

Water Quality Performance Monitoring

--Septic System Upgrade--

Seven Mile Creek Watershed Project

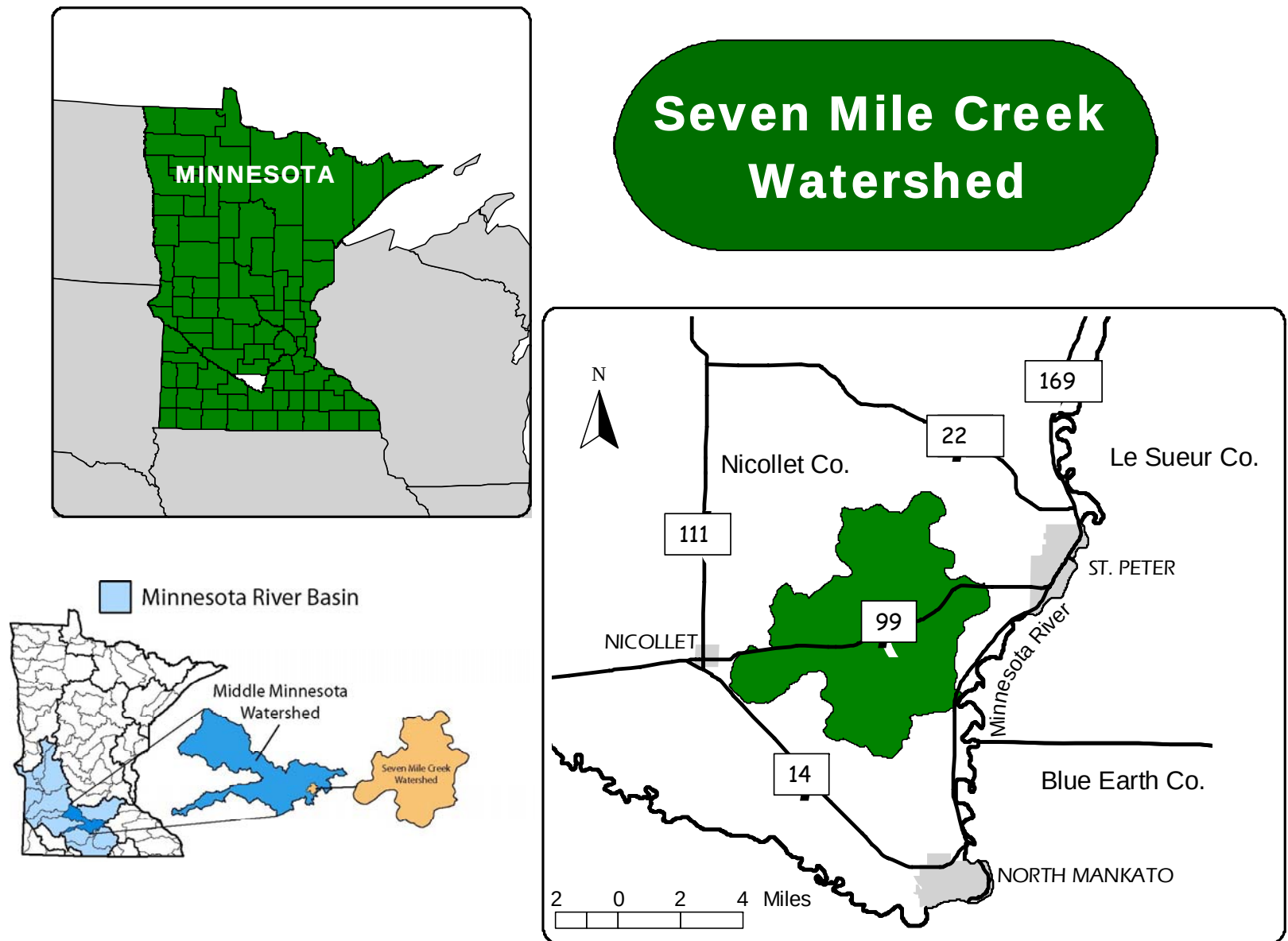
Kevin Kuehner-BNC Water Quality Board

Scott Matteson-MSU Water Resources Center

507-934-4140



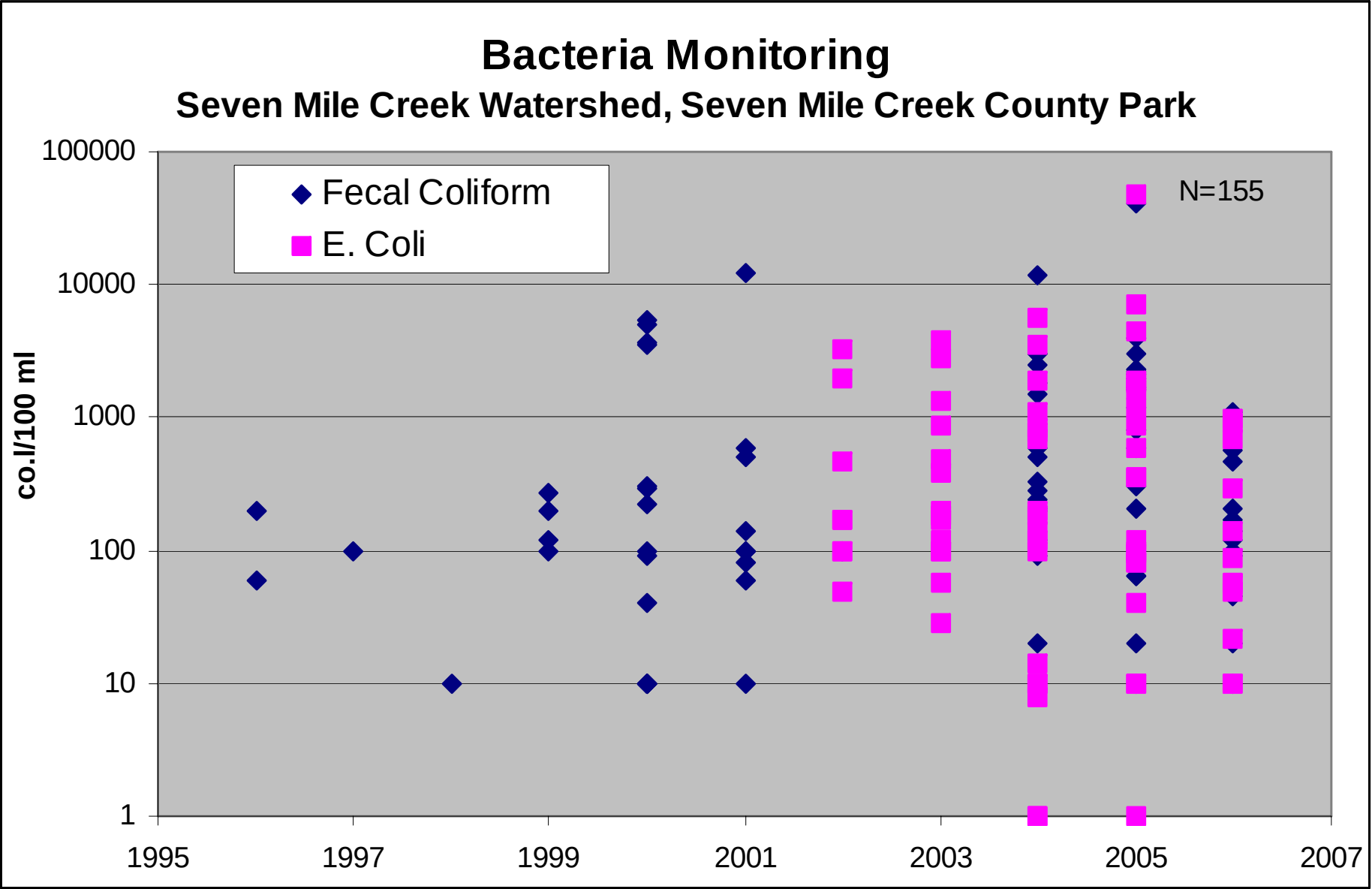
Figure 1. Location



Background

- Since 2000, special efforts have taken place to help protect and enhance the water quality of this high value recreational stream located in Nicollet County.
- Water quality monitoring indicates this resource is impaired for fecal and E. coli bacteria and levels often exceed the proposed surface water standard of 126 col/100 ml for E. coli.
- E. coli monitoring from April through September at the Seven Mile Creek County Park location is typically 2-3 times higher than proposed standards. (Fig. 2)
- In 2002, special low interest loans were acquired through the Clean Water Partnership Program to help upgrade non-complying septic systems.
- Seven Mile Creek has recently been listed on Minnesota's 2006 TMDL 303d impaired waters list for fecal coliform bacteria.

