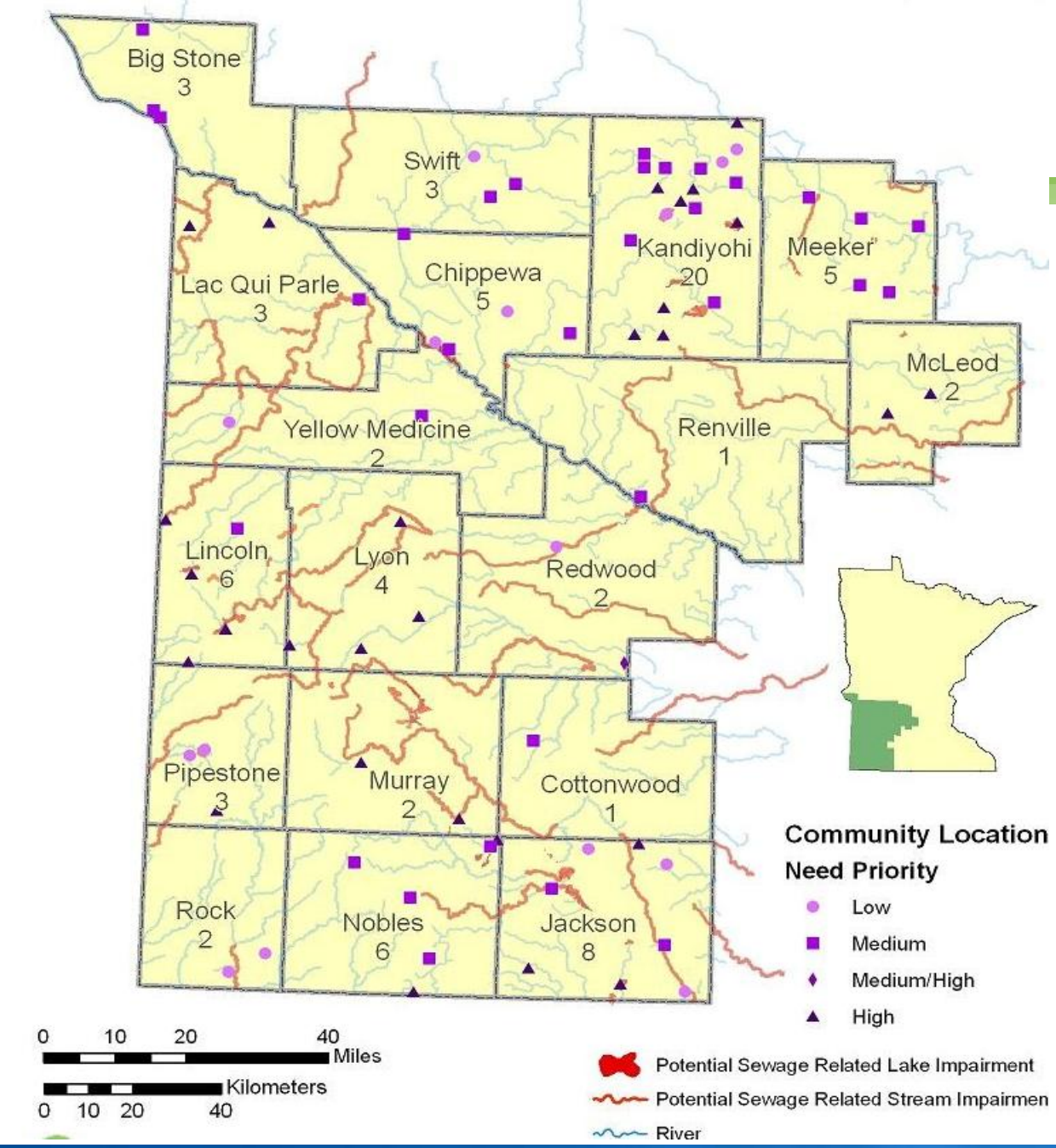
Survey results

75 counties

	Metro Area	South East	South West	North East	North West	North Central	Total
Total Number	136	130	78	108	378	195	1,025
Incorporated Areas	31	14	17	5	15	21	103
Unincorporated Areas	105	116	61	103	363	174	922
Suspect Community Straight-Pipes #1	1	18	13	1	0	0	33
Suspect Individual Straight-Pipes #2	6	11	27	4	1	24	73

2008 distribution of straight pipe communities

Region	No. of Communities
Southwest	40
Southeast	29
North Central	24
Metro Area	7
Northeast	5
Northwest	1
Total	106



