

# Recommendations for well owners

- 💧 Well owner responsibilities
- 💧 Suggestions for water testing
- 💧 Recommendations for water treatment

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# WHERE DOES OUR DRINKING WATER COME FROM?

Ground water supplies 99 percent of total domestic, municipal, and industrial water used in Dakota County.

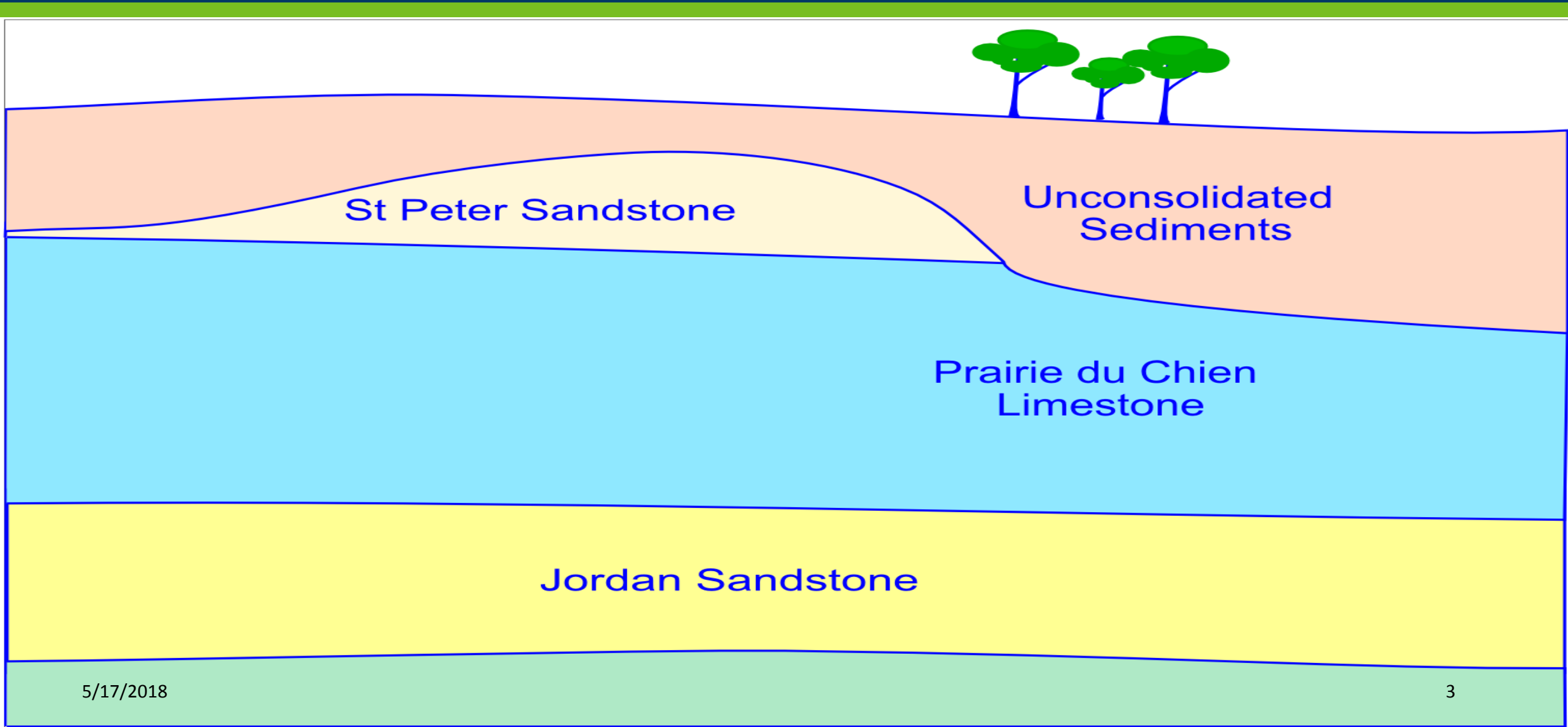
GEOLOGIC FORMATION	GENERAL LITHOLOGY	PRESENCE & USE OF WATER
<b>Quaternary deposits</b> Surface deposits of sand and gravel; erodes easily		May contain water used for domestic, commercial, and irrigation purposes Easily contaminated
<b>Decorah Shale</b> Clay-like shale with thin fossil-bearing limestone		Helps to protect underlying aquifers from contamination
<b>Platteville and Glenwood Formations</b> Fossil-bearing limestone and sandy shale		Supplies very limited amounts of water to northern Dakota County
<b>St. Peter Sandstone</b> Poorly cemented, granular sandstone		Supplies limited amounts of water to Dakota County Easily contaminated in central and southern portions of the County
<b>Prairie du Chien Formation</b> Limestone		Supplies water for domestic use
<b>Jordan Sandstone</b> Poorly cemented, granular sandstone		Primary source for municipal, industrial and high capacity irrigation wells
<b>St. Lawrence-Franconia Formation</b> Shaley sandstone or siltstone		Produces small amounts of water in eastern Dakota County
<b>Ironton-Galesville Sandstone</b> Silty to coarse-grained sandstone		Produces water to supplement flow in some high capacity industrial wells
<b>Eau Claire Formation</b> Siltstone, fine sandstone, and shale		Does not contain water
<b>Mt. Simon-Hinkley Formation</b> Fine to coarse-grained sandstone		The deepest high-yielding aquifer in Dakota County Protected for future use with a restriction on new well drilling