Figure 2. Seven Mile Creek Bacteria Monitoring



Water Quality Performance Monitoring

Septic System Upgrade

- In early April 2006, watershed staff were assisting a landowner with the installation of a CRP filter strip along a drainage ditch.
- It was during this time that a drainage tile outlet was discovered and was suspected to be hooked into a non-complying septic system.
- The drainage tile appeared to be coming from a house about a 1/4 mile away.
- Watershed staff approached the homeowner about the issue and facilitated low-interest loan funding to help with the upgrade of the suspected non-compliant septic system.
- This situation provided a unique opportunity to conduct BEFORE and AFTER E. Coli bacteria monitoring of the drainage tile and effects on surface water quality.



Sampling
drainage tile
outlet near
drainage ditch.



Sampling public drainage ditch
above and below suspected
drainage tile.



Methods

- Samples were collected on a daily basis. Samples were collected from the outlet of the suspected tile and from the drainage ditch above and below the tile outlet.
- Samples were analyzed for E. coli bacteria by MSU-Water Resources Center using the Quantitray method.
- The "Before" samples consisted of 25 water quality samples collected from April 12 through May 25, 2006.
- The septic system was upgraded using a mound system on May 24, 2006. The cost for the four bedroom home was \$9,100.00.
- The "After" samples consisted of 17 water quality samples collected from May 29 through June 29.

