

MAINTAINING PRIVATE WATER SYSTEMS

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College of Agricultural Sciences

MASTER WELL OWNER NETWORK

Pennsylvania's volunteer network for private water source protection.

Volunteer Training



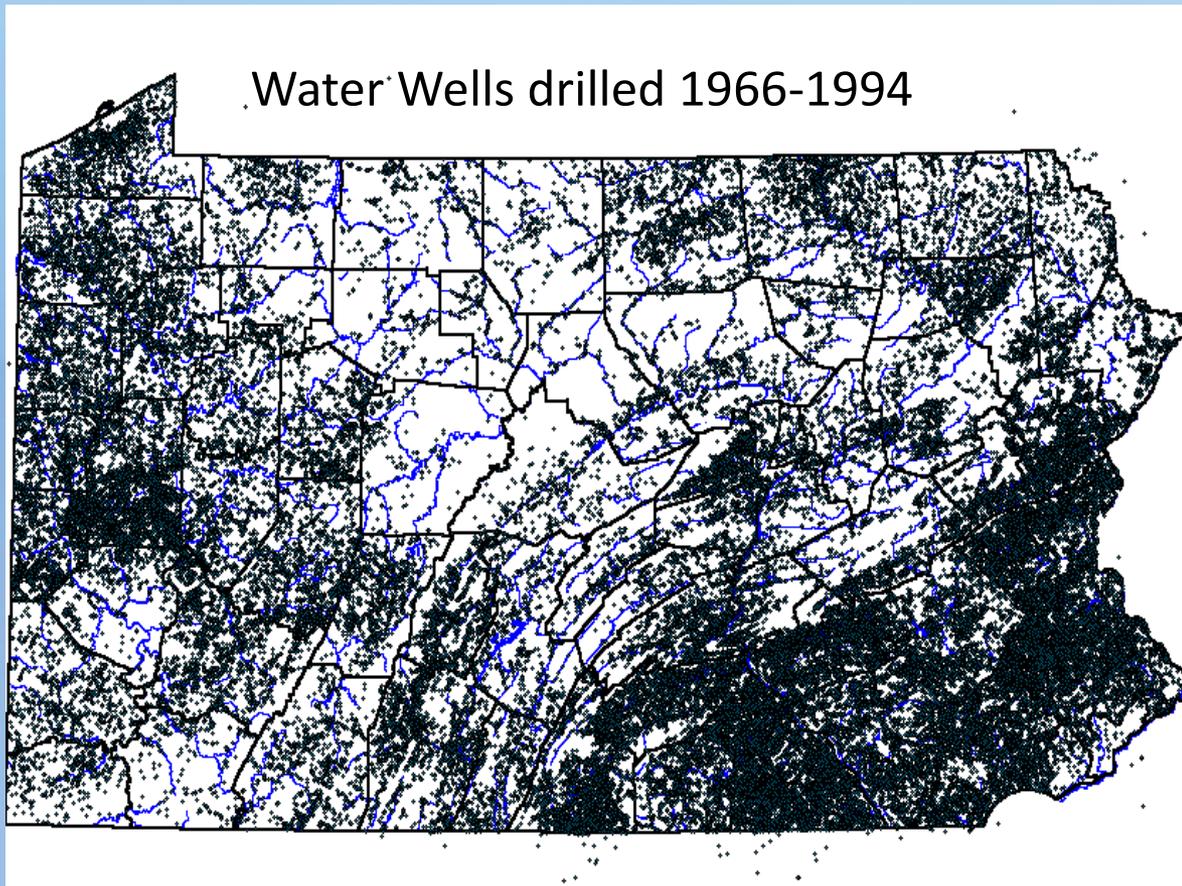
Public Education



<http://extension.psu.edu/water/mwon>



Groundwater Supplies Private Water Wells and Springs



Most are drilled wells

Over one million homes
and farms

Many have never been
tested

One of the few states
lacking regulations!