DAKOTA COUNTY GROUND WATER AND GEOLOGY

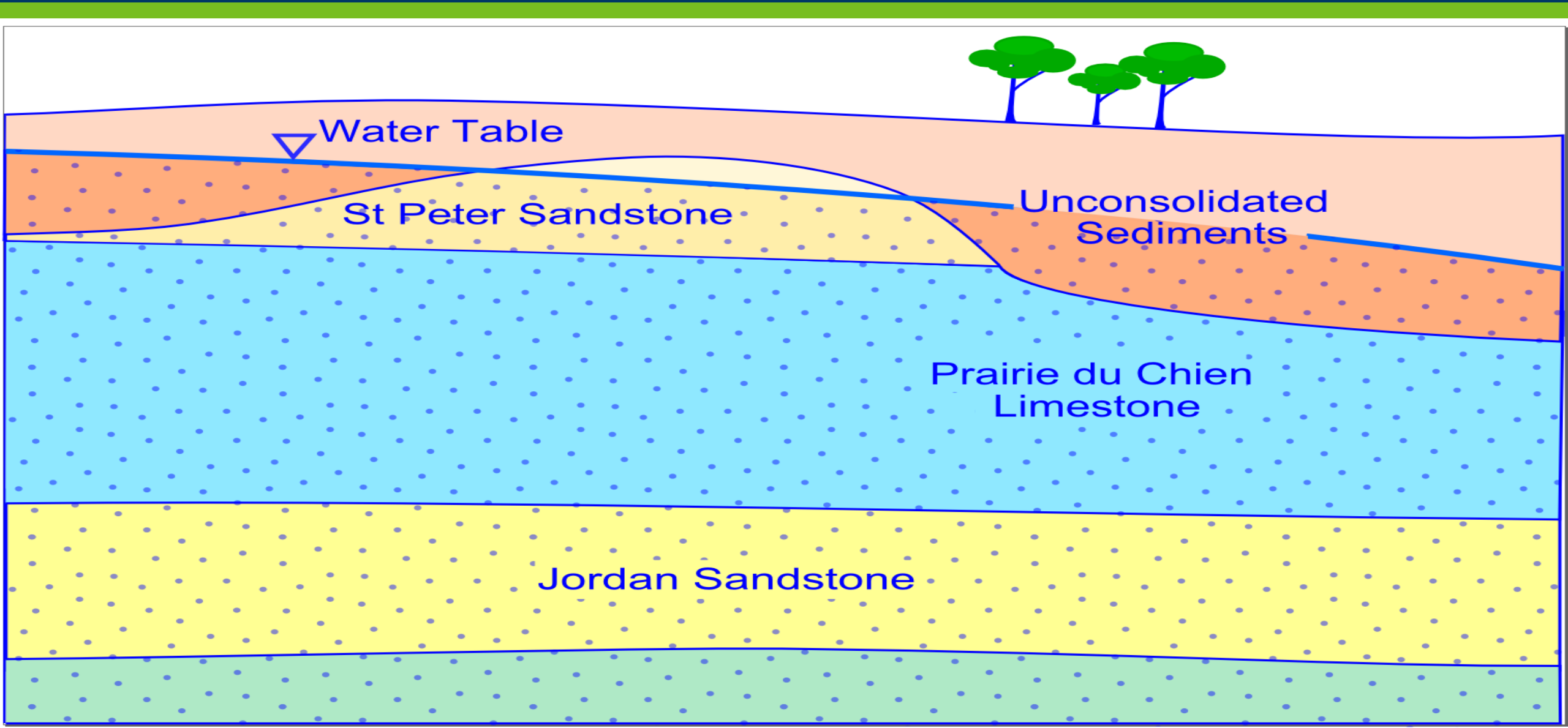
# Aquifers and Wells in Dakota County

- 💧 7 aquifers in Dakota County
- 💧 7000 private wells in Dakota County
- 💧 2000 wells in IGH and Rosemount