Figure 3. E.Coli Monitoring
Results

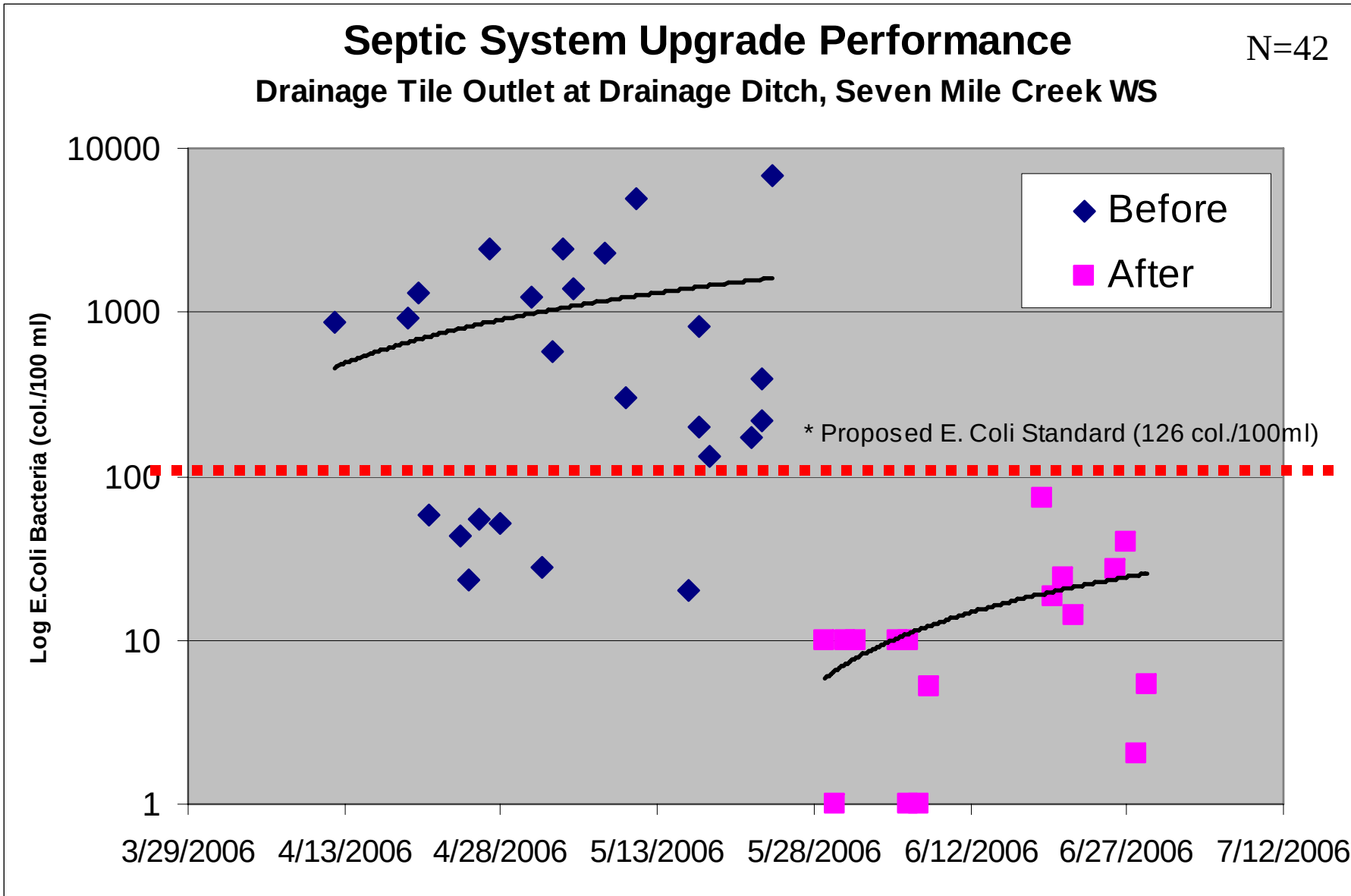
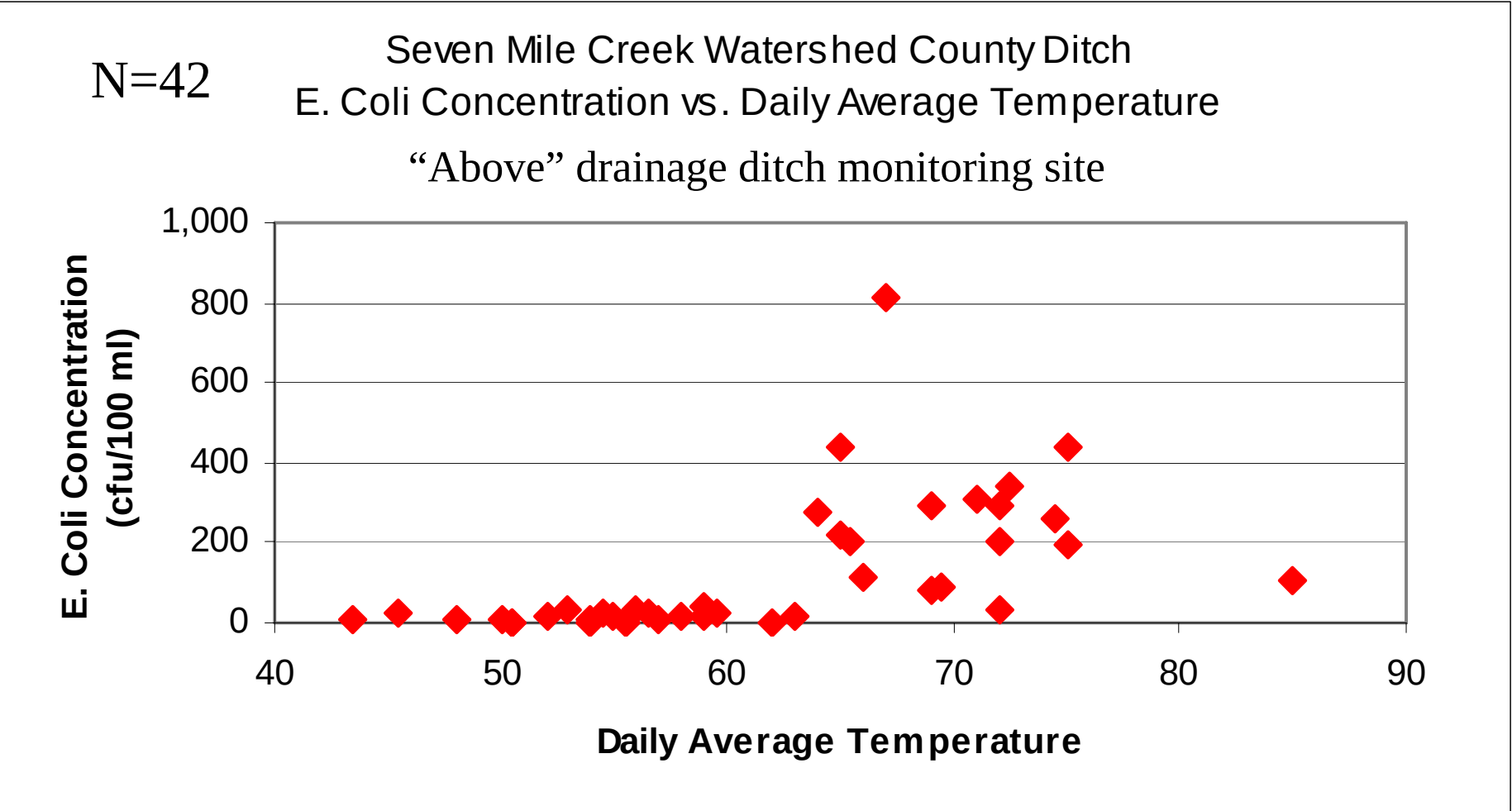