All management is
voluntary

Springs

Often shallow groundwater, prone to bacteria and other surface contamination

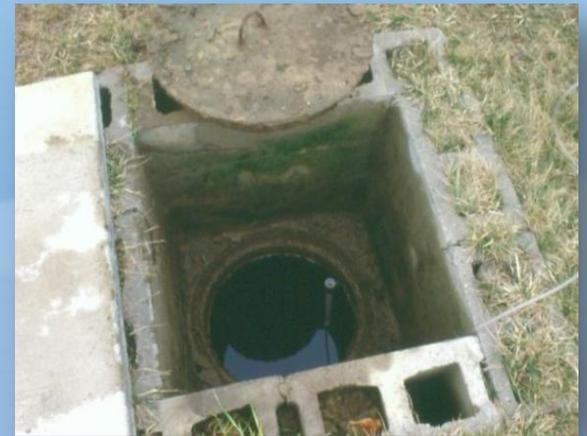
Be careful of land uses around spring



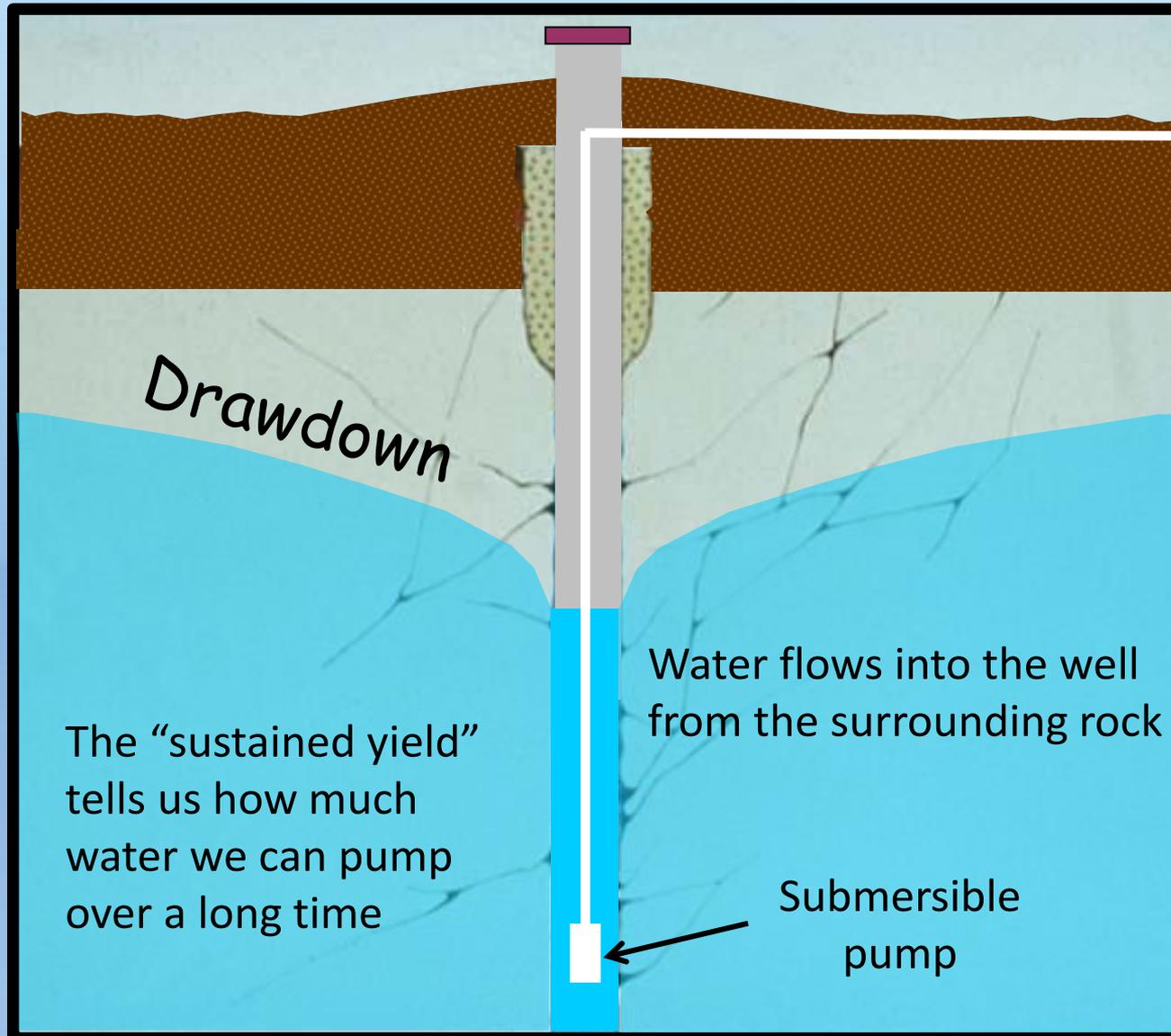
Rainwater Cisterns

Utilized in areas where all groundwater is heavily polluted or unavailable

Require extensive treatment



Groundwater and Well Yield



Well Completion Report

(See previous page for Explanation)
Department of Conservation and Natural Resources

WATER WELL COMPLETION REPORT
Use Ball Point Pen, Press Firmly and print Clearly
(DO NOT WRITE IN GRAY COLORED BLOCK)

Topographic and Geologic Survey
Water Well Drillers Licensing
3240 Schoolhouse Road
Middletown, PA 17057-3534
717-702-2017

