CLEAN WATER IS EVERYONE'S BUSINESS

LESS THAN THREE PERCENT OF OUR PLANET'S WATER IS FRESH WATER, AND LESS THAN HALF OF THAT IS AVAILABLE AS A LIQUID; THE REST IS LOCKED AWAY AS ICE IN POLAR CAPS AND GLACIERS. FOR THESE REASONS, FRESHWATER IS A PRECIOUS RESOURCE.

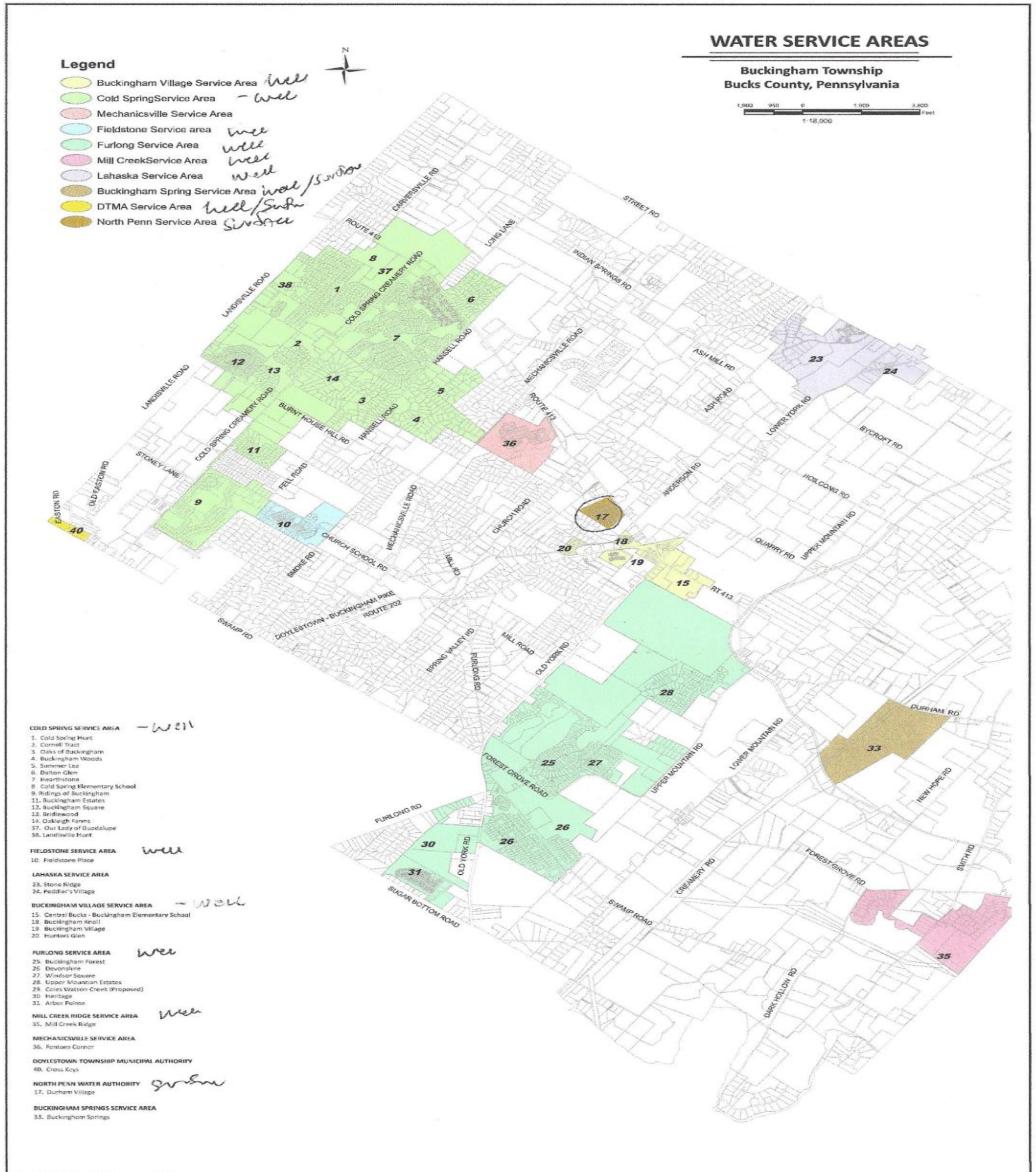
BUCKS2040 VISION PLAN
RESIDENT SURVEY

91% of Respondents Agreed or Strongly Agreed that Bucks County Future should include access to Clean Air and **Water**

WHAT'S IN THE WATER?

