UF | IFAS Extension UNIVERSITY of FLORIDA

FLORIDA WELL OWNER NETWORK

Private Well Management

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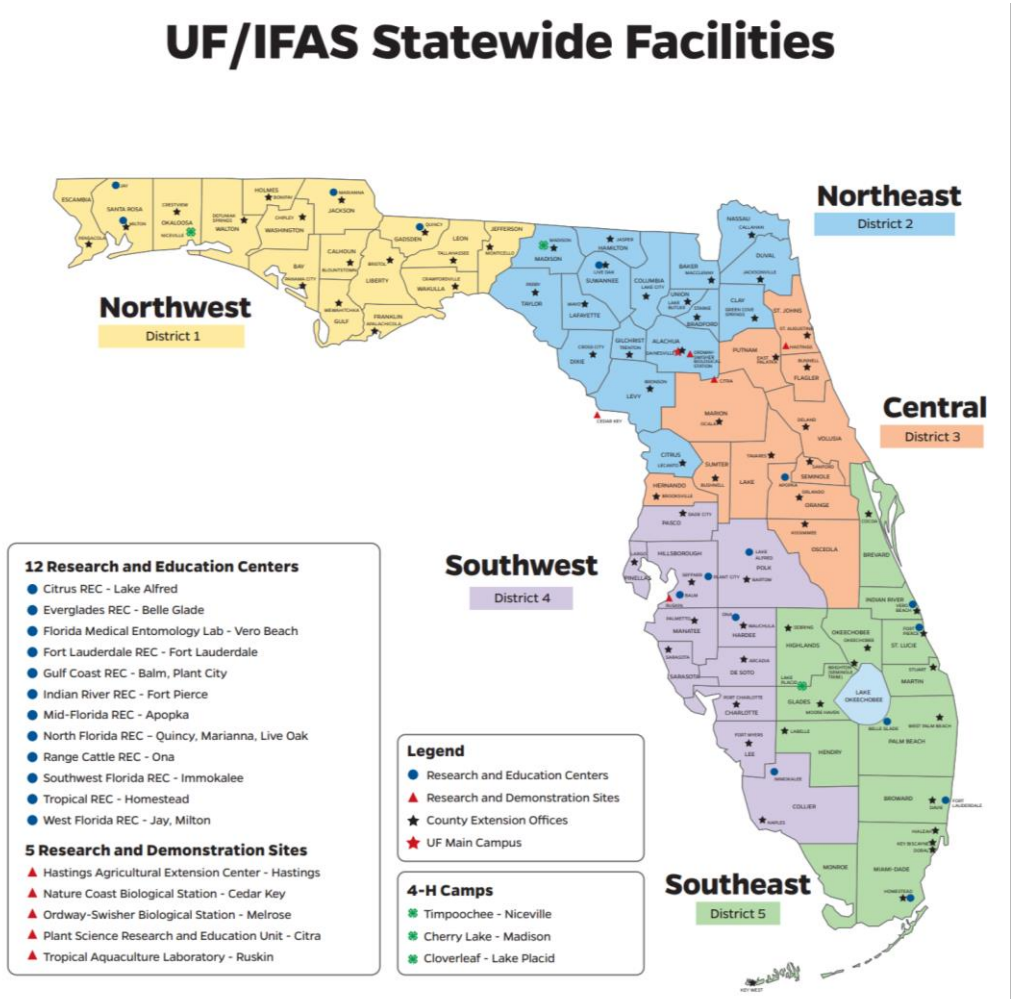
What is Extension?

- A partnership between state, federal, and county governments to provide **scientific knowledge** to the public:
  - Agriculture, natural resources, food safety, money management, lawn care and gardening, 4-H youth development, sustainable living, family issues,
  - Classes, consultations, demonstrations, field days, and more through county Extension offices
  - sfyl.ifas.ufl.edu



Florida Well Owner Network (FWON)

- To **educate** residents about well water quality and quantity, and best practices to ensure well maintenance and groundwater protection.
- To **facilitate** access to well water testing and provide information about treatment options if problems are found.
- To **complement** efforts by Florida Department of Health and Florida Department of Environmental Protection to increase awareness among Floridians about best practices regarding wells, septic systems, and drinking water quality.