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

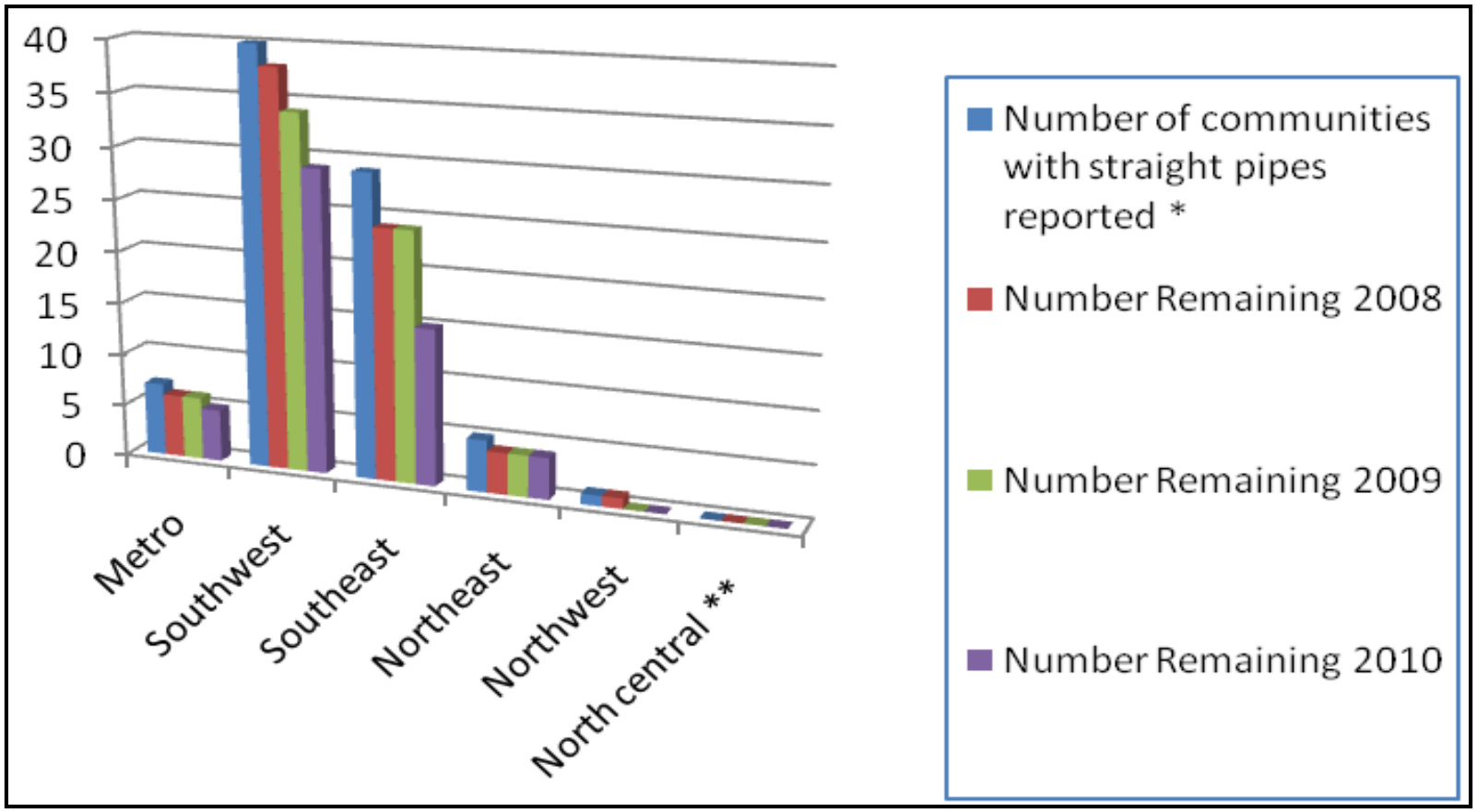
Region	Number of communities with straight pipes reported *	Number Fixed in 2007-08	Number Remaining 2008	Number Fixed in 2009	Number Remaining 2009	Number Fixed in 2010	Number Remaining 2010
Metro	7	1	6	0	6	1	5
Southwest	40	2	38	4	34	5	29
Southeast	29	6	23	0	23	8	14**
Northeast	5	1	4	0	4	0	4
Northwest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

•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

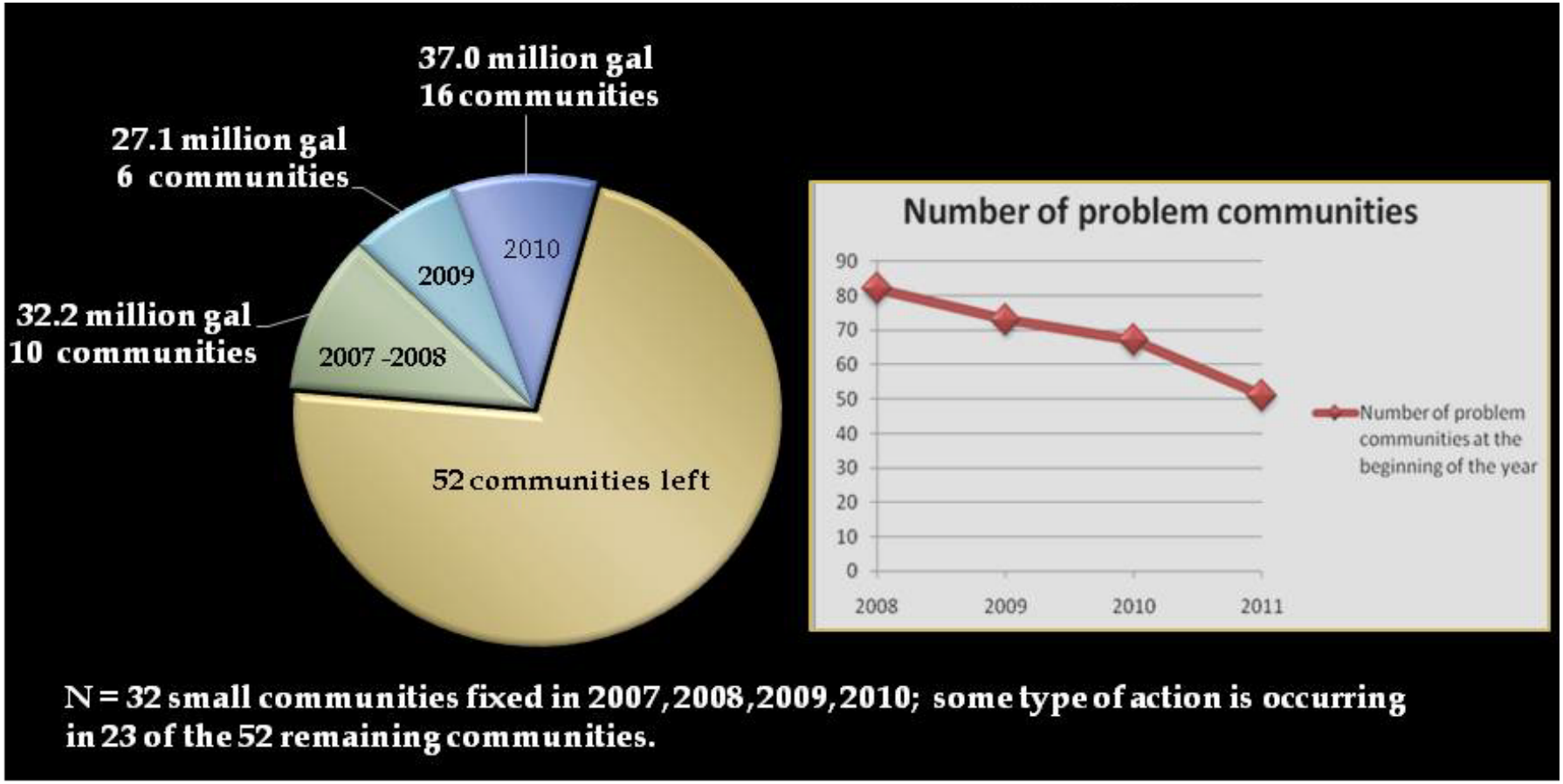


* Per 2008 Small Community Wastewater Needs Report.