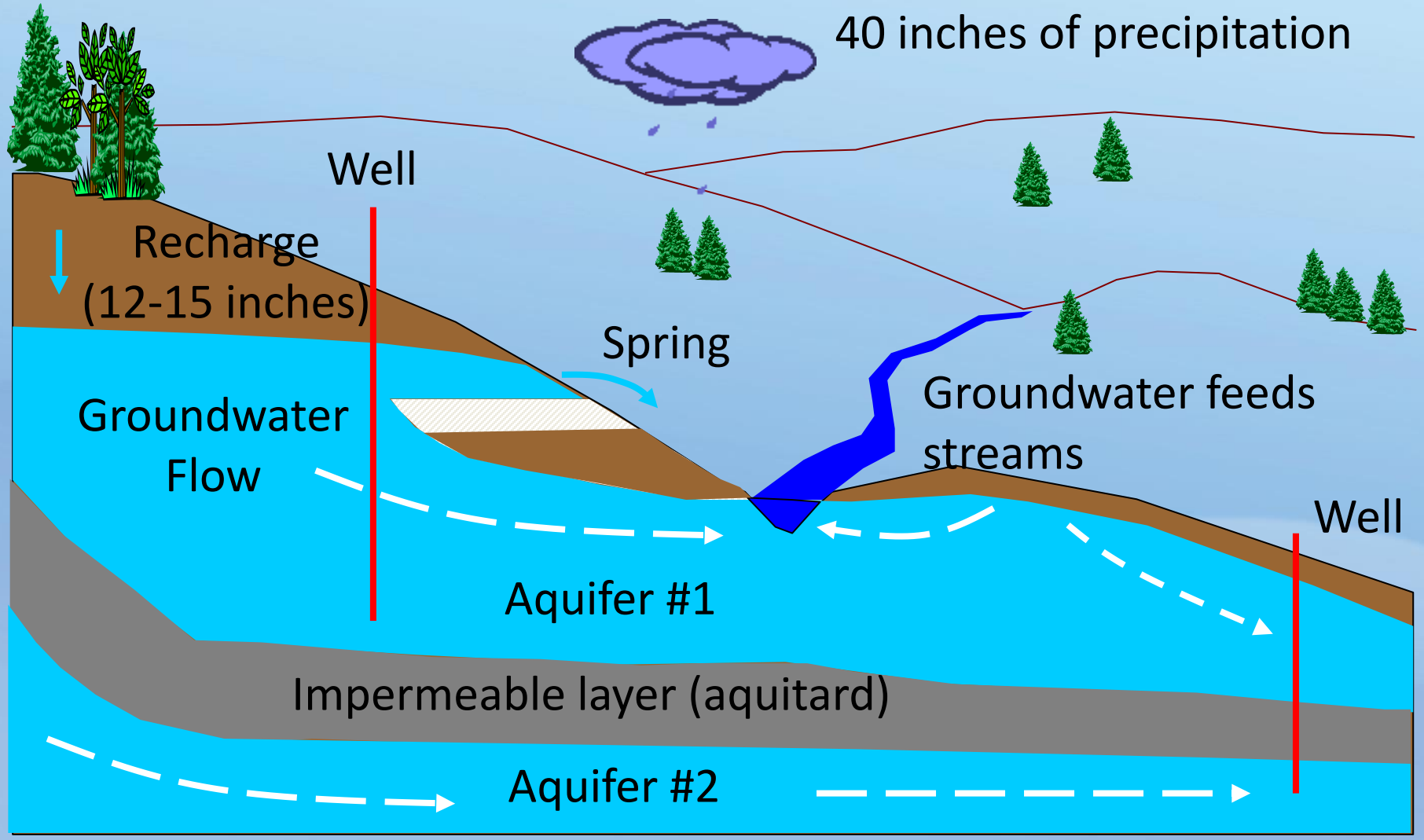
BUCKINGHAM TOWNSHIP EAC

Penn State Extension

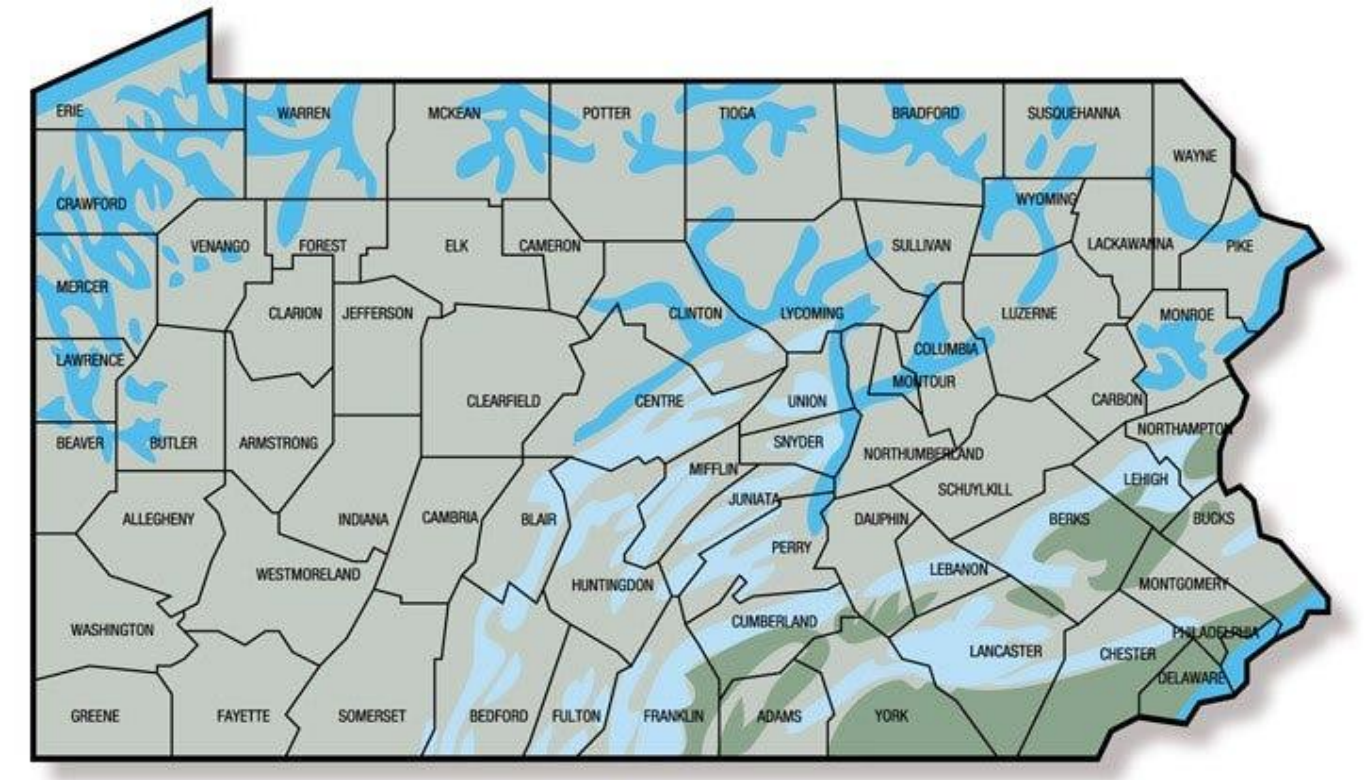

WATER SERVICE AREAS
Buckingham Township
Bucks County, Pennsylvania
1:18,000
Legend
Buckingham Village Service Area
Cold SpringService Area
Mechanicsville Service Area
Fieldstone Service area
Furlong Service Area
Mill CreekService Area
Lahaska Service Area
Buckingham Spring Service Area
DTMA Service Area
North Penn Service Area
COLD SPRING SERVICE AREA
1. Cold Spring Hunt
2. Cornell Tract
3. Oaks of Buckingham
4. Buckingham Woods
5. Summer Lea
6. Dalton Glen
7. Hearthstone
8. Cold Spring Elementary School
9. Ridings of Buckingham
11. Buckingham Estates
12. Buckingham Square
13. Bridlewood
14. Oakleigh Farms
37. Our Lady of Guadalupe
38. Landisville Hunt
FIELDSTONE SERVICE AREA
10. Fieldstone Place
LAHASKA SERVICE AREA
23. Stone Ridge
24. Peddler's Village
BUCKINGHAM VILLAGE SERVICE AREA
15. Central Bucks - Buckingham Elementary School
18. Buckingham Knoll
19. Buckingham Village
20. Hunters Glen
FURLONG SERVICE AREA
25. Buckingham Forest
26. Devonshire
27. Windsor Square
28. Upper Mountian Estates
29. Coles Watson Creek (Proposed)
30. Heritage
31. Arbor Pointe
MILL CREEK RIDGE SERVICE AREA
35. Mill Creek Ridge
MECHANICSVILLE SERVICE AREA
36. Fontons Corner
DOYLESTOWN TOWNSHIP MUNICIPAL AUTHORITY
40. Cross Keys
NORTH PENN WATER AUTHORITY
17. Durham Village
BUCKINGHAM SPRINGS SERVICE AREA
33. Buckingham Springs
ROUTE 413
CARVERSVILLE RD
LONG LANE
STREET RD
INDIAN SPRINGS RD
LANDISVILLE ROAD
COLD SPRING CREAMERY ROAD
HANSELL ROAD
MECHANICSVILLE ROAD
ASH MILL RD
LOWER YORK RD
BYCROFT RD
HOLICONG RD
QUARRY RD
UPPER MOUNTAIN RD
BURNT HOUSE HILL RD
FELL ROAD
STONEY LANE
OLD EASTON RD
EASTON RD
CHURCH SCHOOL RD
SMOKE RD
CHURCH ROAD
ANDERSON RD
RT 413
SWAMP RD
DOYLESTOWN - BUCKINGHAM PIKE
ROUTE 202
SPRING VALLEY RD
FURLONG RD
MILL RD
OLD YORK RD
FOREST GROVE ROAD
LOWER MOUNTAIN RD
DURHAM RD
NEW HOPE RD
SUGAR BOTTOM ROAD
SWAMP ROAD
CREAMERY RD
FOREST GROVE RD
SMITH RD
DARK HOLLOW RD

How Does a Well Work?