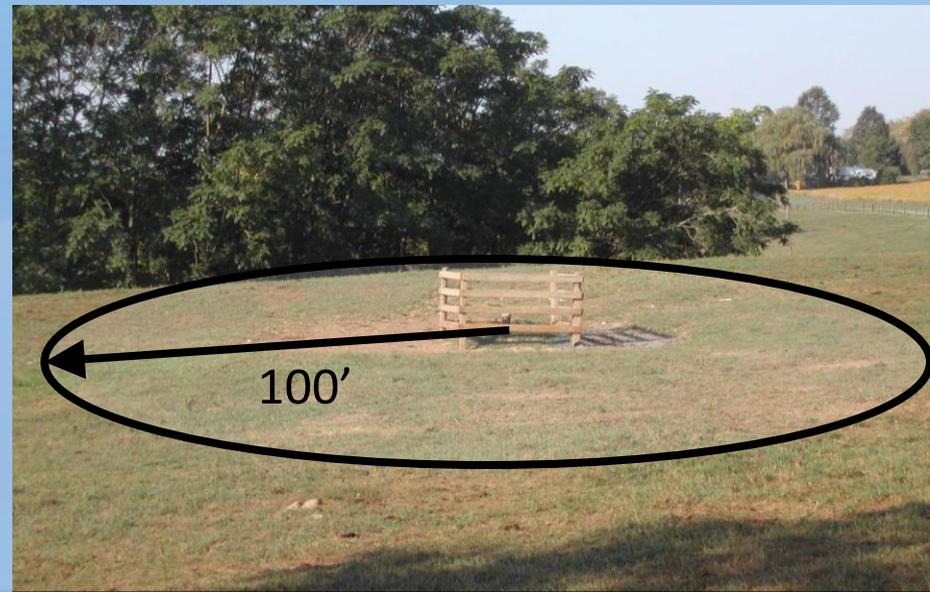
ST. 42 Co. _____ Lat. _____ Long. _____ S&Q: _____ Acc. _____ Topo Setting _____ Aquifer _____ Rock Type _____ State Hydrologic Unit _____ Map _____ Well # _____	<p>(Circle Appropriate Answer)</p> <p>Well Type: water supply, injection, monitoring, heat pump, test, other _____</p> <p>Water Use: residence, public, stock, irrigation, institution, industrial, geothermal, other _____</p> <p>Well Finish: open hole, open end, screen, perforated casing Length of screen or perforated casing _____</p> <p>Drilling method: cable, air rotary, auger, other _____</p> <p>Yield Method: bailer, watch/bucket, orifice, est. pump _____</p> <p>Landform at site: hilltop, valley, hillside, If Abandoned: Why? _____</p> <p>Development _____ Lot No. _____</p> <p>Local Well No. _____ Permit No. _____</p> <p>Directions to site _____</p>	<p>Well Log (materials penetrated) FROM - TO</p> <p>_____ - _____</p>
<p>Township/boro/city _____ County _____ Address _____</p> <p>Owner _____ Last Name _____ First Name _____</p> <p>Driller _____ Licensed Name _____ License Number _____</p> <p>Date Drilled _____</p> <p>Well: _____ Depth (ft) _____ dia (in) _____</p>	<p style="text-align: center;">N</p> <p style="text-align: center; color: red; font-size: 24px;">Only ~10% of well owners have one</p> <p style="text-align: center; color: red; font-size: 24px;">Keep yours in a safe place!</p> <p style="text-align: center; color: red; font-size: 24px;">Google "PaGWIS" for online database</p> <p style="text-align: center;">W E</p> <p style="text-align: center;">S</p> <p style="text-align: center;">(SKETCH MAP)</p> <p>If this portion is traced, please give source. Indicate route numbers, intersections, schools, churches, cemeteries, streams, towns and any notable feature such as quarries, bridges, railroads, etc. Be sure to show distances between these features (miles/feet)</p> <p style="text-align: right;">8700-FM-TGS0015 Rev. 2/2000</p>	
<p>Total Casing (1) _____ steel grouted Length (ft) _____ dia (in) plastic not grouted</p> <p>Total Casing (2) _____ steel grouted Length (ft) _____ dia (in) plastic not grouted</p> <p>Depth to bedrock _____ ft. Saltwater zone _____ ft.</p> <p>Water-bearing zones 1) _____ 2) _____ 3) _____ 4) _____</p> <p>Water levels: _____ ft (static) _____ ft (after test) _____ ft (drawdown)</p> <p>Yield _____ gallons per minute (GPM). Length of pump test: _____ hr _____ min</p>	<p>I hereby certify that the above information is true and complete to the best of my knowledge and belief</p> <p>Driller's Signature (required) _____ Date _____</p>	

Location, Location, Location

At least 100 ft from a septic tank, dosing tank, or seepage bed

Up-gradient and away from runoff, roads, and other sources of contamination

100-foot wellhead protection zone if possible



PREVENTING PROBLEMS WITH PROPER WATER WELL CONSTRUCTION



5

“sanitary” well cap

12” above ground

1

sloping ground

4

casing to bedrock

2

grout seal

3

bedrock



Photo: PA Ground Water Association

Examples of Problems



Inspect Your Well or Spring Regularly

- Keep the area clean and easily accessible
- Inspect your well casing or spring box to detect cracks, holes, or corrosion
- Have a qualified professional inspect your well at least every 10 years
- Keep records in a safe place