Figure 4. E. coli vs. Air Temperature



Results

From the suspected drainage tile (straight pipe)

- Geomean concentrations of before samples = 350 col./100 ml
- Concentrations as high as 7,000 col./100 ml were documented.
- Concentrations were typically highest between 8:00 a.m. and 11:00 a.m. This coincides with typical household peak water usage.
- On average the E. coli bacteria levels from the suspected drainage tile were 3X higher than EPA proposed water quality standards for streams like Seven Mile Creek.
- Following the septic upgrade, E. coli bacteria reductions from the suspected drainage tile were immediate.
- Geomean after the upgrade = 8 col./100 ml
- Overall, the septic upgrade reduced drainage tile water E. coli concentrations by 98%.

Drainage ditch monitoring (above and below drainage tile)

- The effect of the septic upgrade on the drainage ditch water quality is less clear.
- Temperature appeared to have a dominant influence on bacteria levels (fig. 4) and may override any possible E. coli reductions monitored at the drainage ditch sites during this brief study. Dilution, rainfall events, and stream flows are other compounding factors.
- More sampling, including sediment sampling within the ditch, will take place to evaluate any drainage ditch water quality improvements as a result of the septic upgrade.

Discussion

- There are nearly 200 homes within the Seven Mile Creek Watershed.
- Before the start of the watershed project, it was estimated that 71% of those homes did not have a complying septic system.
- From 2002-2005, about 40 homes were upgraded using special low-interest loan funding.
- It is estimated that at least 100 more homes within the watershed are non-compliant and possibly connected to drainage tile systems like the one featured in this study (fig. 5)
- The cumulative effect of these homes could be directly compromising the integrity of water quality and public health for this high-value water resource.
- Approximately 40 additional homes could be upgraded using special low-interest financing made available through the watershed project.
- Special outreach initiatives and targeting (mailings, on-site visits, homeowner and septic installer meetings) will take place in 2006 to encourage additional septic upgrades. (fig. 6)

Figure 5. Homes Without a Certificate of Compliance

Certificate of Compliance Status--July, 2006

Individual Septic Systems, Seven Mile Creek Watershed



Total homes
= 197

Total homes with no certificate
= 100, or 51%. (Before WS project = 66%)