Wells and Springs Utilize Groundwater Aquifers

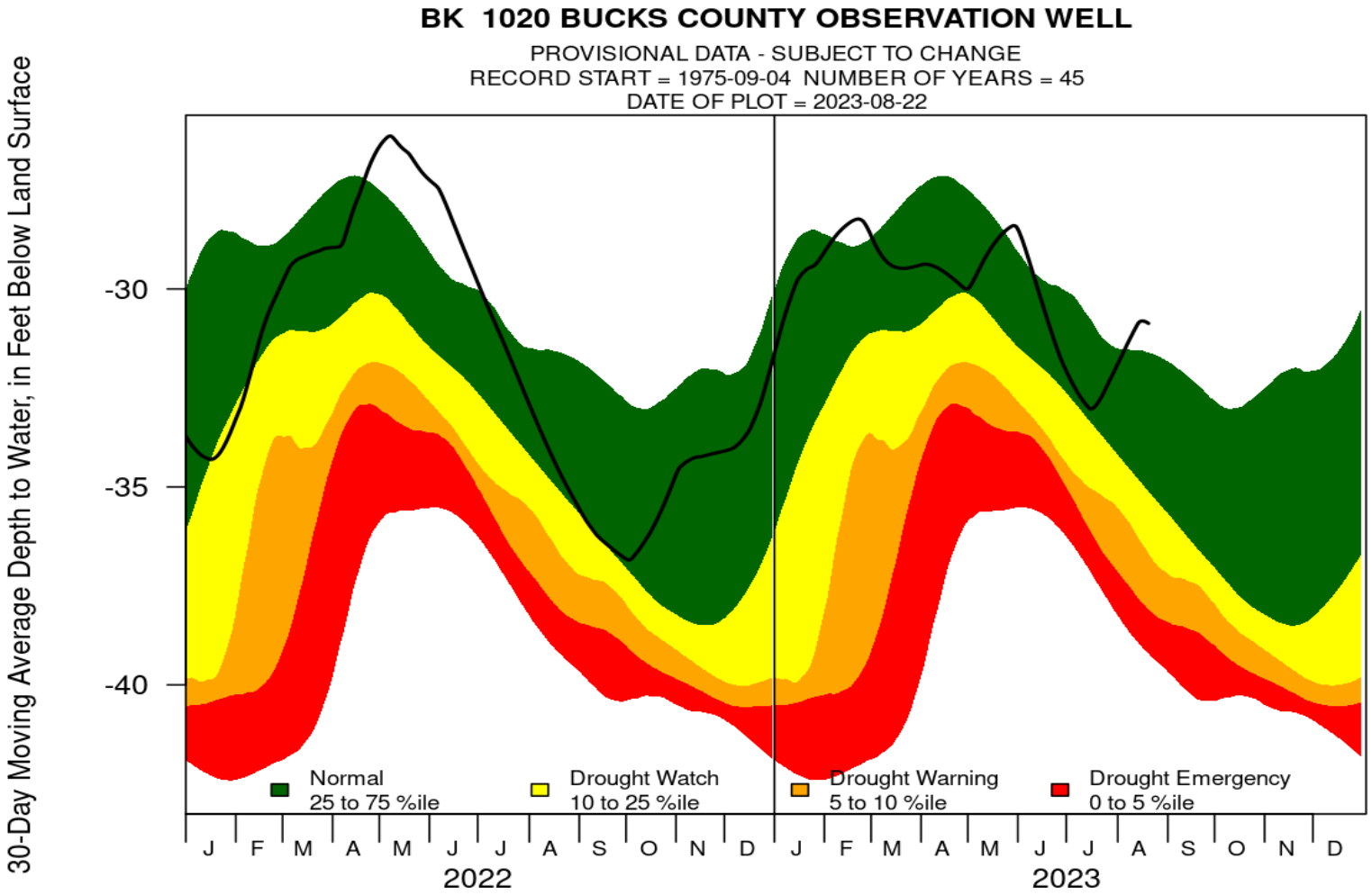


Types of Aquifers in PA



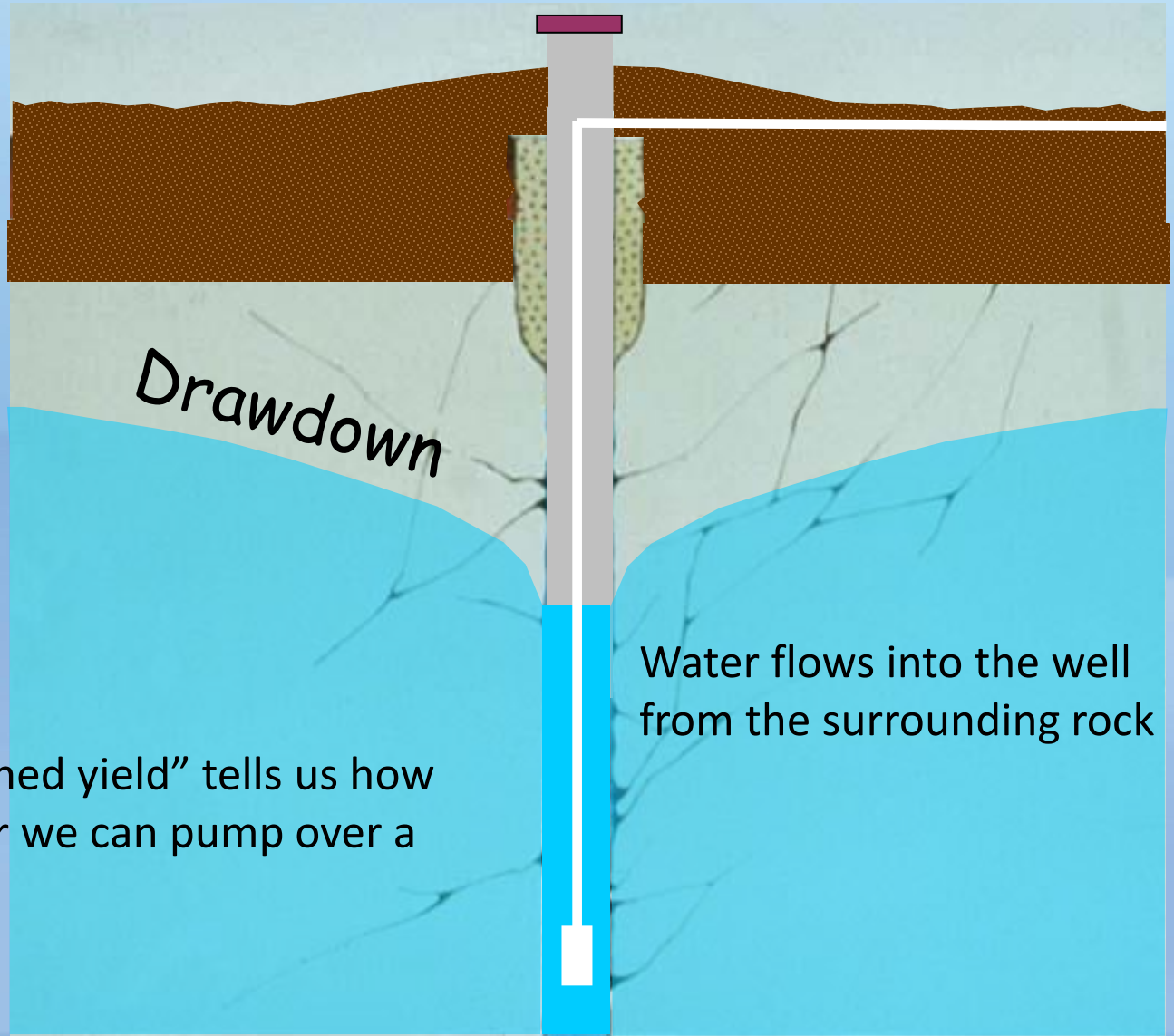
Type	Color	Well Depth	Quality
Sandstone and Shale	Gray	80-200 ft	Moderately Hard 200-250mg/l
Carbonate/Limestone	Light Blue	100-250 ft	Hard water>250 mg/l Sinkholes
Crystalline Rock	Green	75-150 ft	Soft but may contain iron