** 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).

Small community straight pipe effort

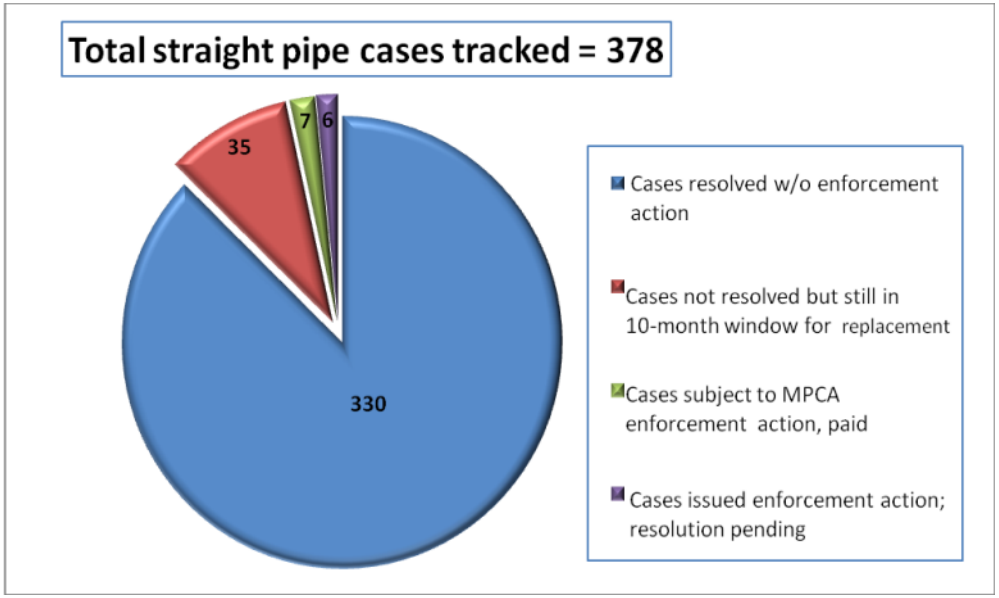
Untreated Sewage Status CY10 (gallons/year)



- 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.

Effect of straight pipe law

- 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

Straight pipe summary

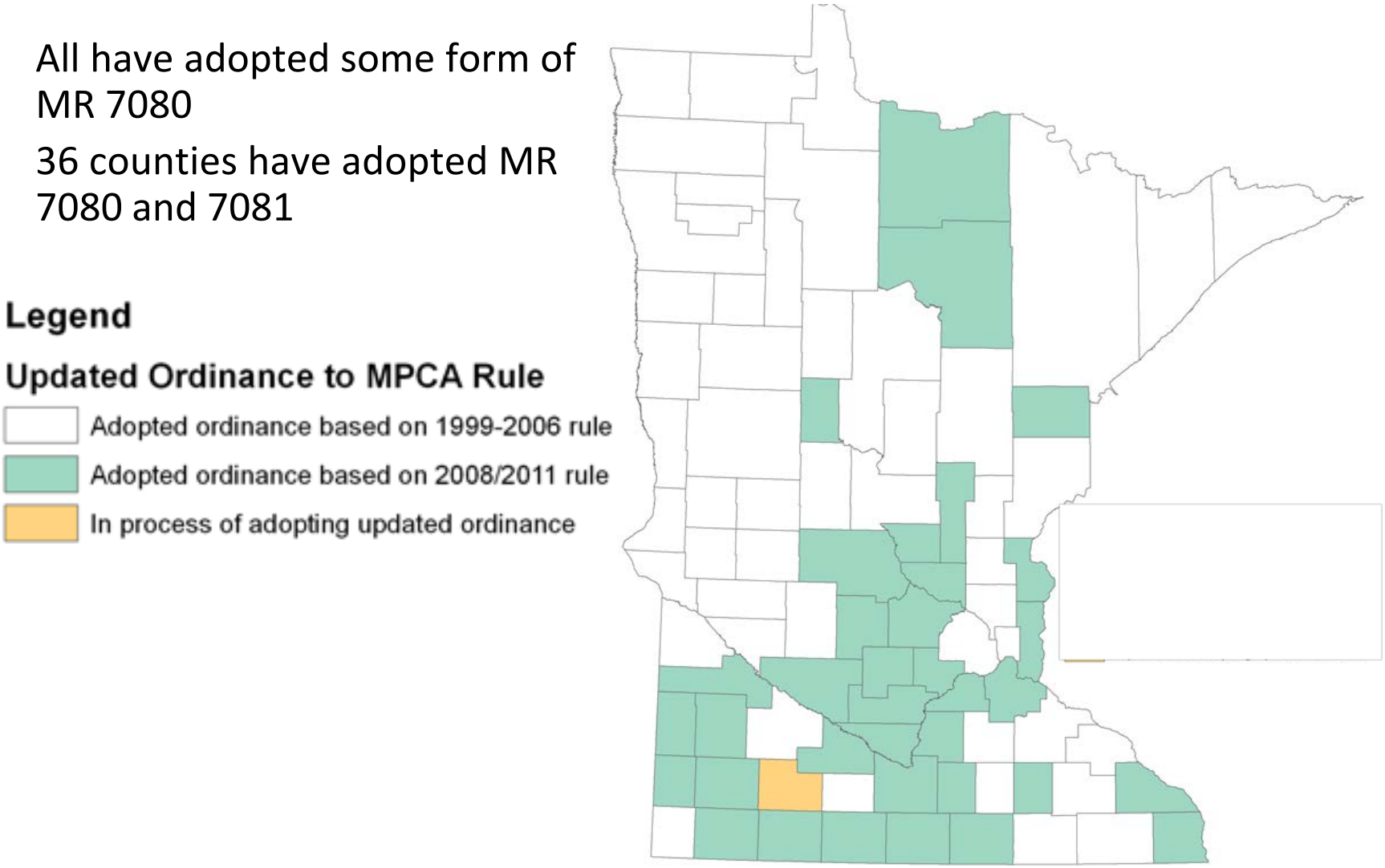
- Minnesota is making progress in eliminating the illegal discharge of sewage onto the surface and into surface waters
- From 1996 – 2007 the illegal discharges from roughly 40 small communities have been eliminated
- Over past four years, 32 small communities have eliminated illegal surface discharge
- 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