Private Wells in Florida

- An estimated 2.5 million Floridians (approximately 12% of the population) rely on private wells for home consumption.
  - Approximately 800,000 private wells.
- Private well users control the management and protection of their wells.
  - U.S. EPA safe drinking water regulations do not apply to residential private wells.

Private Wells in Florida

- Florida Department of Health (FDOH) provides information to well users.
- FDOH Wells Surveillance Program identifies and monitors areas where contaminated drinking water is suspected.
  - Surveyed over 19,000 sites and sampled nearly 48,000 wells since 2005.
- Limited public data exist on how many well users regularly test their water or drink from contaminated wells.

Septic Systems in Florida

- Nearly one in three household in Florida depends on septic systems.
- More than 2.5 million septic systems are in use across the State of Florida.
- The Basin Management Action Plans identify septic systems as a major source of nitrogen to impaired water bodies.

What will be covered in this presentation?

- Where does our water come from?
- What are the basic well components?
- What can contaminate well water?
- What should you have your water tested for?
- Where can you have your water tested?

Where does our water come from?

The Floridan Aquifer System

- It is one of the most productive aquifers in the world.
- It covers approximately 100,000 square miles of the southeastern U.S. including all of Florida and parts of Georgia, Alabama, Mississippi, and South Carolina.

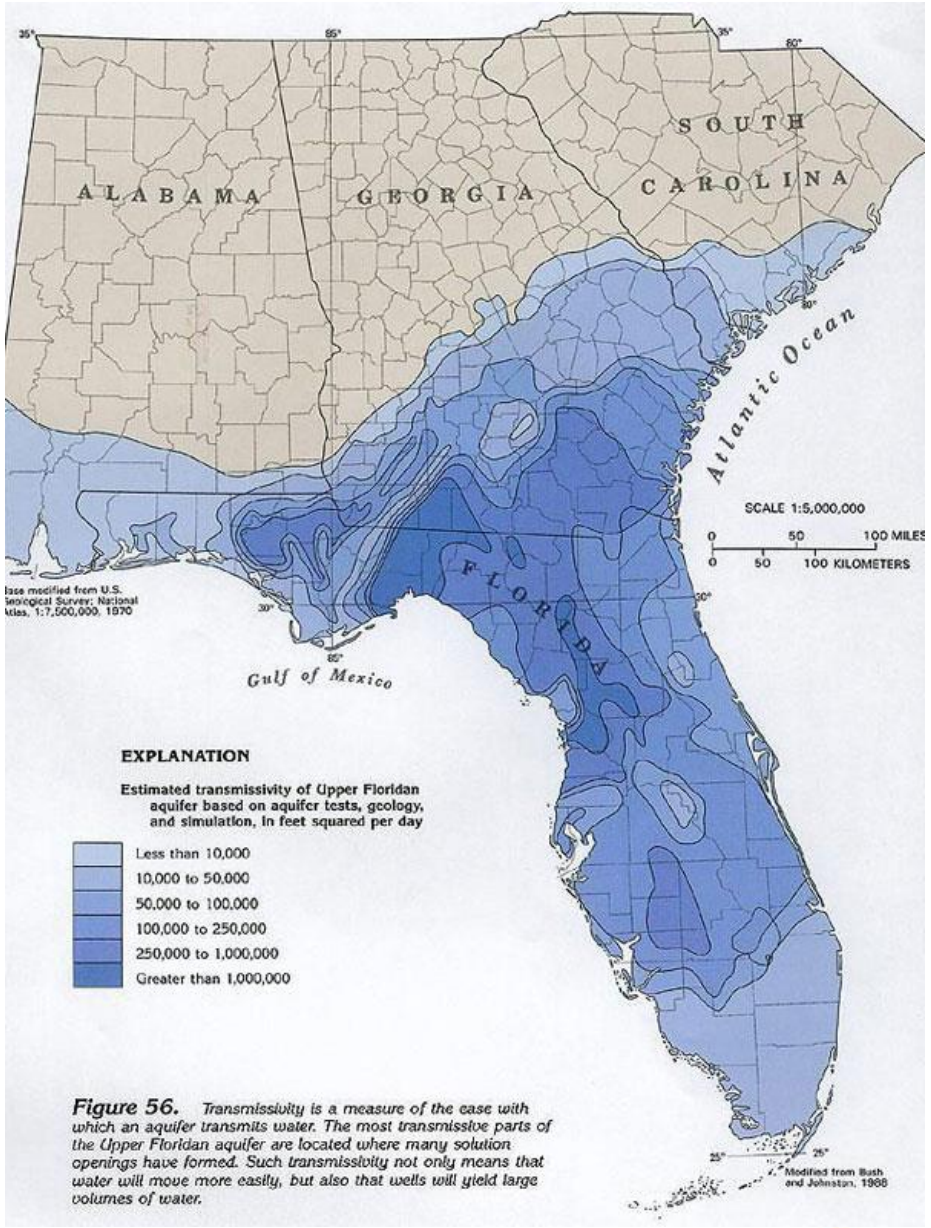


Figure 56. *Transmissivity is a measure of the ease with which an aquifer transmits water. The most transmissive parts of the Upper Floridan aquifer are located where many solution openings have formed. Such transmissivity not only means that water will move more easily, but also that wells will yield large volumes of water.*

Photo: U.S. Geological Survey
Floridan Aquifer System Groundwater Availability Study: Additional
https://fl.water.usgs.gov/floridan/intro.html

Major Aquifers in Florida

- Surficial aquifer
- Sand & gravel aquifer
- Biscayne aquifer
- Floridan aquifer