Monitoring Groundwater Levels



http://pa.water.usgs.gov/durplots/well_duration.html

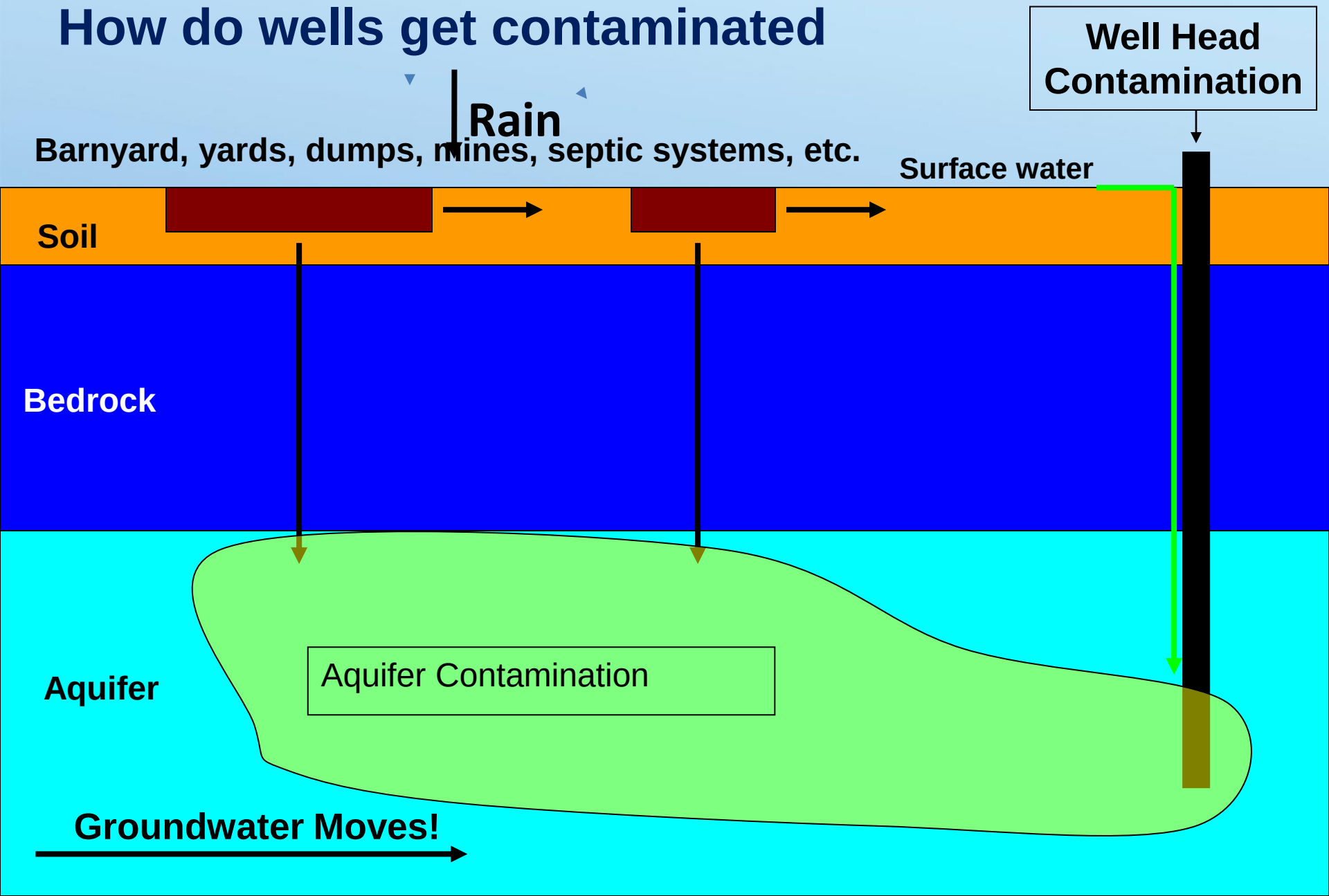
When the Well is Pumped



Water flows into the well from the surrounding rock

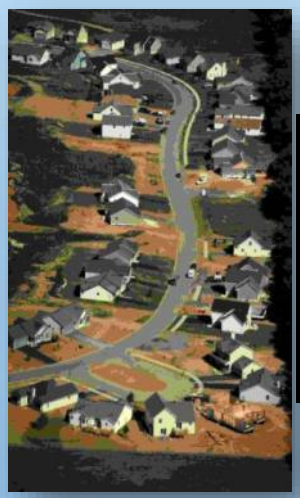
The “sustained yield” tells us how much water we can pump over a long time

How do wells get contaminated



LAND USE IMPACTS GROUNDWATER

Landfills
Organics, ?



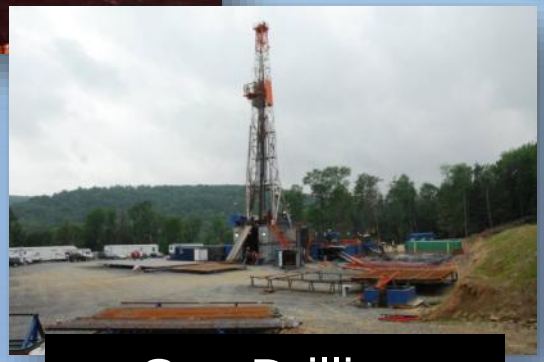
Houses
Bacteria
Nitrate
Sediment
Yard Chemicals

Roads
Chloride, Sodium

Industry
Organics, Petroleum

Agriculture
Bacteria, Nitrate, Pesticides

Mining
Metals, pH



Gas Drilling
Barium, chloride, TDS

WELLHEAD PROTECTION AND LAND USE

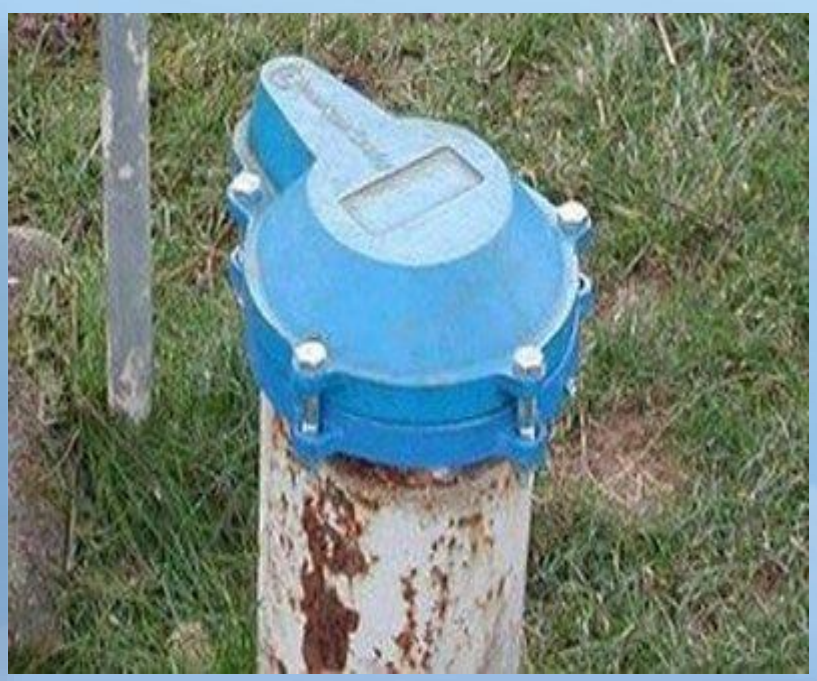
Penn State **Extension**

Water Supply Protection Starts at Home!

Don’t Get Carried Away !

Photo by Tom McCarty

Sanitary Well Caps



WHAT IS IN MY WATER?