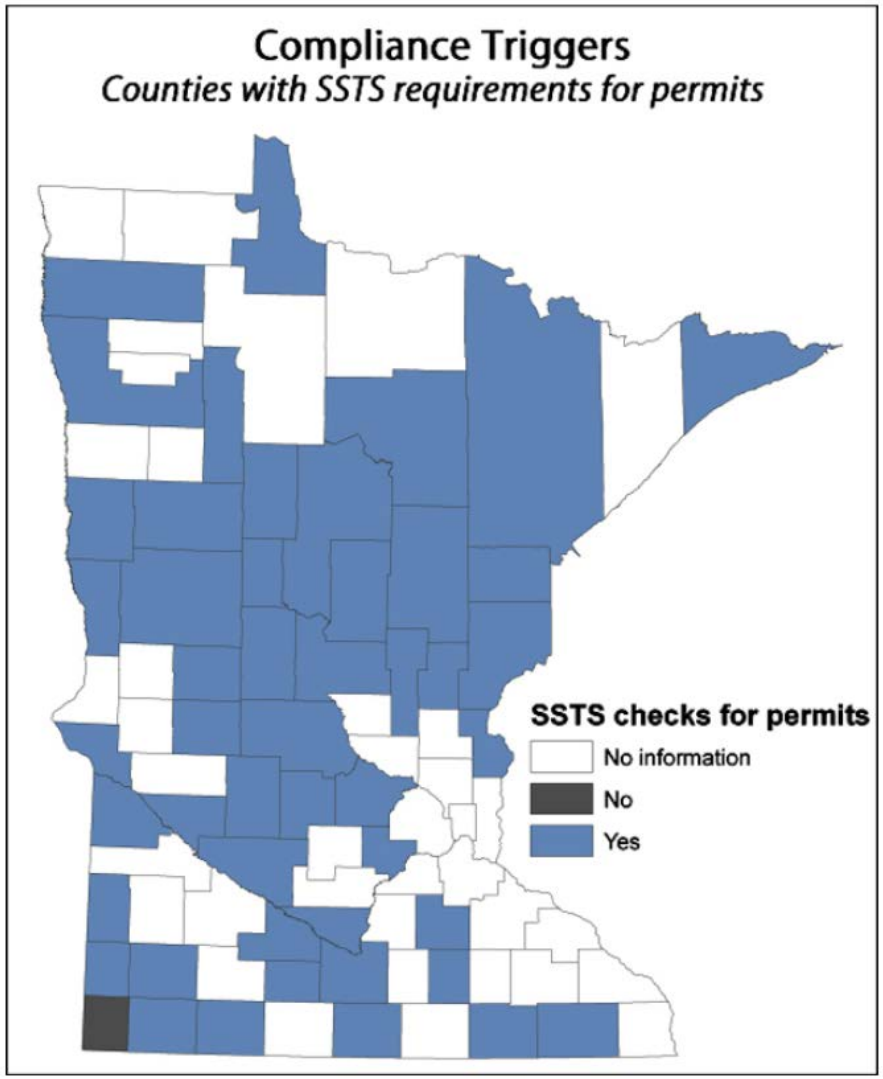
- All have adopted some form of MR 7080
- 36 counties have adopted MR 7080 and 7081