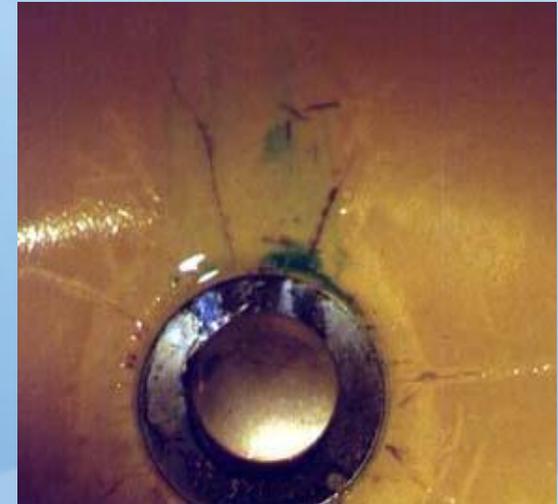
Photo: PA Ground Water Association

Common Aesthetic Issues

(can be naturally occurring)

Some Common Symptoms

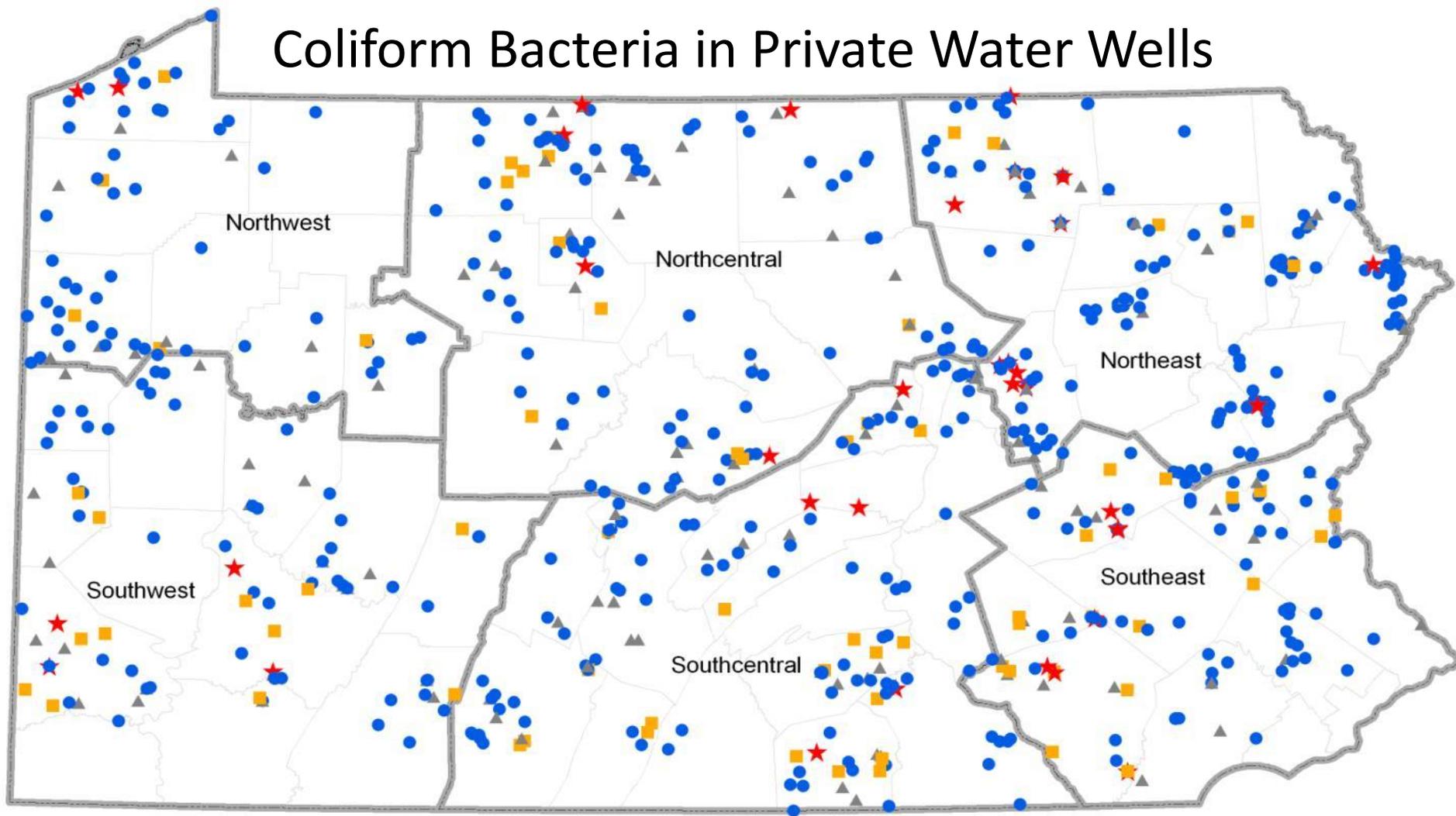
- White residue where water is heated = *hardness*
- Reddish stains, metallic taste = *iron*
- Black stains, metallic taste = *manganese*
- Rotten egg odor = *hydrogen sulfide gas*
- Blue stains, metallic taste = *corrosive water, copper*