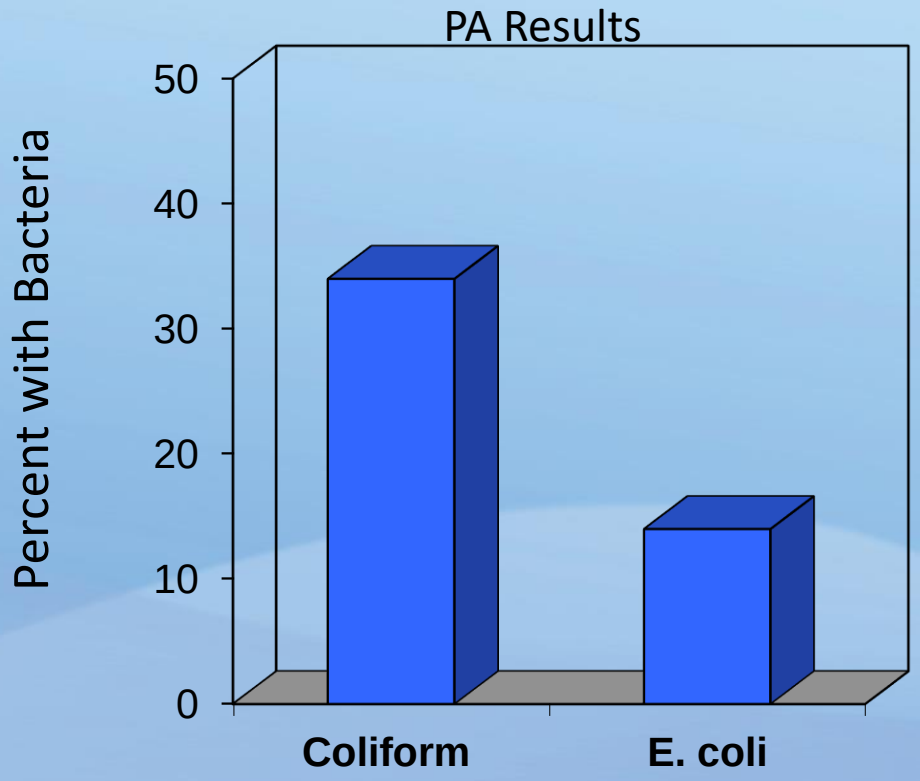
Penn State **Extension**

Drinking Water Standards

- "Acceptable" levels of the pollutant in drinking water, enforced by DEP for public supplies
- Specific to intended water use
- **Primary** (health) and **Secondary (**aesthetic) Standards exist for drinking water
- Limits set by the U.S. EPA, enforced by the PA DEP – on public water systems only!
- Primary = health based (MCL)
  - Total coliform bacteria = absent (<1/100 mL)
  - E. coli bacteria = absent (<1/100 mL)
  - Arsenic < 0.01 mg/L(ppm)
  - Nitrate < 10 mg/L (ppm)
  - Lead < 0.015 mg/l (ppm)
- Secondary = aesthetic (RMCL or SMCL)
  - Iron = 0.3 mg/L (ppm)
  - Hardness (TDS)
  - Corrosivity
  - pH = 6.5 to 8.5

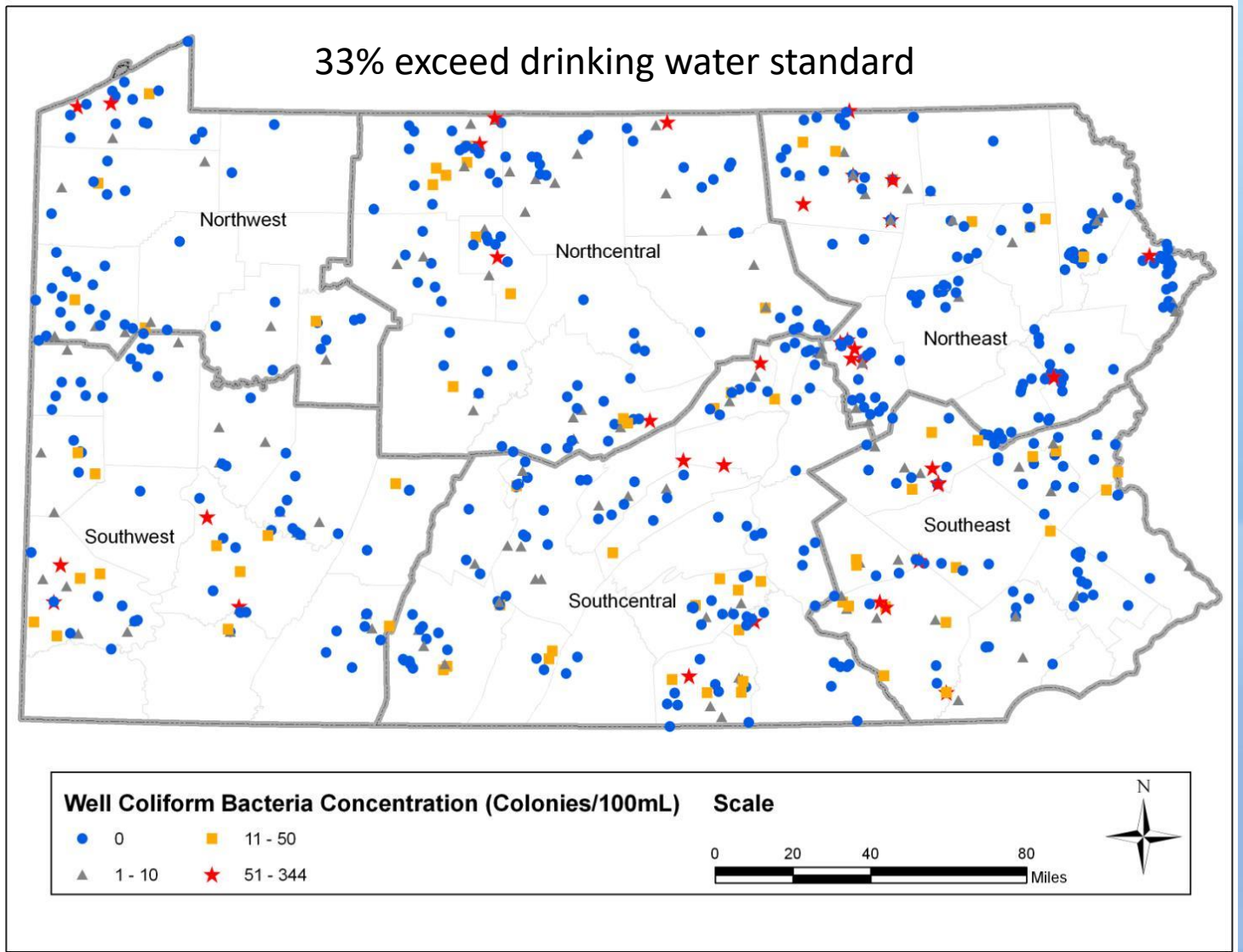
Coliform and *E. coli* Bacteria in Private Wells

- Coliform are “indicator organisms” that occur from surface runoff, insects, etc.
- May cause flu-like symptoms
- E.coli come from animal waste
- Both should be zero in drinking water
- Often related to construction of water well or septic systems