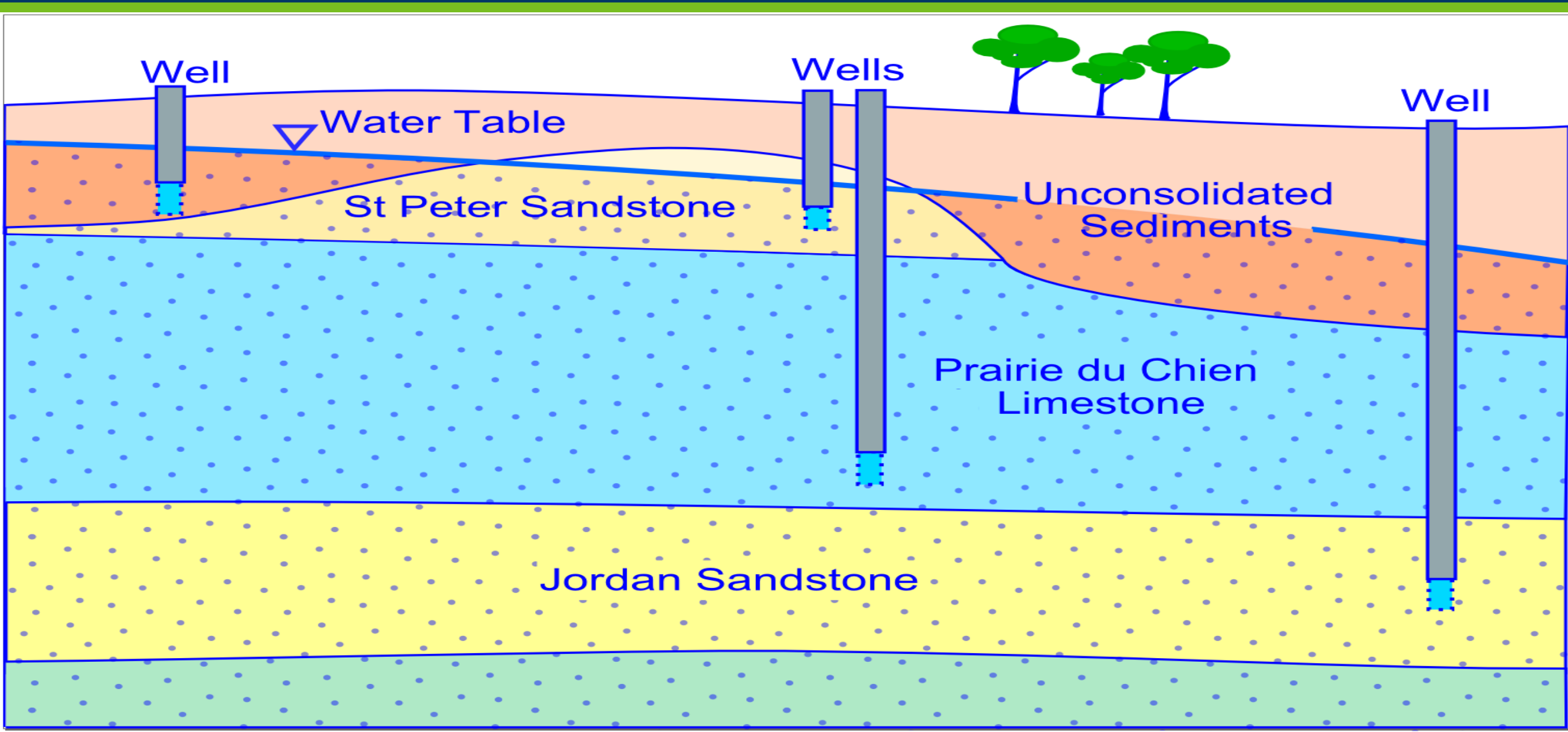
# Geologic Cross-section



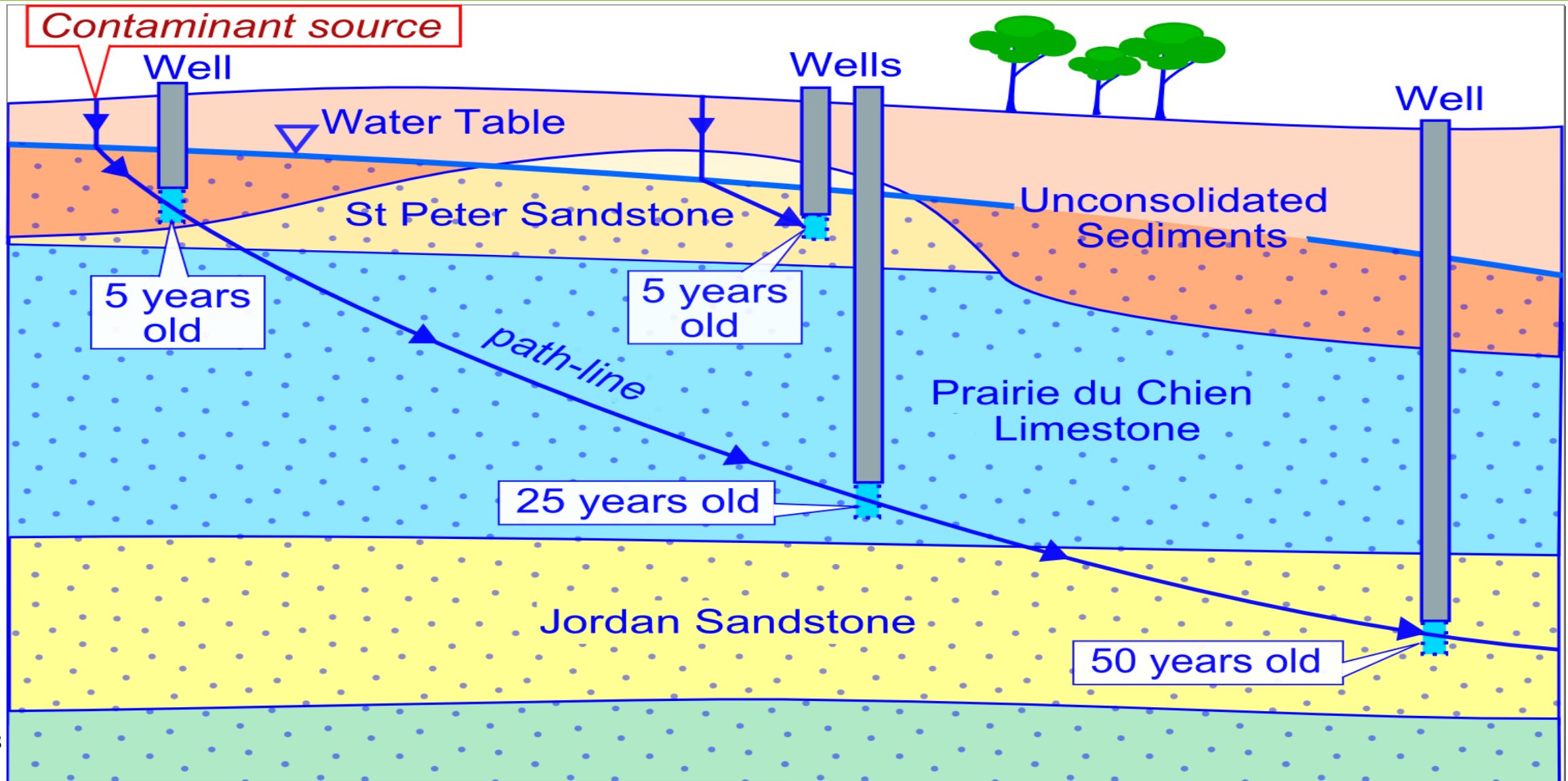
# Water Table



# Cross-section of Wells



# Illustration of Contaminant Travel



# Dakota Co. webpage to request your well's construction record

The screenshot shows the Dakota County website interface. At the top, there is a search bar and a navigation menu with categories like Government, Home & Property, Permits & Licenses, Law & Justice, Health & Family, Environment, Transportation, Libraries, and Parks. Below the navigation is a secondary menu with links for Maps & Directions, Departments, About Us, and Contact Us. The main content area is titled 'Water Quality' and features a sidebar with various water-related services. The 'Find Private Well Information' section is highlighted, containing a form for requesting well information. The form includes fields for First Name, Last Name, Address, City, State, Zip, Phone, Fax, Email, and Well ID. There are also 'Submit' and 'Reset' buttons at the bottom of the form.

**Water Quality**

- Wells & Drinking Water
  - Test the Waters Campaign
  - Drinking Water Studies
  - Drinking Water Contaminants
  - Find Private Well Information**
  - Testing Well Water
  - Sealing Unused Wells
  - Well Disinfection
  - Request a Water Test Kit
  - Well Permits
- Stormwater
- Shoreland and Floodplain Management
- Agriculture
- Wetlands
- Septic Systems
- Aquatic Invasive Species
- Swimming Pools & Recreational Beaches
- Lake Byllesby Dam & Reservoir
- Links & Resources
- Contact
  - Environmental Resources
  - [952-891-7000](tel:952-891-7000)

**Find Private Well Information**

County staff may be able to provide you with information about your well's age or depth. Look for a well identification number printed on a metal tag attached to the well. The identification number will help locate information about the well. Enter the information in the form below and click *Submit*.

County staff will reply with any available information.

**Private Well Information Request Form**

First Name:

Last Name:

Address:

City:

State:  Zip:  ex. 55033

Phone:  ex. 000-000-0000

Fax:  ex. 000-000-0000

Email:

Well address (if different from above)

Address:

City:

State:  Zip:  ex. 55033

Well ID:

# Well Owner's Handbook

A Consumer's Guide to Water Wells in Minnesota



Well Management Section  
Environmental Health Division  
Minnesota Department of Health

Fourth Edition,  
(updated January 2014)

## Well Owner Resources

Well Owner's Handbook can be found on MDH website at:

<http://www.health.state.mn.us/divs/eh/wells/construction/handbook.pdf>



# Owner's Guide to Wells



## Well Owner Resources

**T**est your water.

**I**nspect your well.

**P**rotect your well.

**S**eal unused wells.

# TIPS – Test your water

## **T**est your water.

You are responsible for regularly testing your well water. Both natural sources and human activities can contaminate wells and cause short- or long-term health effects. You cannot taste, see, or smell most contaminants. MDH recommends using an accredited laboratory to test your water. Contact an accredited laboratory to get sample containers and instructions, or ask your county environmental or public health services if they provide well water testing services.



# Dakota County Webpage to Request a Water Test Kit



## Request a Water Test Kit

Water test kits are available to purchase from Environmental Resources. Kits are available to test for coliform bacteria, nitrate, manganese, lead and arsenic. Go to the [Testing Well Water page](#) to see costs. Payment is made when you drop off the water sample.

### Water Test Kit Order Form

First Name:  \*

Last Name:  \*

Address:  \*

City:  \*

State:  Zip:  ex. 55033

Phone:  \* ex. 000-000-0000

Fax:  ex. 000-000-0000

Email:

Please indicate which tests you would like to receive (check all that apply): \*

- Arsenic
- Coliform bacteria
- Coliform bacteria and nitrate
- Fluoride
- Lead
- Manganese
- Nitrate



## Test more frequently if:

- 💧 There is a change in the taste, odor, or appearance of the well water
- 💧 If problems occur: broken well cap, flood, or a new contamination source
- 💧 An infant is living in the home
- 💧 If the well has a history of bacterial contamination
- 💧 The septic system has recently malfunctioned
- 💧 To monitor water treatment device
- 💧 Family members or house guests have recurrent incidents of gastrointestinal illness

# TIPS – Inspect your well regularly

## **I**nspect your well regularly.

- **Damage:** Any cracks or holes in well casing, corrosion, loose wires, or soil settling?
- **Well cap:** Is it securely attached to the well casing? Is it broken or missing?
- **Connections:** Are the electrical conduit and other connections watertight?