BUT, some problems have no obvious symptoms

- *Bacteria, nitrate, lead, pesticides, arsenic*

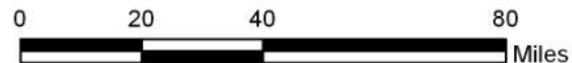
Coliform Bacteria in Private Water Wells



Well Coliform Bacteria Concentration (Colonies/100mL)

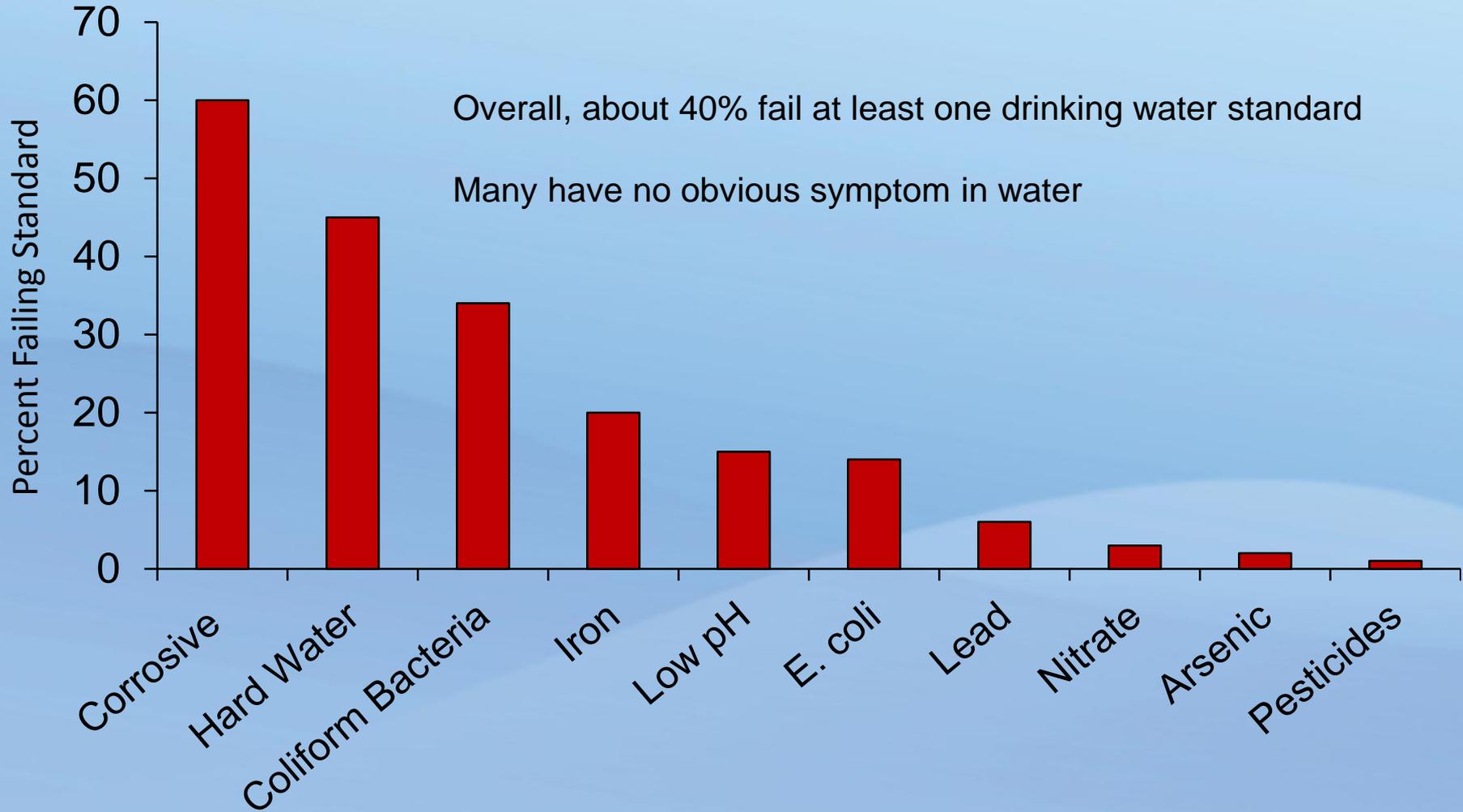


Scale



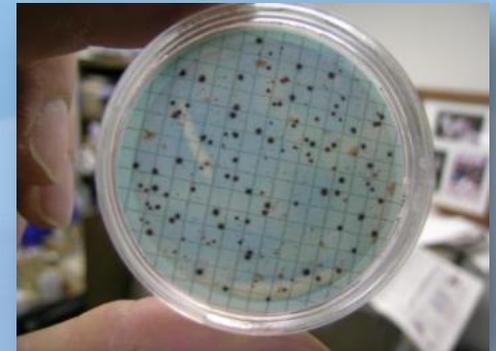
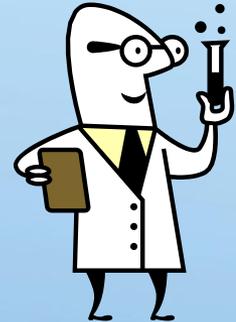
Water Quality Problems

(based on several PSU surveys)



Test Your Water!

- Why test? - many pollutants have no symptoms
- Many water supplies have never been properly tested
- Use state accredited laboratories!
- Consider third party, chain-of-custody testing **BEFORE** new activities for legal protection (gas drilling, etc.)
- Test recommendations
 - Annual test for bacteria (every 14 months)
 - Every three years for pH, TDS, pollutants associated with activities within sight
- Compare test results to drinking water standards