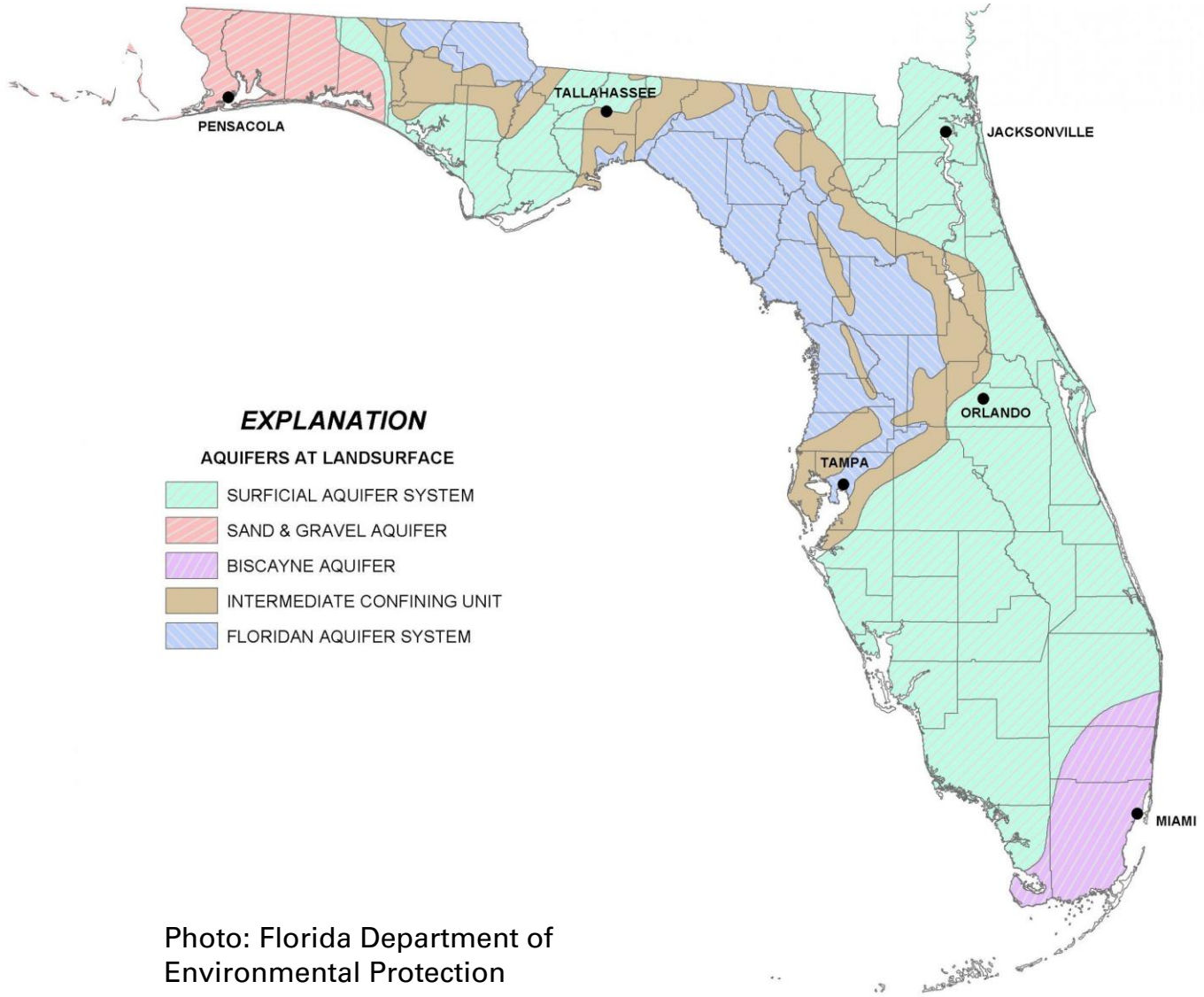


Photo: Florida Department of Environmental Protection

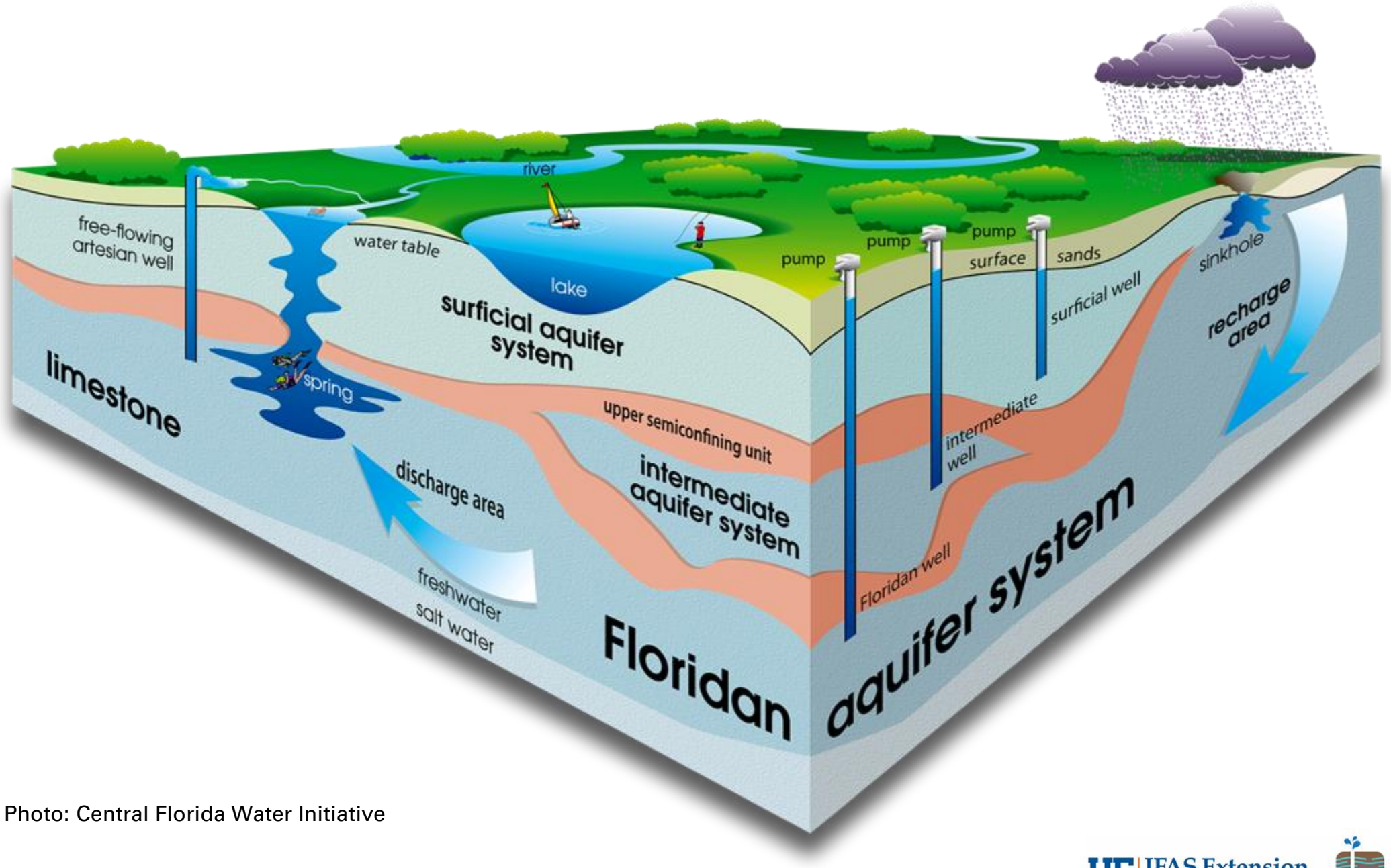


Photo: Central Florida Water Initiative

Florida Water Management Inventory Projects