Well in good condition

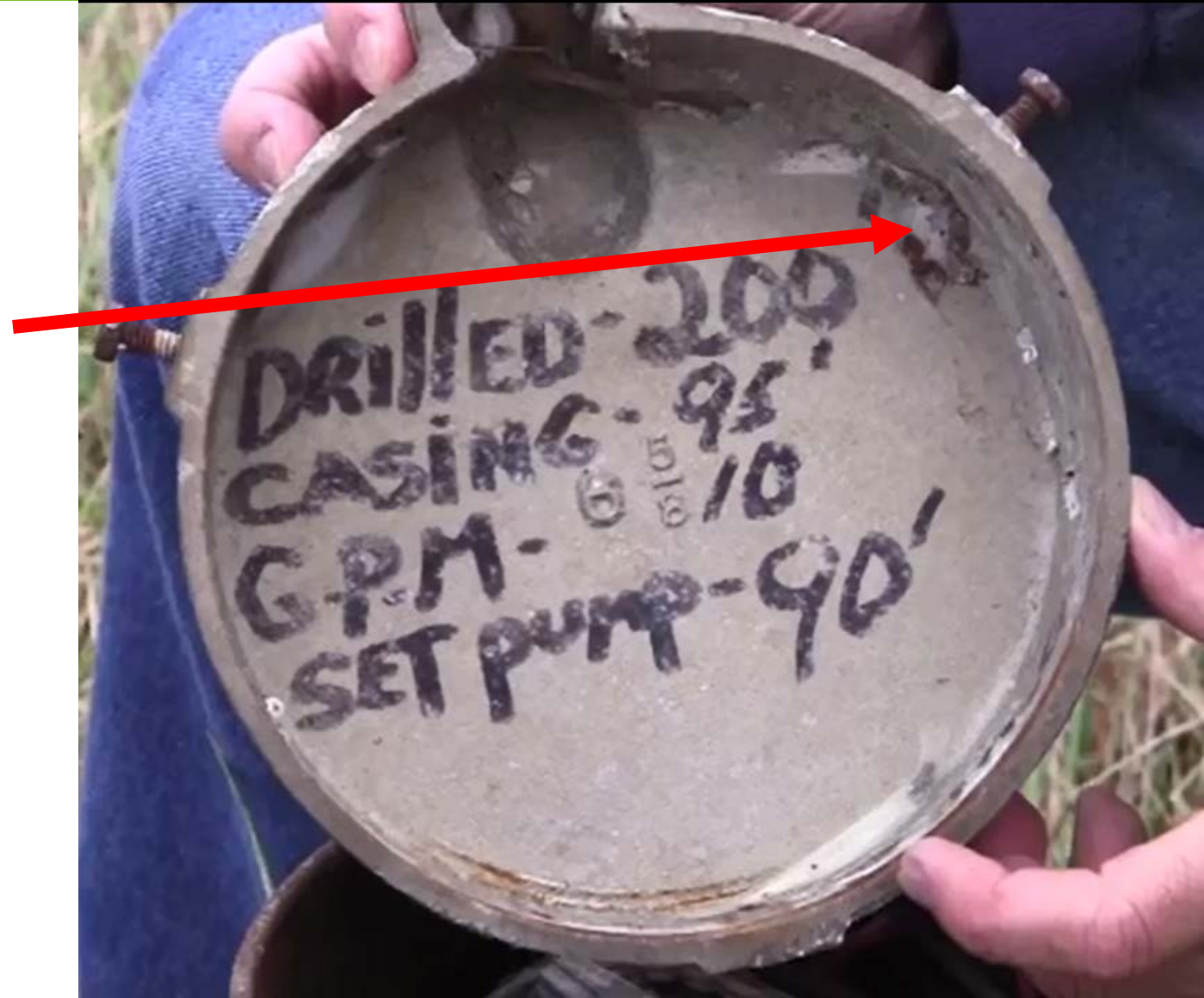


Damaged well



# Tips – Inspect your well regularly

Evidence of insects and insect eggs under well cap



# Proper Well Cap

A proper well cap keeps insects & contaminants out of the well.

- 💧 Insect droppings raise the bacteria level in the well
- 💧 Insects can get trapped in the well, die and decompose



Well pits are safety and health concerns

- 💧 Lack of oxygen
- 💧 Flooding
- 💧 Vermin, snakes & other animals may get trapped

Hire a well contractor to raise the well above grade and fill the pit

5/17/2018





# TIPS – Protect your well

## **P**rotect your well.

### **Do these things:**

- Keep top of well at least 1-foot above ground.
- Keep well area clear of debris.
- Maintain minimum isolation distances from contamination sources (see image to left).
- Mark your well with flags or posts to protect it from being hit by vehicles or machinery.
- Take precautions before and after floods.

### **Do NOT do these things:**

- Allow water to pond around your well.
- Use, store, or dispose of potential pollutants (such as animal wastes, fertilizers, pesticides, or hazardous chemicals) near your well.
- Tie animals to your well.
- Dispose of waste in unused wells.

# TIPS – Protect your well

12 inches between  
ground and top of well





# TIPS – Protect your well





# TIPS – Protect your well





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# TIPS – Protect your well

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# TIPS – Seal unused wells

## **S** eal unused wells.

A well that you no longer use (unused well) can be a pathway for contaminants to get into groundwater and is a safety hazard. You are responsible for getting unused wells on your property sealed. Only a licensed well contractor can legally seal wells.

**Contact a licensed well contractor if your well needs to be repaired or sealed.**



# MDH Website – well owner related information

## Water Quality in Well Water

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- ▶ [Arsenic in Minnesota's Well Water](#)
- ▶ [Bacterial Safety of Well Water](#)
- ▶ [Causes and Symptoms of Giardiasis](#)
- ▶ [Commonly Asked Questions About Springs](#)
- ▶ [Copper in Drinking Water: Health Effects and How to Reduce Exposure](#)
- ▶ [Flood Precautions For Private Water Wells](#)
- ▶ [Iron Bacteria in Well Water](#)
- ▶ [Iron in Well Water](#)
- ▶ [Lead in Well Water Systems](#)
- ▶ [Let it run. . . and get the lead out!](#)
- ▶ [Manganese in Drinking Water \(PDF\)](#)
- ▶ [Methane in Well Water - Consumer Brochure](#)
- ▶ [Methane in Minnesota Well Water - Technical Document](#)
- ▶ [Nitrate in Well Water](#)
- ▶ [Owner's Guide to Wells](#)
- ▶ [Perfluorochemicals \(PFCs\) and Health](#)
- ▶ [Safe Drinking Water For Your Baby](#)
- ▶ [Sulfate in Well Water](#)
- ▶ [VOCs: Volatile Organic Chemicals in Private Drinking Water Wells](#)
- ▶ [Why Does My Water Smell Like Rotten Eggs? Hydrogen Sulfide and Sulfur Bacteria in Well Water](#)

Radium is a carcinogen when consumed,  
not a concern for skin contact or inhalation

## Radium – naturally occurring

City of Rosemount:

New municipal well **exceeds** the drinking water standard for radium

MDH has approved the blending of this well with a nearby municipal well with lower radium

City of Inver Grove Heights:

All municipal wells **exceed** the drinking water standard for radium

IGH water treatment process reduces the radium level

Testing is \$160 a sample contact us through our website if you are interested.