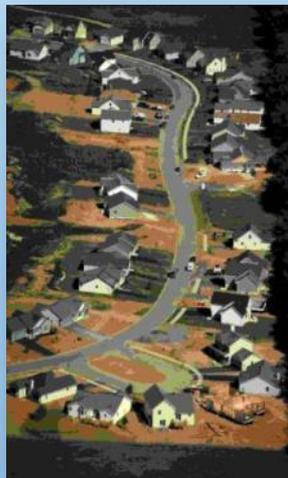


Target Testing at Local Land Use



Landfills

Organics, metals



Houses

Bacteria
Nitrate
Sediment



Roads

Chloride, Sodium



Industry

Organics, metals



Agriculture

Bacteria, Nitrate, Pesticides



Mining

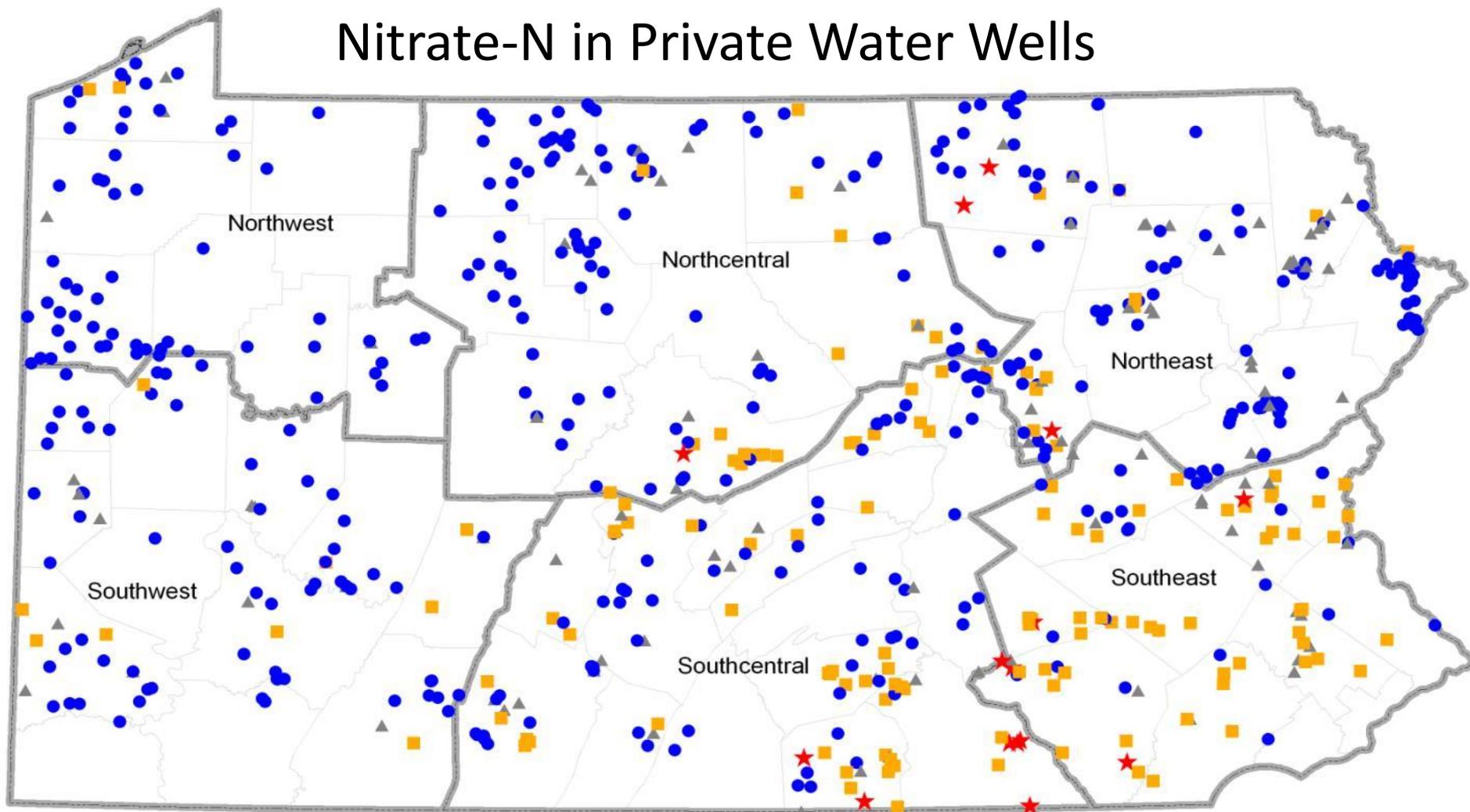
Iron, pH, Sulfate



Gas Drilling

Barium, Chloride, TDS

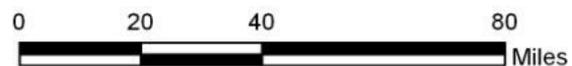
Nitrate-N in Private Water Wells



Well Nitrate-N Concentration, mg N/L



Scale



Interpreting Water Test Reports

LAB ID	SAMPLE ID	REPORT DATE	DATE SAMPLED	SAMPLE TYPE	COUNTY
		12/20/2007	12/10/07	Drinking Water	Schuylkill

WATER ANALYSIS Trace Element Package (WD07)

Analysis	Units	Your Test Results	Drinking Water Standard ¹		Method
			Standard	Type	
Total Coliform Bacteria	MPN ² per 100 mL	18	0	Health	SM 9223B
<i>E. Coli</i> Bacteria	MPN ² per 100 mL	None detected ³	0	Health	SM 9223B
pH	-	8.1	6.5 - 8.5	Aesthetics	EPA 150.1
Total Dissolved Solids (TDS)	mg/L	96	500	Aesthetics	SM 2540C
Arsenic (As)	mg/L	0.022	0.01	Health	EPA 200.9
Barium (Ba)	mg/L	< 0.002	2	Health	EPA 200.7
Cadmium (Cd)	mg/L	< 0.002	0.005	Health	EPA 200.7