- Geographic data map for developed properties with **a drinking water source** (public water or private domestic well) and **wastewater treatment method** (central sewer or onsite septic).

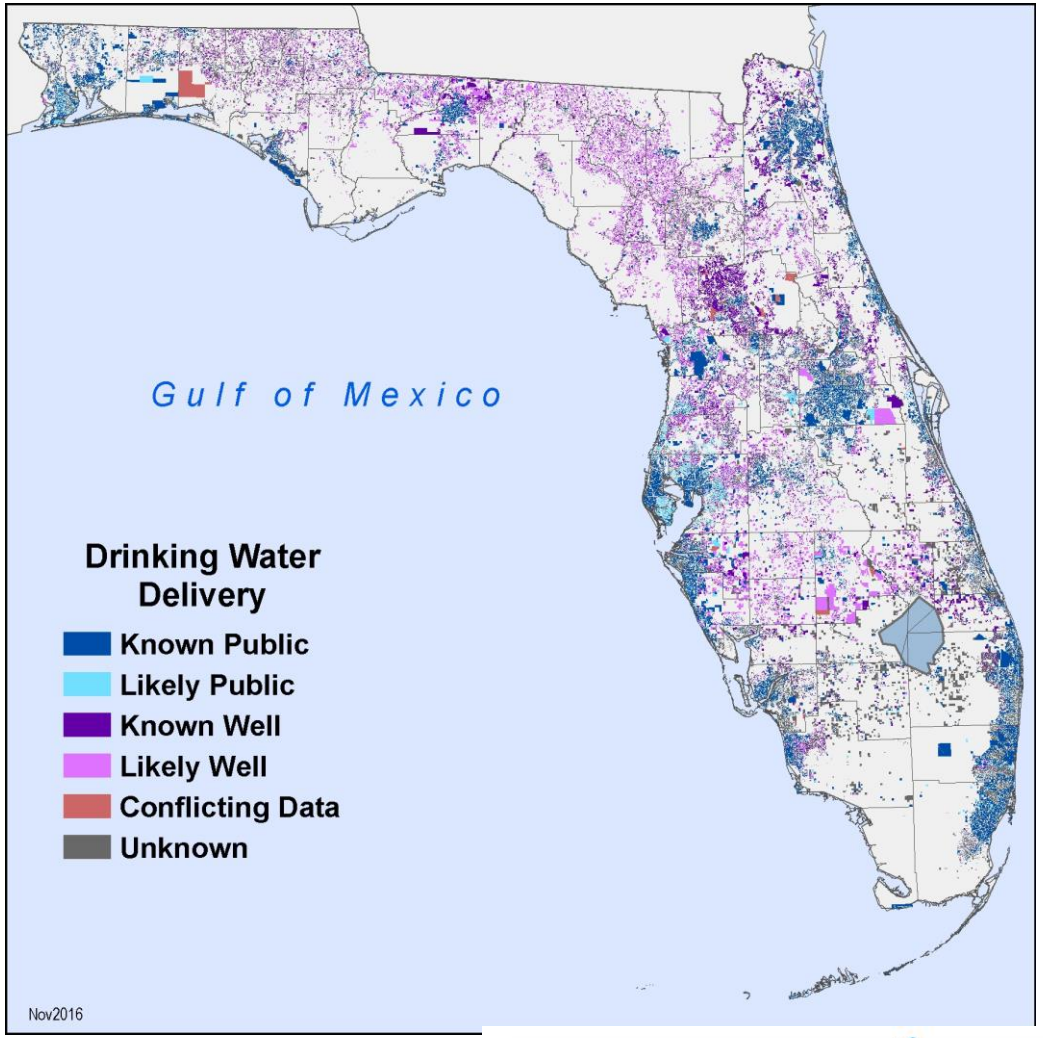


Photo: Florida Department of Health
https://www.floridahealth.gov/environmental-health/drinking-water/flwmi/index.html

What are the basic well components?