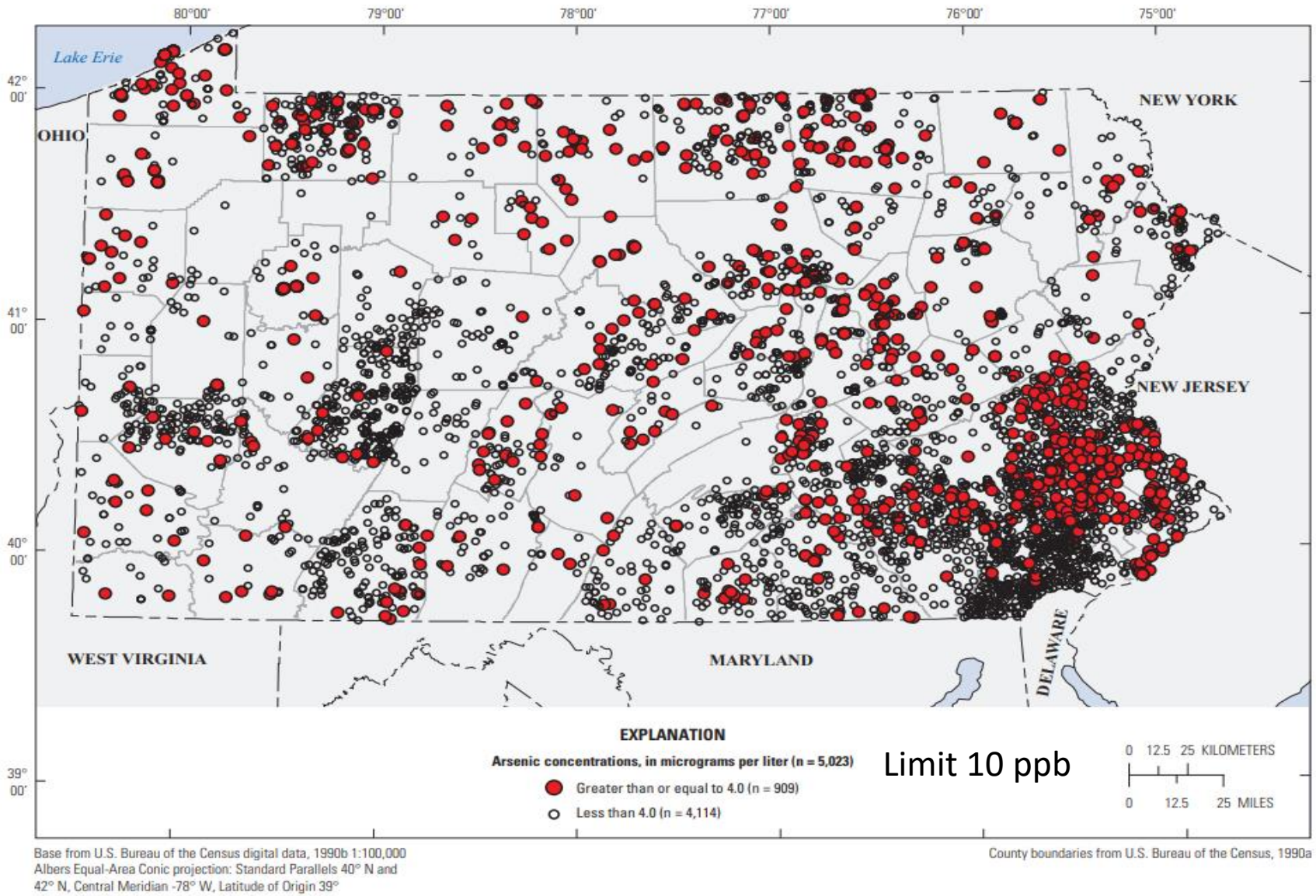


BACTERIAL CONTAMINATION

TYPICALLY LOCALIZED, WELLHEAD ISSUE

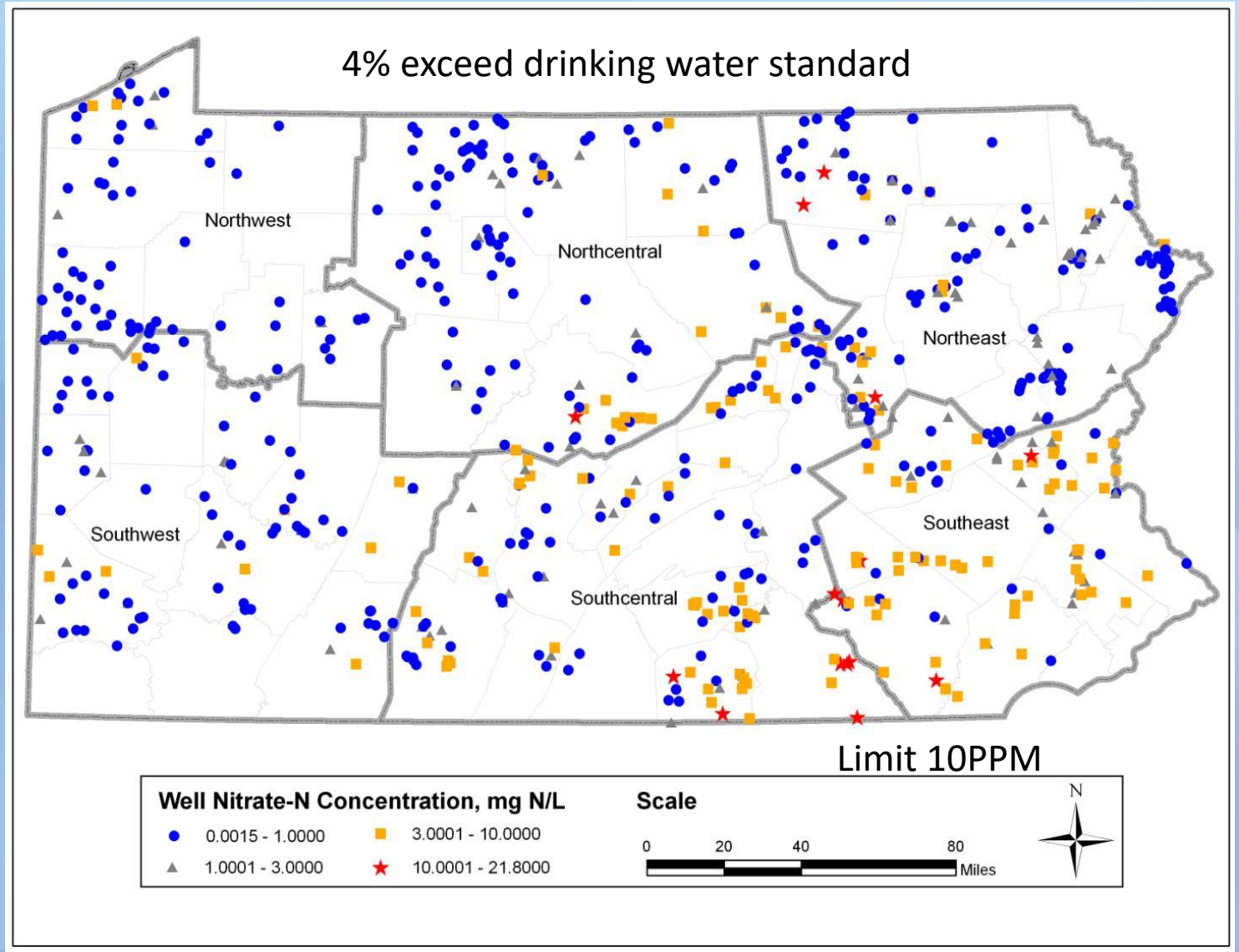


Arsenic in PA Private Well Water



Limit 10 ppb

Nitrate-N in Water Wells

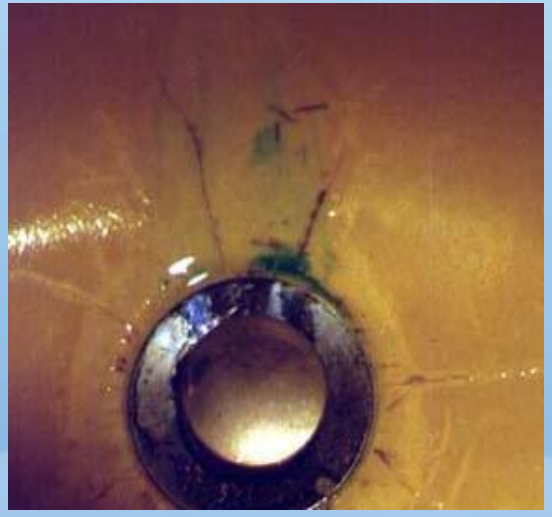


Lead in Water

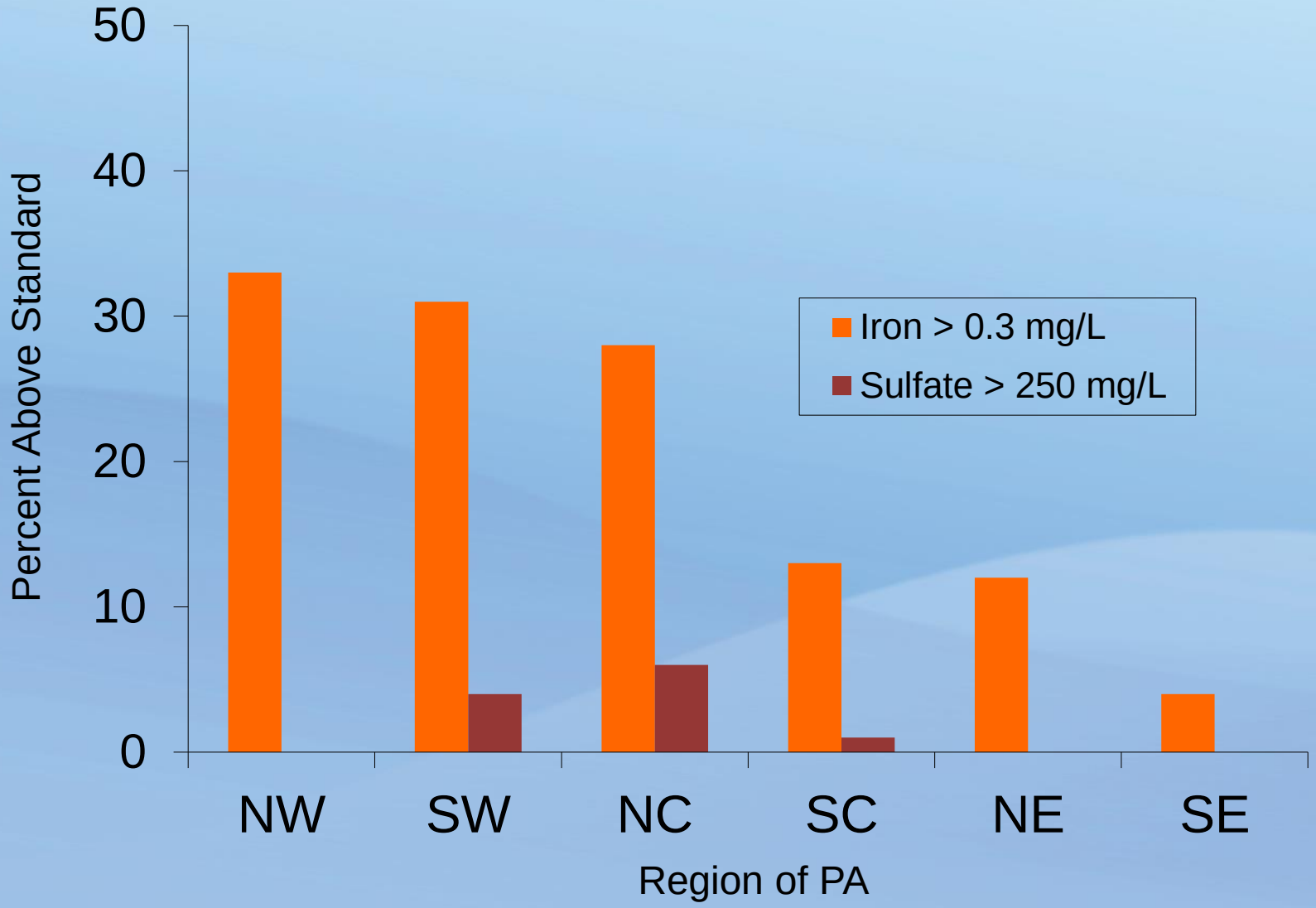
- Lead is rarely in PA ground water but is extracted from lead containing pipes in water supply systems
- A survey of private water supplies (individual homes using groundwater wells) across Pennsylvania in 2006 and 2007 found that 12 percent contained unsafe lead levels of above 15 µg/L.
- The survey also found that high lead levels could nearly always be explained by corrosion of lead from metal plumbing components.

Common Naturally Occurring Aesthetic Problems in PA Groundwater

- White residue, dull laundry – *hardness*
  - *Especially in carbonate (limestone) areas*
- Reddish stains, metallic taste – *iron*
  - *Common in sandstone / shale aquifers*
- Black stains, metallic taste - *manganese*
  - *Often occurs with iron*
- Rotten egg odor - *hydrogen sulfide gas*
  - *Very common in wells in certain shale formations*
- Blue stains, metallic taste - *corrosive water*
  - *Generally caused by low pH and soft water*