Chromium (Cr)	mg/L	< 0.002	0.1	Health	EPA 200.7
Copper (Cu)	mg/L	< 0.01	1.3	Health	EPA 200.7
Lead (Pb)	mg/L	< 0.006	0.015	Health	EPA 200.9
Nickel (Ni)	mg/L	< 0.01	-	-	EPA 200.7
Mercury (Hg)	mg/L	< 0.0004	0.002	Health	7471
Zinc (Zn)	mg/L	< 0.05	5	Health	EPA 200.7

Water sample failed the drinking water standard for TOTAL COLIFORM BACTERIA.

Water sample failed the drinking water standard for ARSENIC.

For more details on your water test results, please see the description of each parameter on the back of this report and any fact sheets that may have been included with your results.

If you have any questions on your test report, please contact Bryan Swistock, extension associate, at 814-863-0194 (telephone) or brs@psu.edu (email) OR Tom McCarty, extension educator, at 717-240-6500 or trm3@psu.edu.

Penn State Extension has many resources to help!

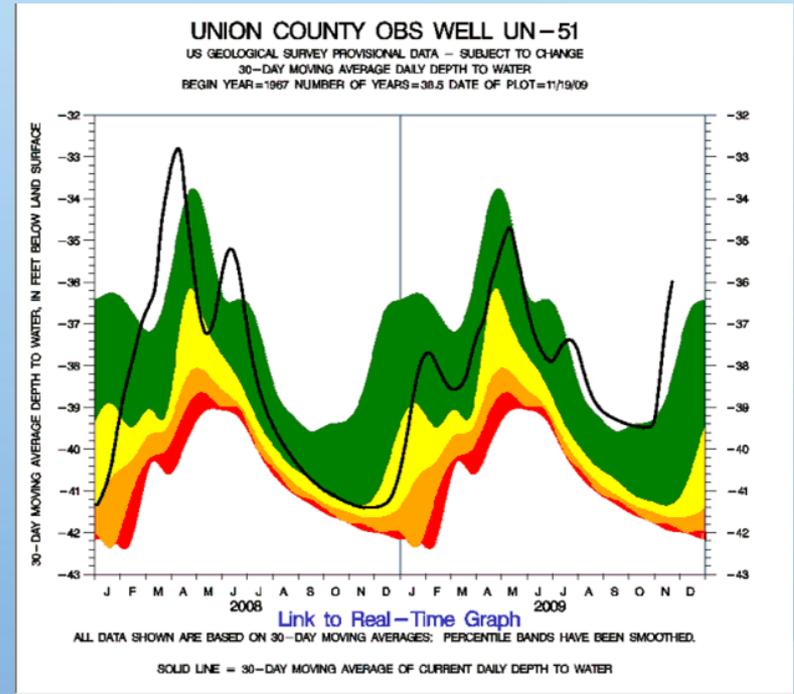
Solving Water Quality Problems

- New source
- Maintenance / pollution control
- Treatment
 - Rely on results from accredited lab
 - Seek reputable companies
 - NSF and WQA certifications
 - Shop around