# Treatment options to reduce radium

- 💧 Reverse osmosis
- 💧 Water softener – certified to reduce radium

\*Infants should not have softened water\*



# Other Parameters

💧 Manganese

💧 Arsenic

💧 Lead

💧 Coliform Bacteria

💧 Chloride

# Treatment options to reduce manganese

💧 Reverse osmosis

💧 Water softener \*\*Infants should not have softened water\*\*

💧 Distillation

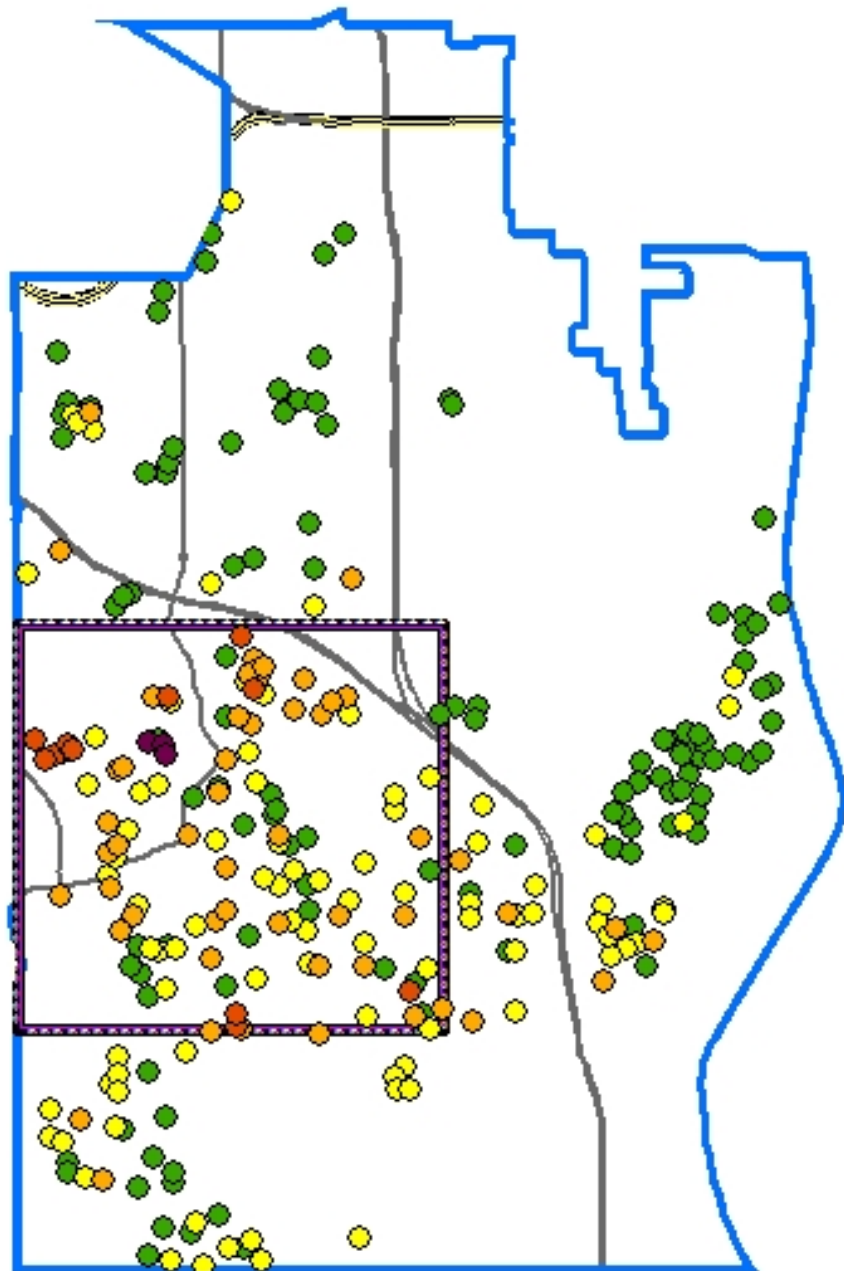
💧 Oxidation by ozonation or aeration, then filtration

# Word on water softeners

- 💧 purpose is to reduce hardness; calcium & magnesium
- 💧 can reduce iron and manganese
- 💧 typically treat hot water
- 💧 if you want the softener to reduce manganese and radium in your drinking water, direct softened water to your cold water kitchen faucet



# Arsenic



## Legend (N = 274)

### Arsenic Levels (ug/L)

- Non-detect (119)
- 0.5 - 3.0 (88)
- 3.1 - 6.9 (52)
- 7.0 - 9.9 (12)
- > 10.0\* (3)

▭ Elevated Arsenic Area

\* MDH Health Risk Limit = 10 ug/L

Arsenic is a carcinogen.  
No amount is safe.

# Treatment options to reduce arsenic

- 💧 Specialty Media Systems
- 💧 Reverse Osmosis with pre-oxidation
- 💧 Reverse Osmosis with additional filter specific for arsenic removal
- 💧 Distillation



When water stands idle in pipes over time, it may absorb lead from old lead pipes, galvanized drop pipe or pressure tank, lead soldered copper pipes, or brass plumbing components such as valves or faucets.

Never use water from hot water faucets for drinking or cooking because lead and other metals dissolve more easily in hot water.

## Sample collection

Pre-purge – collect the first water from the primary drinking water faucet after it has sat idle for 6 hours or more. \* Worse-case sample\*

Purge sample – collect the water at the primary drinking water faucet after running the water until it is as cold as it can get