Iron, Sulfate Are More Common Near Mining



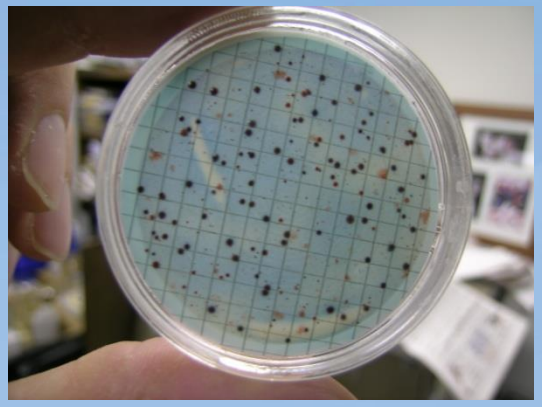
2023 Results from a Survey of 300 Private Wells in Pa-60% failed a health based standard

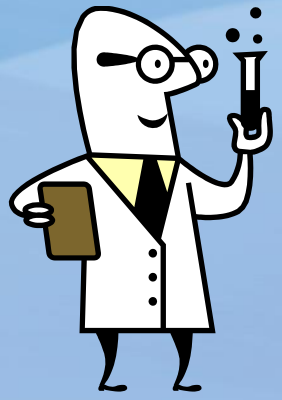
Water Test Parameters	**Percent of Water Supplies Failing**
Total Coliform bacteria	29%
E. coli bacteria	5%
Nitrate	3%
Manganese	12%
Lead	4%
Copper	12%
Arsenic	2%
*Sodium	42%
Barium	< 1%

Sodium does not have a drinking water standard in Pennsylvania. Levels above 20 mg/L were considered "failing" because this is the concentration that could be a concern to those on low-sodium diets (Swistock & Clark, 2023).

WHY TEST YOUR WATER?

- 25% of private water supplies have never been tested, another 20% have only been tested by a water treatment company!
- Many contaminants have no obvious symptoms in water
- Routine water testing can protect your health





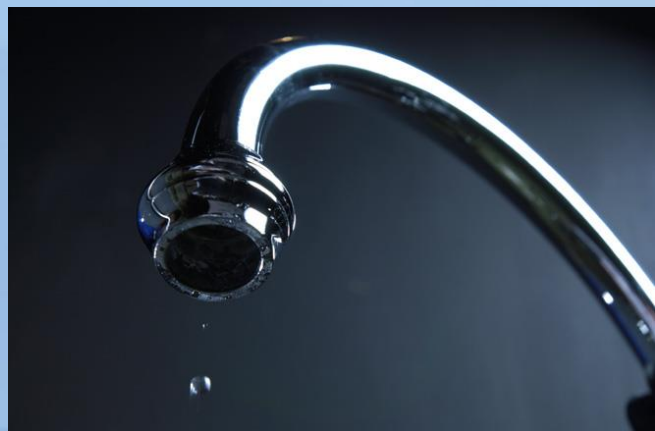
Where to Get Your Water Tested

- Certified state accredited labs
  - List from PA DEP or Extension office (online)
- Penn State Extension
  - County offices carry test kits
- Regional DEP office
  - Generally only do bacteria testing

Penn State Water Testing Lab

How Do You Take a Water Sample?