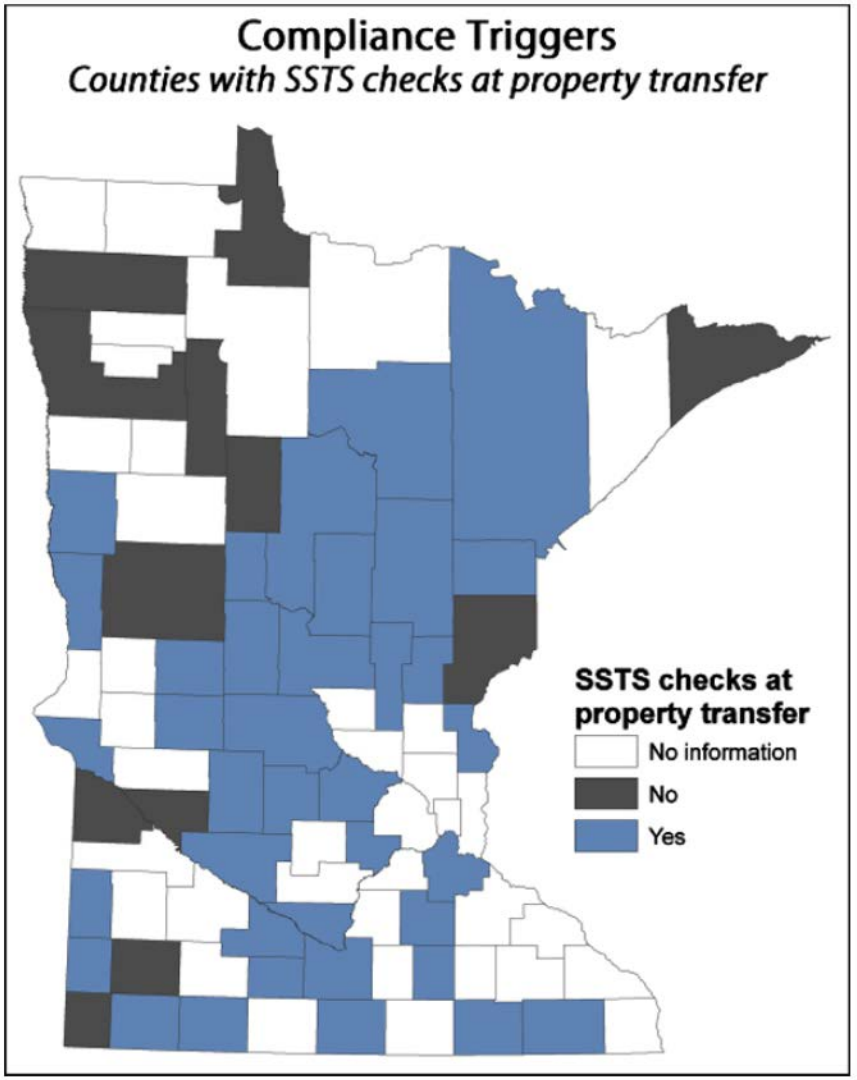


County inspection triggers

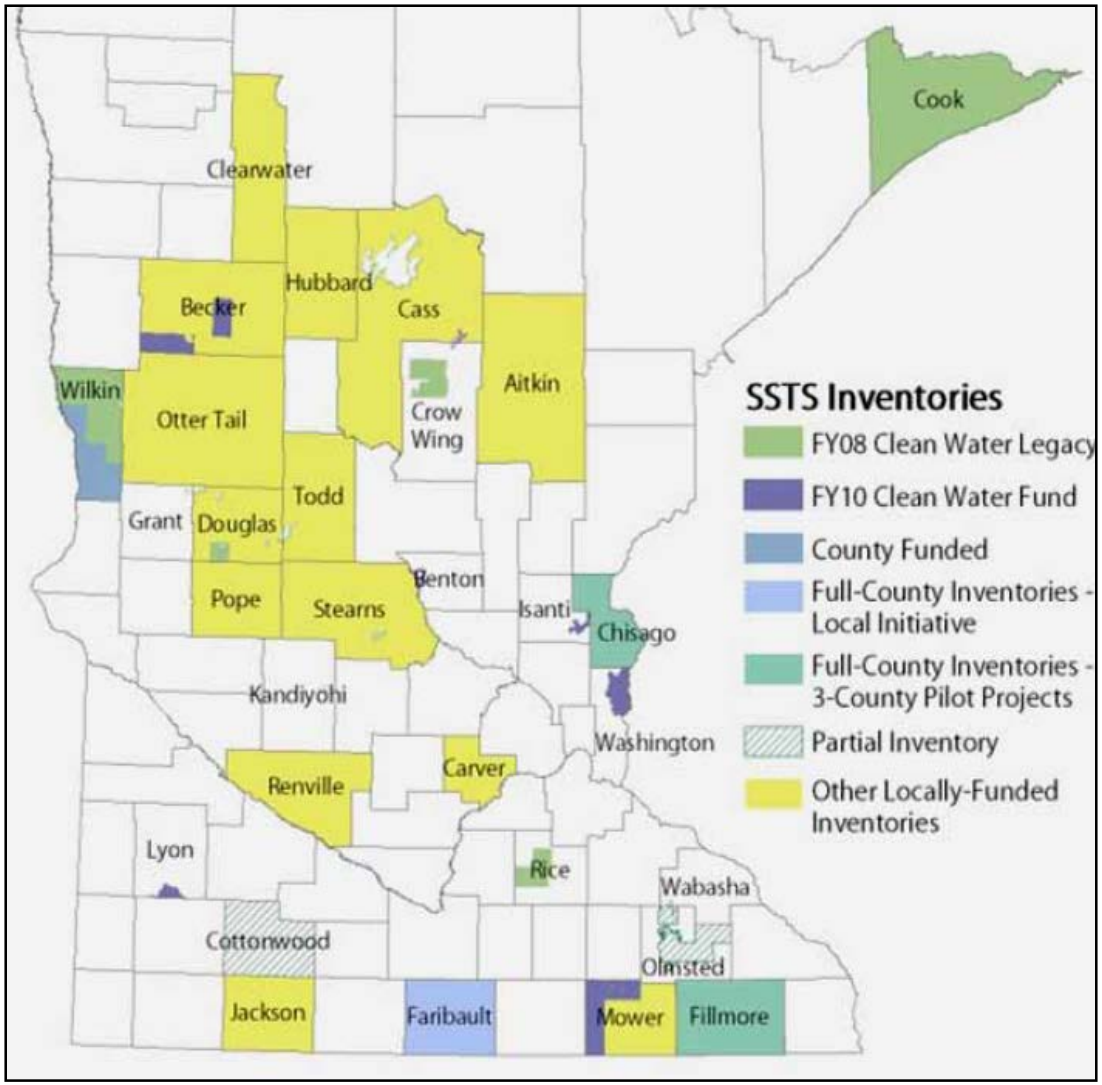
- **Events that trigger a compliance inspection can include:**
- An inventory of systems in a specific area
- A program under which systems are routinely inspected in a specific period of time
- Addition of a bedroom, where the local government issues permits for this (MN Statute 115.55)
- Issuance of 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