# Treatment options to reduce lead

- 💧 Reverse osmosis
- 💧 Distillation
- 💧 Carbon filter certified to reduce lead

Lead can cause long-term health and behavioral problems

# Coliform bacteria - sampling

1. Have a water sample analyzed for coliform bacteria
2. If the result is positive, disinfect the well

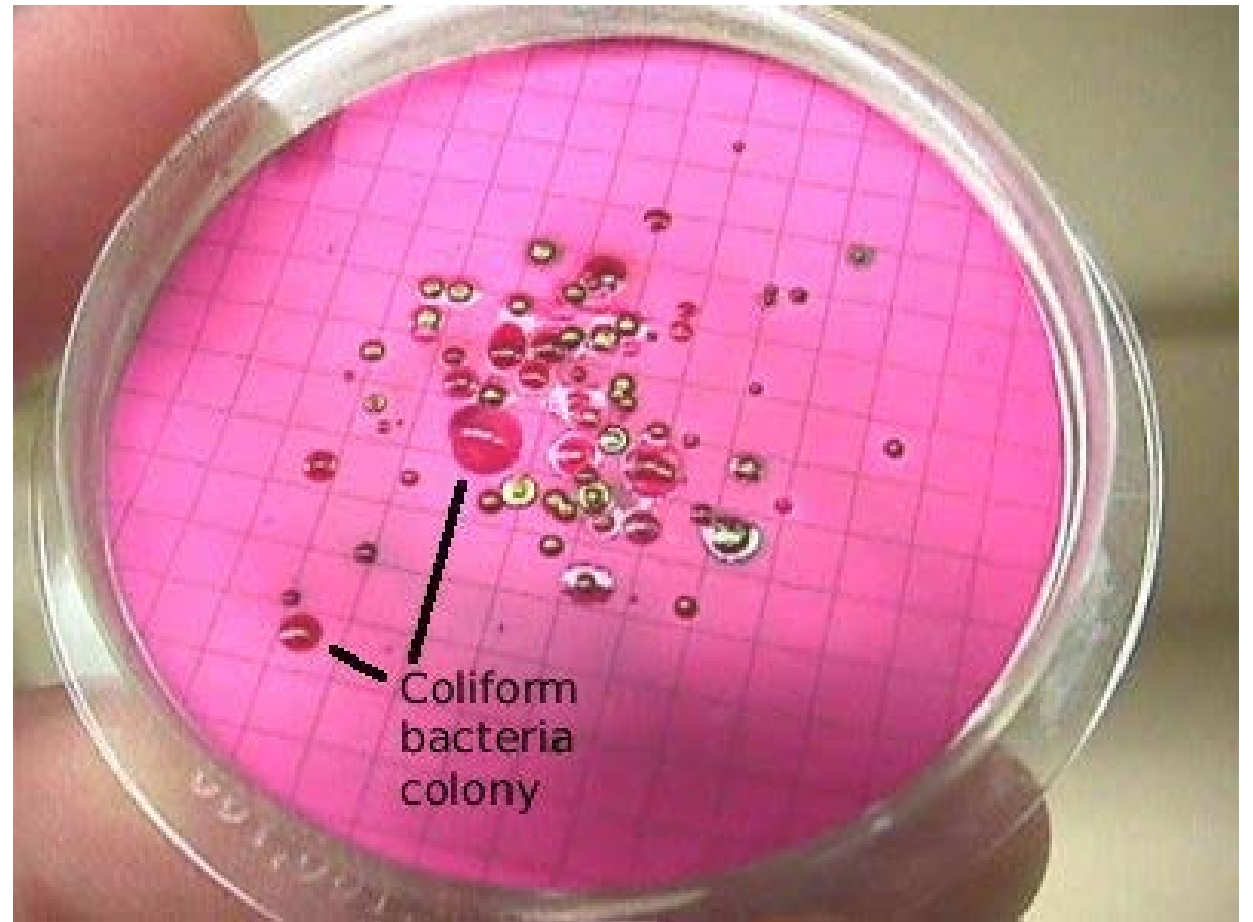
**\*\*Hiring a well contractor to disinfect is recommended\*\***

3. Retest for coliform bacteria

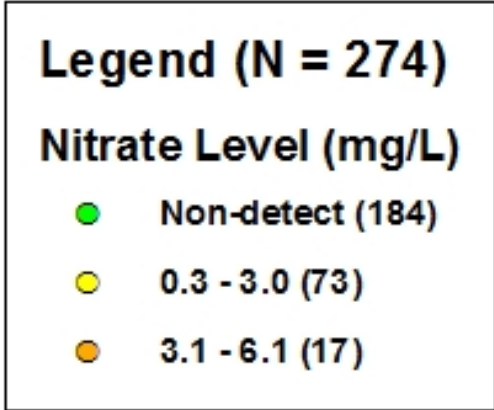
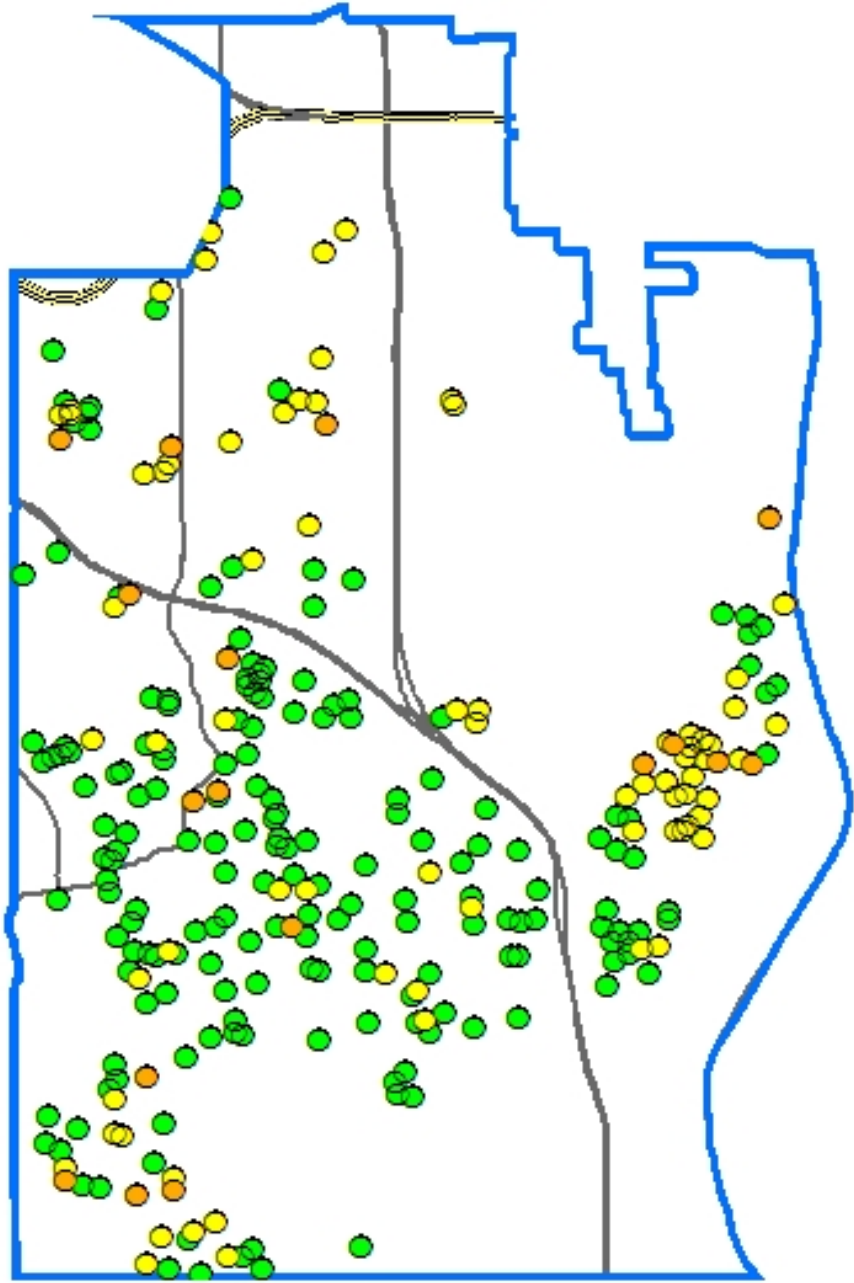
# Treatment options to reduce coliform bacteria

- 💧 Ozonation
- 💧 Chlorination
- 💧 Ultra-violet

Coliform bacteria can cause stomach problems, headaches or fever.