- Use a clean container from the certified laboratory
- Follow lab instructions carefully
- Be especially careful with bacteria sample collection
- Keep samples cool for delivery to lab



A Penn State Water Test Report

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

WATER ANALYSIS
Trace Element Package (WD07)

Analysis	Units	Your Test Results	Drinking Water Standard[1] Standard	Drinking Water Standard[1] Type
Total Coliform Bacteria	MPN[2] per 100 mL	18	0	Health
E. Coli Bacteria	MPN[2] per 100 mL	None detected [3]	0	Health
pH	-	8.1	6.5 - 8.5	Aesthetics
Total Dissolved Solids (TDS)	mg/L	96	500	Aesthetics
Arsenic (As)	mg/L	0.022	0.01	Health
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

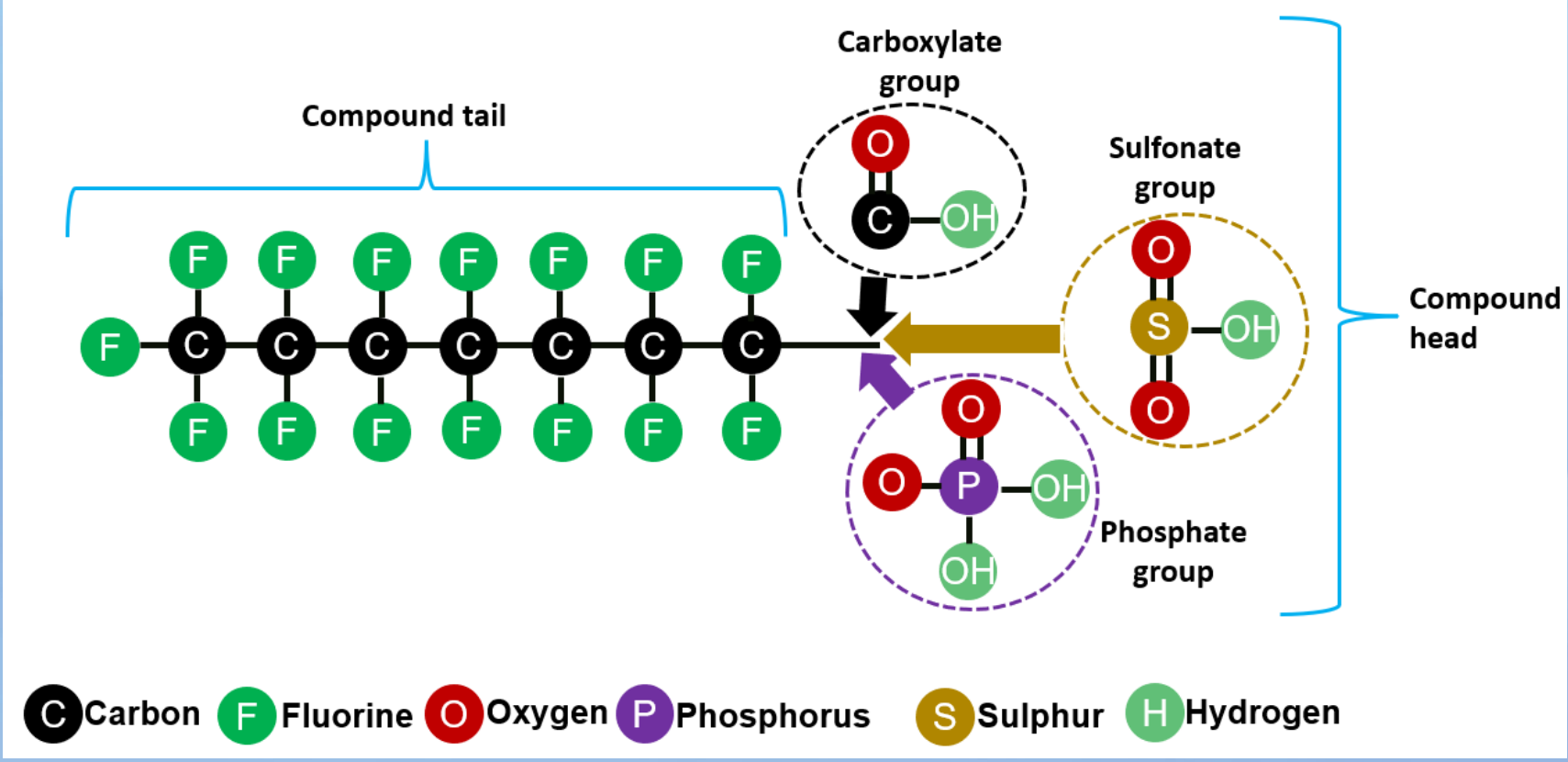
Water sample failed the drinking water standard for TOTAL COLIFORM BACTERIA.

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.

What is PFAS ?
Should I be Concerned?



PFAS= Per- and Polyfluoroalkyl Substances

- PFAS are a group of man-made chemicals used in many consumer products, including food wrappers, fabrics, clothing and carpets, to make them resistant to water, oil, grease, stains, and heat. Certain types of firefighting foam may contain PFAS.

PFAS= Per- and Polyfluoroalkyl Substances –

- PFAS are widely used, long lasting chemicals, components of which break down very slowly over time.
- Because of their widespread use and their persistence in the environment, many PFAS are found in the blood of people and animals all over the world and are present at low levels in a variety of food products and in the environment.
- PFAS are found in water, air, fish, and soil at locations across the nation and the globe.
- Scientific studies have shown that exposure to some PFAS in the environment may be linked to harmful health effects in humans and animals.
- There are thousands of PFAS chemicals, and they are found in many different consumer, commercial, and industrial products. This makes it challenging to study and assess the potential human health and environmental risks.

What we don't know about PFAS

- How to better and more efficiently detect and measure PFAS in our air, water, soil, and fish and wildlife
- How much PFAS are people exposed to
- How harmful PFAS are to people and the environment
- How to best remove PFAS from drinking water
- How to manage and dispose of PFAS

PFAS in Water

- On January 14, 2023, PA DEP published the PFAS MCL Rule.
- This rule set a maximum contaminant level (MCL) for two PFAS: perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), two of the more common and persistent PFAS chemicals.
- The MCL for PFOA was set at 14 parts per trillion (ppt) and the MCL for PFOS was set at 18 ppt.
- The required monitoring is set to begin in 2024,

PFAS in Water

- On March, 2023, US EPA proposed drinking water maximum contaminant levels (MCL) for six PFAS compounds.
- When fully implemented, the proposed rules will become enforceable federal drinking water standards requiring public drinking water treatment plants to reduce levels of PFOA and PFOS to meet the standard.

PFAS Compound	Proposed MCL
Perfluorooctanoic acid (PFOA)	4 PPT
Perfluorooctane sulfonic acid (PFOS)	4 PPT
Perfluorononanoic acid (PFNA)	1 PPT
Perfluorohexane sulfonic acid (PFHxS)	1 PPT
Perfluorobutane sulfonic acid (PFBS)	1 PPT
Hexafluoropropylene oxide dimer acid (HFPO-DA) (commonly referred to as a GenX chemical)	1 PPT

We have PFAS in Local Streams

Stream	PFOA (PPT)	PFOS (PPT)	Hazard Index
Neshaminy Creek in Langhorne PA	11.0 PPT	23.0 PPT	1.4

Table: Frank Kummer Source: U.S. Geological Survey

And some in Bucks water supply- Below PA's MCL's

Water source	PFOA (PPT)	PFOS (PPT)
Doylestown Borough Water Department	11.6	13.7
Solebury/Lahaska EP101*	11.2	15.0
Solebury/Lahaska EP102*	7.6	14.3
Quakertown Burrough	11.2	9.6
Grand View Hospital Sellersville	7.2	13.3

Table: Oliver Morrison Source: Pennsylvania DEP * Bucks County Water Authority

Resources

- Master Well Owner Network (psu.edu)
- Water Testing — Agricultural Analytical Services Lab — Penn State College of Agricultural Sciences (psu.edu)
- Https://extension.psu.edu/testing-and-treating-pfas-chemicals-in-pennsylvania-water-wells
- Water & Wastewater | Buckingham Township (buckinghampa.org)

Thank You !

Join us for part 2-Stormwater

- January 24th 1-3PM