Total homes with no certificate
AND within 1/4 mile of stream/ditch
= 43

Nicollet County Env. Services
data, July 2006

7000 0 7000 14000 Feet

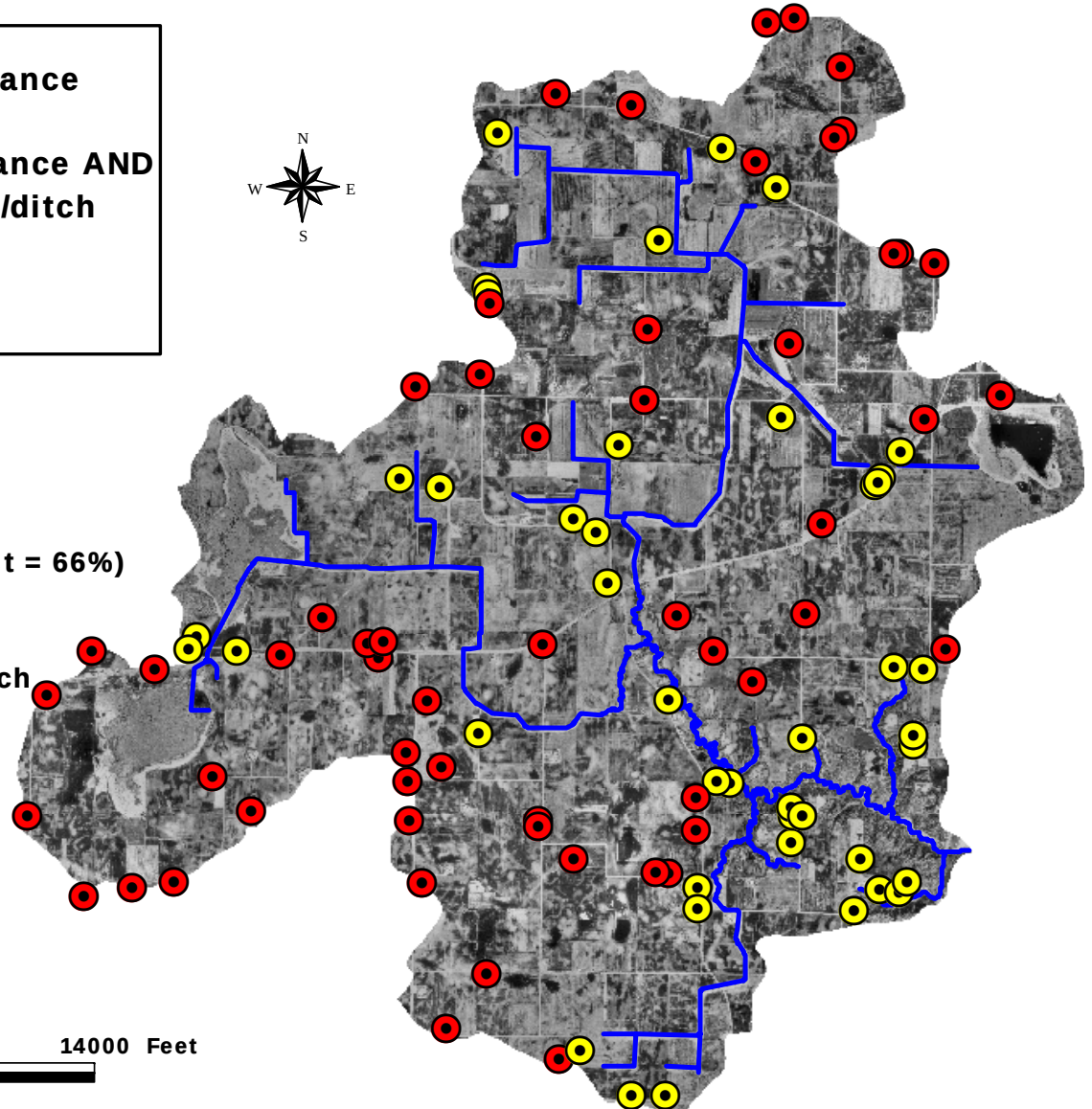
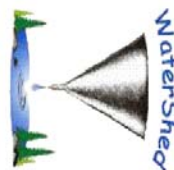


Figure 6. Outreach material example

Take advantage NOW and
save \$1,300 or more on a
septic upgrade!



Seven Mile Creek
Watershed Project
322 S. Minn. Ave.
St. Peter MN, 56082
507-934-1140

Why Upgrade Your System?

1) Groundwater
and surface
water can be
contaminated by
a failing system.



2) It's the Law
and it's the right thing to do.

3) Help keep your watershed and Seven Mile
Creek clean.