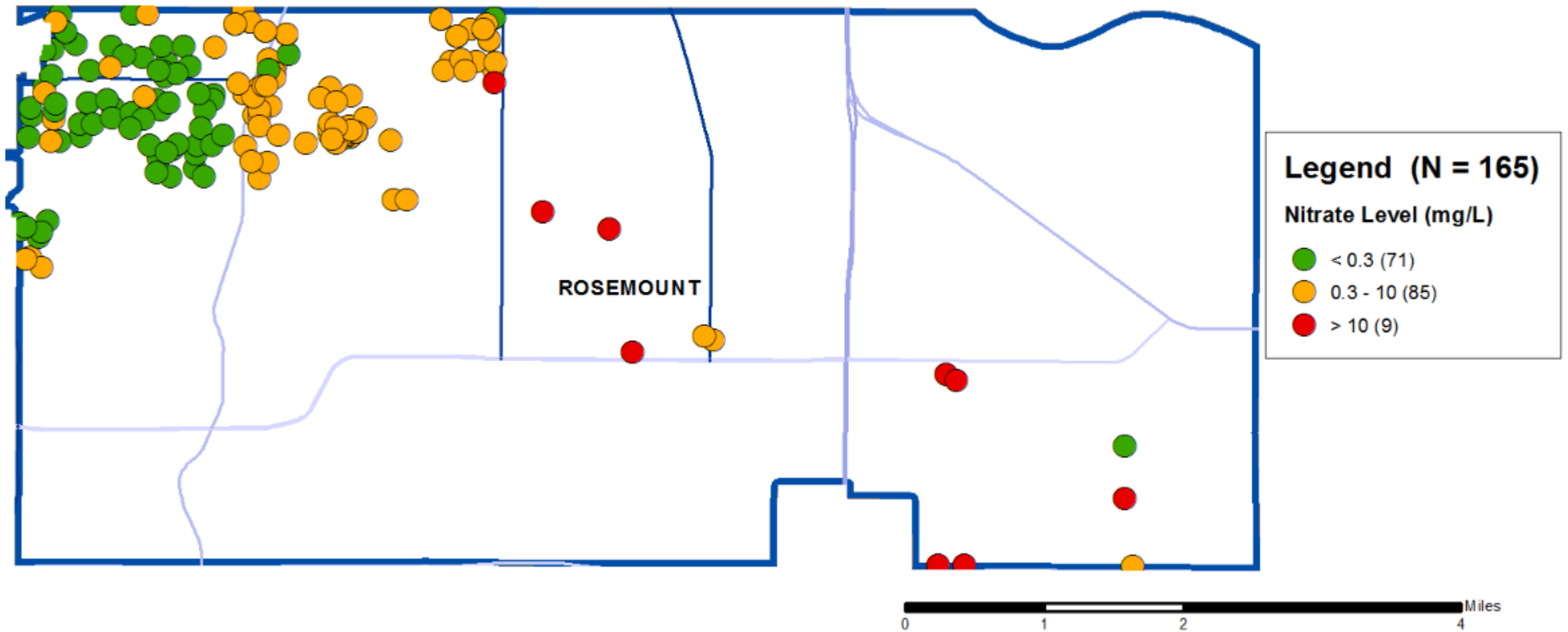


# Nitrate in IGH



MDH Health Risk Limit = 10 mg/L

# Nitrate in Rosemount





# Treatment options to reduce nitrate

💧 Reverse osmosis

💧 Distillation

Infants younger than 6 months should not drink water with nitrate over 10 mg/L. it can cause Blue Baby Syndrome.



# WIISE Chloride results


- 💧 Chloride comes from road salt and water softener brine that discharges into septic system drain fields (92% of WIISE study participants had softeners).
- 💧 Wells within 500 feet of a storm water pond had chloride levels 30% higher than wells further away.
- 💧 The highest chloride result was 288 mg/L, no known health concerns for elevated chloride, but at 250 mg/L the water will start to taste salty.
- 💧 Chloride can increase the water's ability to erode metals from household plumbing
- 💧 Reverse osmosis systems reduce chloride



# Water Treatment Summary

- 💧 It is recommended that you hire a water conditioning professional to install your water treatment device(s).
- 💧 Consider testing your treated water
- 💧 It is important to follow the manufacturer's instructions on maintenance of the water treatment system.
- 💧 Failure to properly maintain your water treatment system could jeopardize your water quality.

# Special Well Construction Area

DEPARTMENT OF HEALTH

[HOME](#) [TOPICS](#) [ABOUT US](#)

### Wells and Borings

- Home
- Construction of Wells and Borings
- Contractor Information
- Delegated Well Programs
- Fees
- Geothermal
- Laws and Rules
- Licensed Well and Boring Contractor Directory
- Natural Disasters
- Newsletter
- Online Services
- Resources
- Sealing of Wells and Borings
- Special Construction Areas
- Water Quality/Well Testing/Well Disinfection
- Water Well Information
- Well Disclosure/Property Transfer
- About Us


## Inver Grove Heights (Pine Bend Area) Special Well and Boring Construction Area Well Management Program

Koch Refinery, North Star Chemical, St. Paul Ammonia, Pine Bend Landfill, and Crosby-American Landfill are located in Pine Bend, approximately 10 miles south of St. Paul and 1/2 to 1 mile west of the Mississippi River in Dakota County. Koch Refining was constructed in the 1950s to refine high-sulfur crude oil imported by pipeline from the oil fields of the Province of Alberta, Canada. Numerous petro-chemical industries associated with the refinery were built in the area. Pine Bend Sanitary Landfill and Crosby-American Landfill began operation in the early 1970s, accepting mixed municipal solid waste and demolition wastes.

In December of 1972, in response to complaints to the Minnesota Pollution Control Agency (MPCA) from well owners about tastes and ammonia odors, the Minnesota Department of Health (MDH) sampled a number of wells to the east of the refinery. Reports from the refinery indicated that process water holding ponds were leaking millions of gallons of waste water to the ground. Further well sampling was done in 1972. Contamination with metals, phenols, ammonia, and lowered Ph was reported.

On April 19, 1973, the Minnesota Department of Health contacted the Village of Inver Grove Heights requesting their assistance to control well construction in Sections 33, 34, and 35, T27N, R22W. The Department requested that before any well permit is issued for construction of a new well or reconstruction of an existing well, the Health Department be contacted.

A series of hydrologic investigations have been conducted. The Koch, Northstar, and St. Paul Ammonia sites have been combined into a single Permanent List of Priorities (PLP) site (superfund) by the Minnesota Pollution Control Agency. The Pine Bend and Crosby-American Sites have been combined into a single PLP