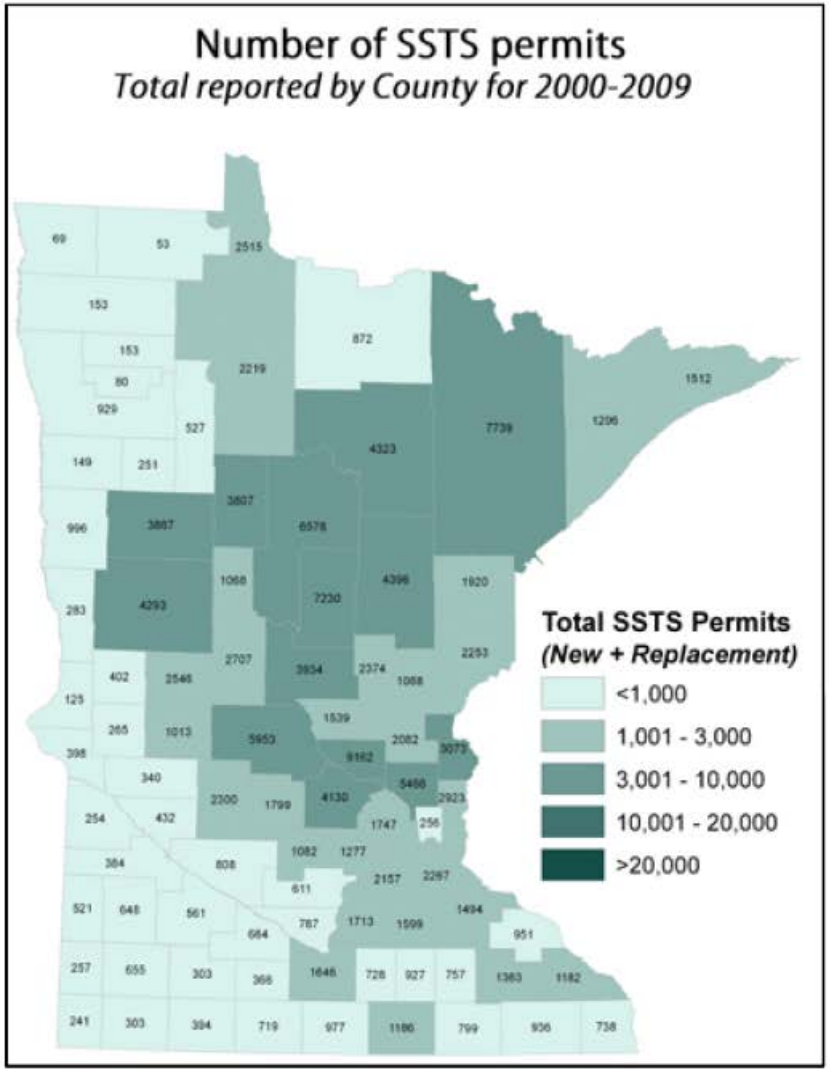


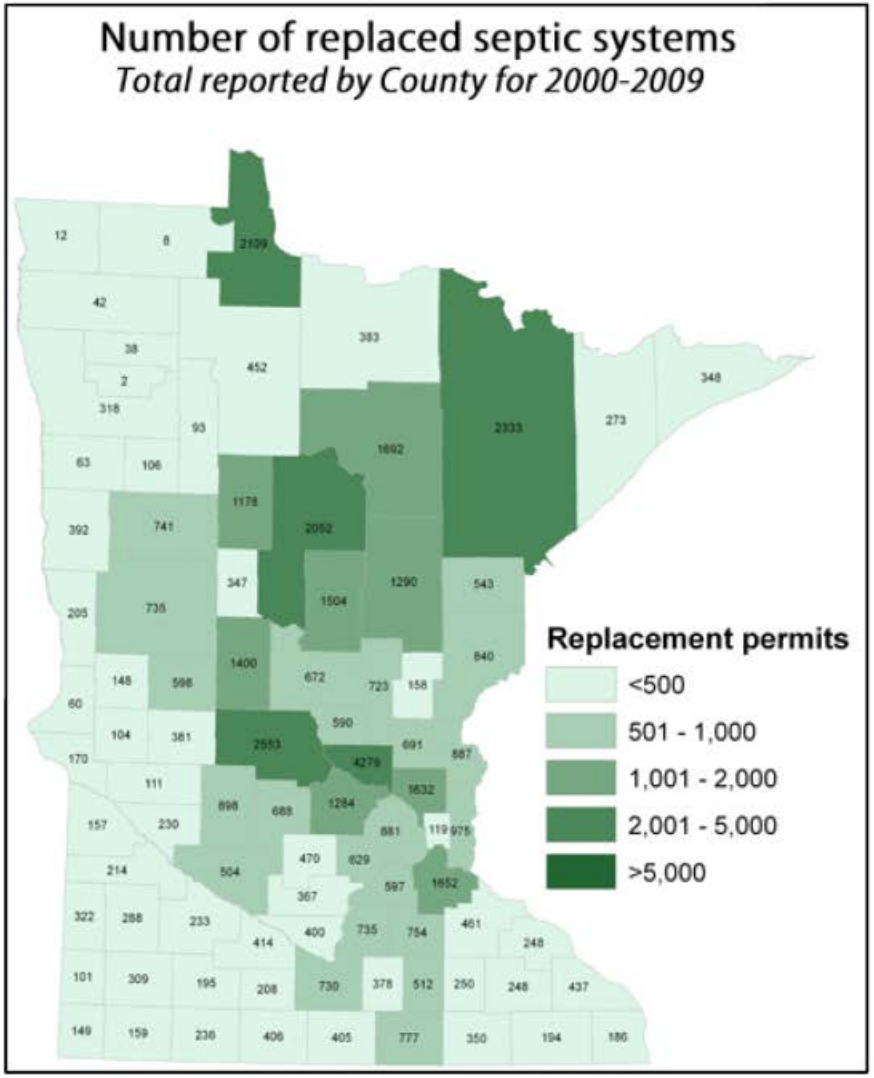


SSTS inventories (state, locally funded)