4) It is required that your septic system be up to
code when adding a bedroom.

5) Septic system inspection at point of sale has
been required since January 1, 1998.

6) If your system is hooked into a tile line or
drains to the surface, you could be **fin**ed **\$500**
every month if it is not upgraded within the
10 month period given on the notice of non-
compliance. (*New MN law as of Aug. 1, 2006)

Is your septic
system up to
code?

If you are a homeowner in the Seven Mile
Creek Watershed and believe that your
septic system needs to be upgraded,
contact the Nicollet County Environmental
Services Office to learn more about a
special low-interest loan program.

Save \$1,300 or more!

Telephone

507-934-0250

Figure 6. Outreach material example

Does my septic system need to be upgraded?

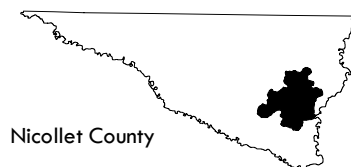
If sewage from your house:

- ⇒ Goes into a field drainage tile;
- ⇒ Goes out of a pipe into a river, creek, pond, wetland, drainage ditch, lake, slough, or a ravine;
- ⇒ Goes out of a pipe onto the surface of the ground;
- ⇒ Goes into a cesspool, drywell, or seepage pit;
- ⇒ If you never needed to pump your septic tank and have never had any trouble with your system;

If you answered YES to any of these questions you are legally obligated to repair, upgrade, or replace your septic system.

Seven Mile Creek Watershed homeowners are eligible for special low interest financing to upgrade their non-complying septic system.

*These funds are limited and will not be available after 2007.



Nicollet County

Seven Mile Creek Watershed is located between St. Peter and Nicollet and includes parts of Traverse, Oshawa, Belgrade, Granby, and Nicollet Townships.

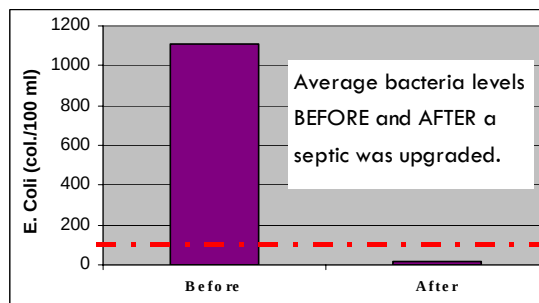
EXAMPLE for an \$8,000.00 Loan	Conventional Financing	Watershed Septic Loan
Loan Amount	\$8,000.00	\$8,000.00
Interest Rate	6.75%	4.00%
Loan Length	10 years	10 Years
Monthly Loan Payment	\$91.86	\$81.00
Total Interest Paid	\$3,023.11	\$1719.53
Total Interest Savings:	\$1,303.00 or \$10.86/month	

Conventional vs. Watershed Septic Loan Program

You can make a difference!

The chart below depicts *actual* before and after bacteria testing of a drainage tile outlet at a public drainage ditch in the Seven Mile Creek Watershed.

The tile was hooked directly to a home 1/4 mile away with a non-complying septic. The septic was upgraded in May of 2006. Over a 98% reduction! (*Levels above 126 col./100ml are considered a public health threat for Seven Mile Creek)



Simple steps to upgrade your septic system:

- 1) Pick up a loan applic. at the Env. Services office and verify you are in the Seven Mile Creek Watershed. (507-934-0250)
 - 2) If you qualify, contact a licensed septic contractor to get a design and estimate.
 - 3) After you have a design and estimate, contact the Environmental Services Office to schedule a time to process the loan application.
- ⇒ A fee of \$104 will be collected at the time of application. A \$46 recorder's fee will be collected at the time of lien signing.
 - ⇒ If your loan amount is \$5,000 or less, the payback time is 5 years. If the loan amount is greater, the payback is 10 years.

Funds are limited so act now!

- ⇒ About 60% of the homes in the watershed could benefit from this special financing program.
- ⇒ Since 2002, over 30 homeowners have used the special financing.
- ⇒ There is enough money to fix about 40 additional homes.

Nicollet County Environmental Services
510 S. Minn. Ave.

St. Peter, MN 56082-2533
507-934-0250