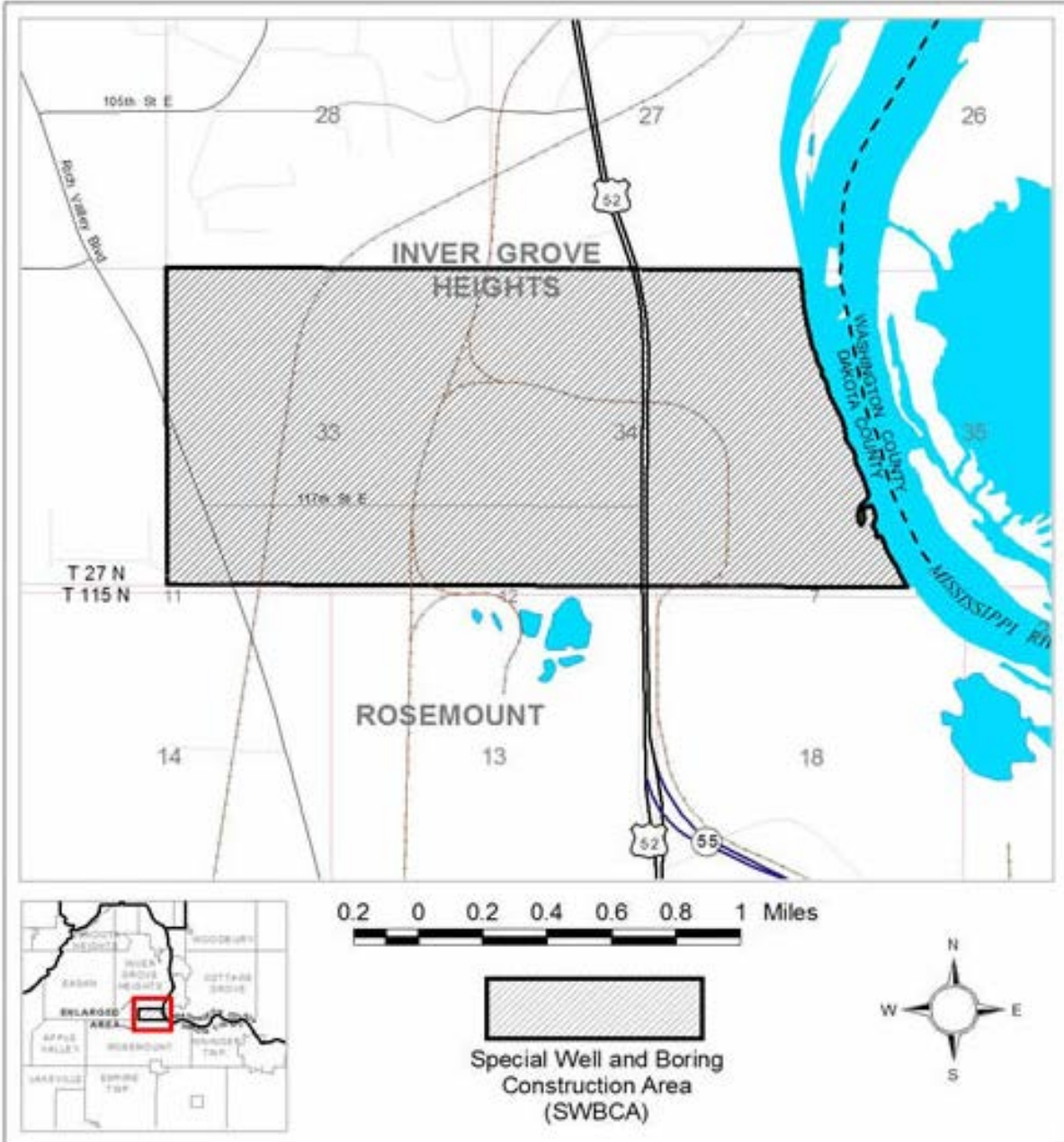
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**Map**  
[Inver Grove Heights \(Pine Bend Area\) Special Well and Boring Construction Area Map](#)

**Questions?**  
[Well Management Section 651-201-4600](#) or [800-383-9808](#)  
[health.wells@state.mn.us](mailto:health.wells@state.mn.us)

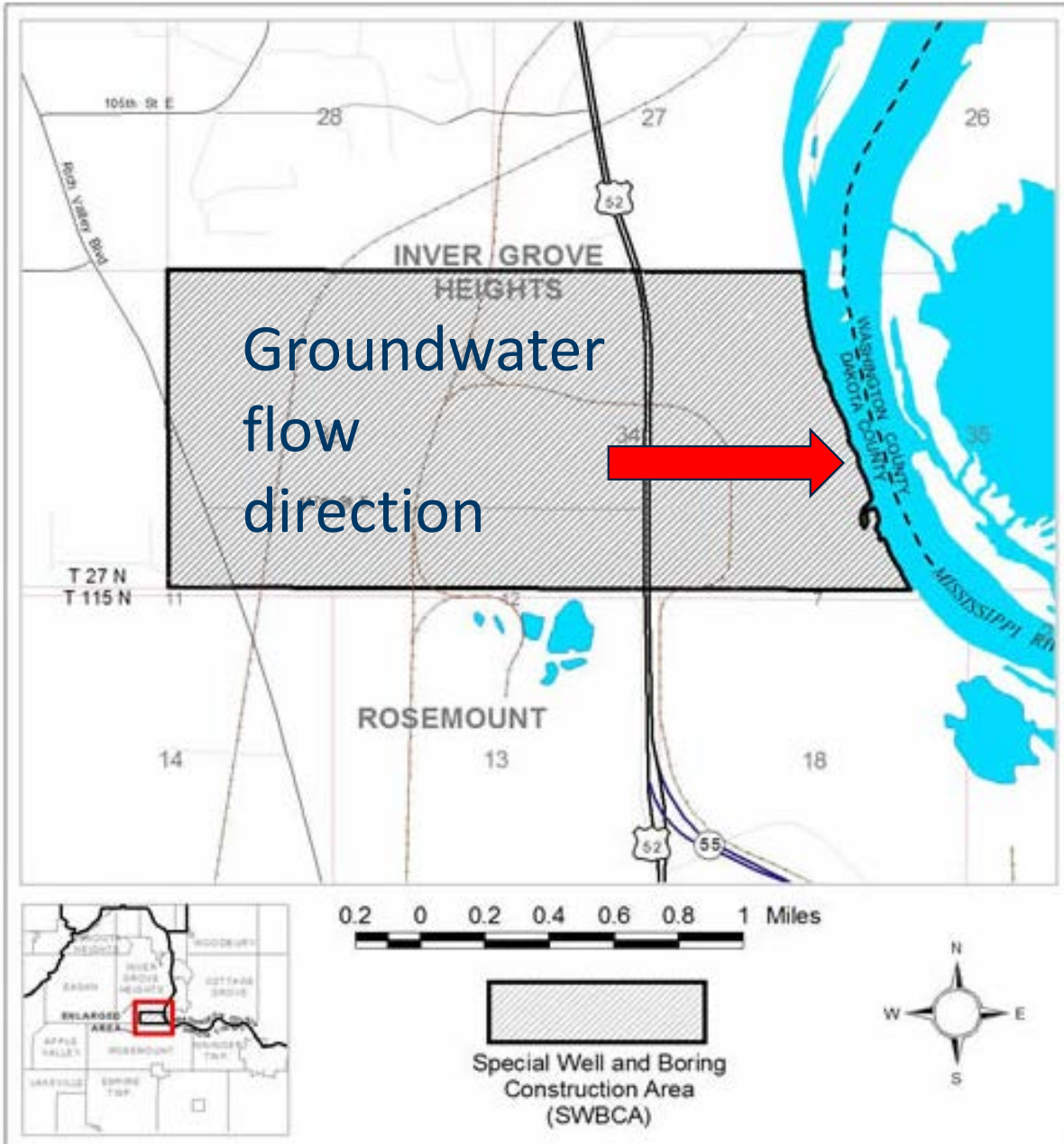
Special Well and Boring Construction Area  
Inver Grove Heights (Pine Bend Area)  
Dakota County

# Special Well Construction Area



Special Well and Boring Construction Area  
Inver Grove Heights (Pine Bend Area)  
Dakota County

# Special Well Construction Area



WIISE Study Participants  
And  
Dakota County Board  
for funding tonight's event and water sample analysis



# Time for Questions

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