Water Quantity Monitoring

- Existing groundwater network of wells
- Water conservation!
 - Habits
 - Fixtures and appliances
 - Save \$\$ and septic system



<http://groundwaterwatch.usgs.gov/>

PENNSTATE Search Site

College Of Agricultural Sciences **COOPERATIVE EXTENSION**

Home Publications Videos Links News Events Contact Us

Water Resources

- Drinking Water
- Water Conservation
- Pond Management
- Drought and Climate Information
- Discovery Watersheds
- Marcellus Shale
- Master Well Owners Network

[Nutrient and Water Policy](#)

[Septic Systems](#)

AgSci >> Extension >> **Water Resources**



LATEST NEWS

Nutrient Management Research to Benefit Chesapeake Bay
May 28, 2010

Nitrogen contamination of ground and surface water and air pollution caused by leaching, runoff and gaseous nitrogen emissions from animal-feeding operations are the most important environmental concerns related to animal agriculture, which is known to be the leading polluter of the bay.

On-Lot Septic Management is Vital to Water Quality
May 19, 2010

This webinar offers guidelines and maintenance advice for owners of septic systems

New Penn State Water Testing Program for Ponds and Lakes
April 19, 2010

For ponds or lakes with an existing water quality program, testing is an essential tool for diagnosing the cause of the problem and determining suitable treatment options.

SPOTLIGHT

- Penn State Water Testing
- Water Conservation Home Study
- Webinar Series

ADDITIONAL RESOURCES

- ▶ Frequently Asked Questions
- ▶ Educational Materials
- ▶ Find a Local Educator

Penn State Pond Guru Says: Get Your Water Tested

Google "DEP private water wells" or use "private water wells" from the DEP homepage

The screenshot shows a web browser window displaying the Pennsylvania Department of Environmental Protection (DEP) website. The browser's address bar shows the URL: <http://www.depweb.state.pa.us/portal/server.pt/community/>. The DEP logo is visible in the top left corner, and the navigation bar includes links for "PA STATE AGENCIES", "ONLINE SERVICES", and a search box. The main content area is titled "Private Water Wells" and features a breadcrumb trail: Home > Water > Bureau of Point and Non-Point Source Management > Drinking Water Management > Private Water Wells. A list of links is provided, including "General Information about Private Wells", "Well Contaminants", "Water Testing", "Publications", "Well Construction", "Well Driller Information", "Flooding Resources", and "Other Private Well Websites". A diagram of a well is shown, with labels for various components: vermin-proof, vented well cap; back flow prevention; pressure adapter; gravel seal; water table; good casing; bedrock; backflow preventer; and drive shoe. A pump is also indicated at the bottom of the well. On the right side, a sidebar titled "Bureau of Point and Non-Point Source Management Topics" lists various categories, with "Private Water Wells" highlighted. The bottom of the page shows a Windows taskbar with the system clock displaying 4:27 PM on 9/17/2012.

Home > Water > Bureau of Point and Non-Point Source Management > Drinking Water Management > Private Water Wells

Private Water Wells

- [General Information about Private Wells](#)
- [Well Contaminants](#)
- [Water Testing](#)
- [Publications](#)
- [Well Construction](#)
- [Well Driller Information](#)
- [Flooding Resources](#)
- [Other Private Well Websites](#)

General Information about Private Wells

Does the state of Pennsylvania regulate private homeowner wells?
No. The PA Department of Environmental Protection (DEP) does not regulate private wells. However, since DEP receives many questions from homeowners about their privately-owned wells, this page is designed to provide homeowners with information about the following:

- Well contaminants
- Water testing

Bureau of Point and Non-Point Source Management Topics

- ▼ **Bureau of Point and Non-Point Source Management**
- ▼ **Drinking Water Management**
- ▶ Regulations
- ▶ Drinking Water Regulations, Standards & Resources
- ▶ Public Drinking Water
- ▼ **Private Water Wells**
- ▶ Waterborne Diseases
- ▶ Partnership for Safe Water
- ▶ Filter Plant Performance Evaluation
- ▶ Capability Enhancement Program
- ▶ Operator Certification
- ▶ About Water Supply
- ▶ Water Quality Standards
- ▶ Emergency Preparedness for Water and Wastewater Facilities
- ▶ Wastewater Management
- ▶ Innovative Water Technology