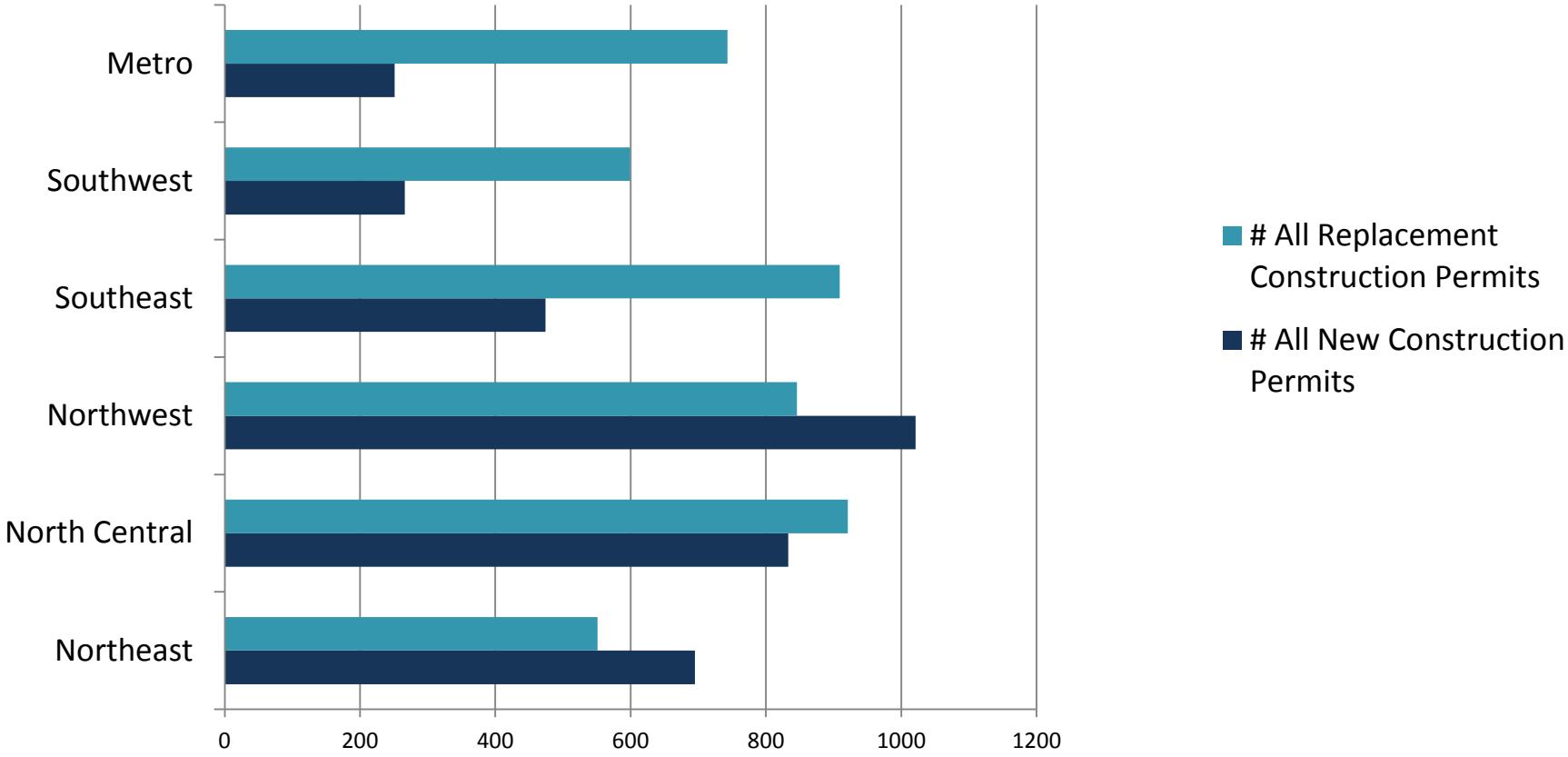


County SSTS permitting activities





New, replacement permits 2010



Upgrade triggers

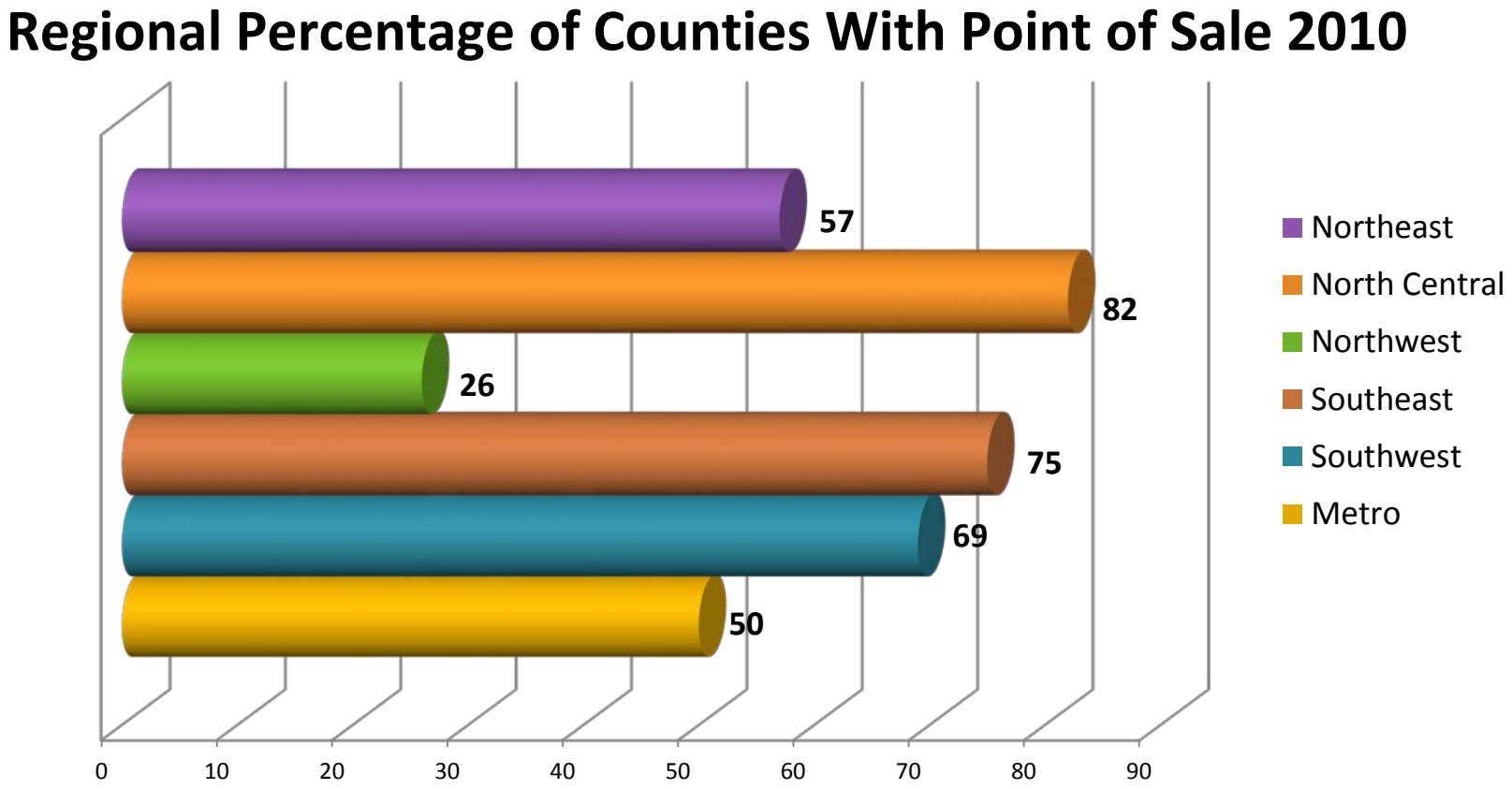
Trigger Effectiveness

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**.

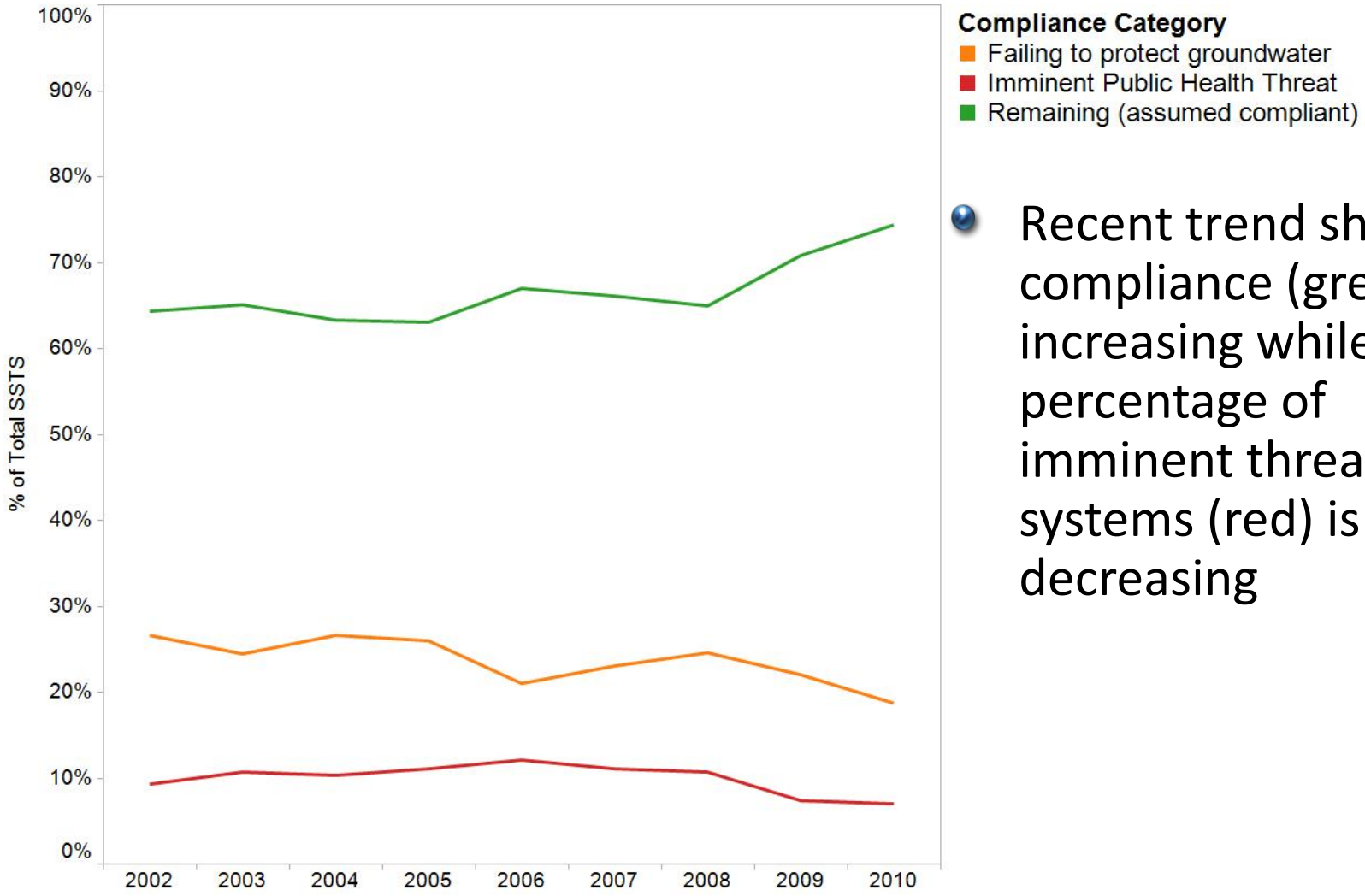
Figure 19 - Trigger effectiveness

	Most effective	Second most effective	Third most effective	Fourth most effective	Fifth most effective	Least effective
A county wide inventory effort	18	8	10	7	11	31
A targeted areas inventory effort	14	15	10	8	23	15
Requiring upgrade at the time of point of sale	43	18	9	8	2	5
Requiring upgrade at the time of issuing building permits	17	31	11	10	6	10
Requiring upgrade at the time of issuing variances	7	6	23	12	12	25
Requiring upgrade at the time of issuing any land use permit	15	10	11	24	10	15

SSTS upgrade triggers



Compliance trends 2002-2010



- Recent trend shows compliance (green) increasing while the percentage of imminent threat systems (red) is decreasing

AMC concerns

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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Websites:

www.pca.state.mn.us/ssts (MPCA)
http://Septic.umn.edu (U of M)