Basic Well Components

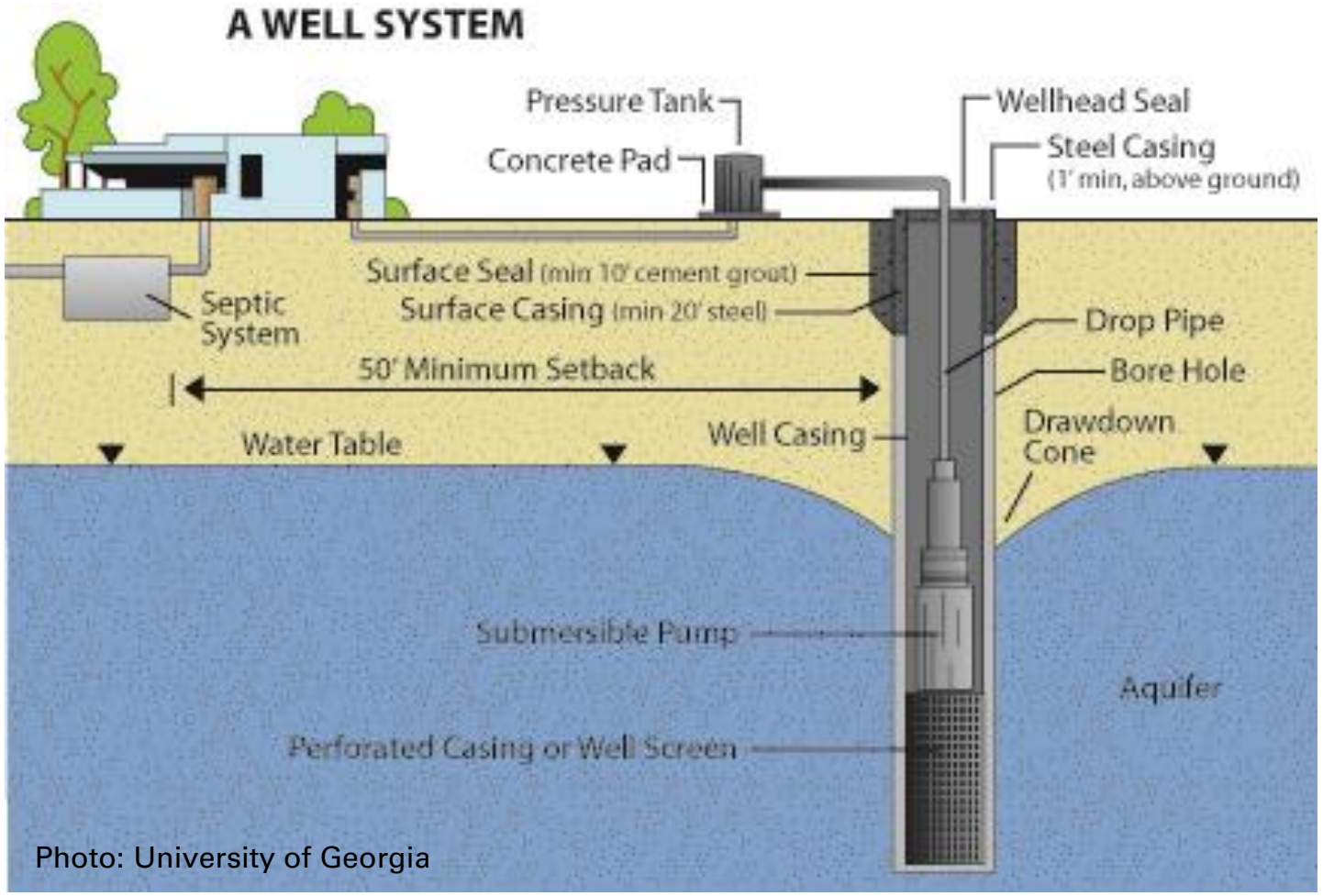
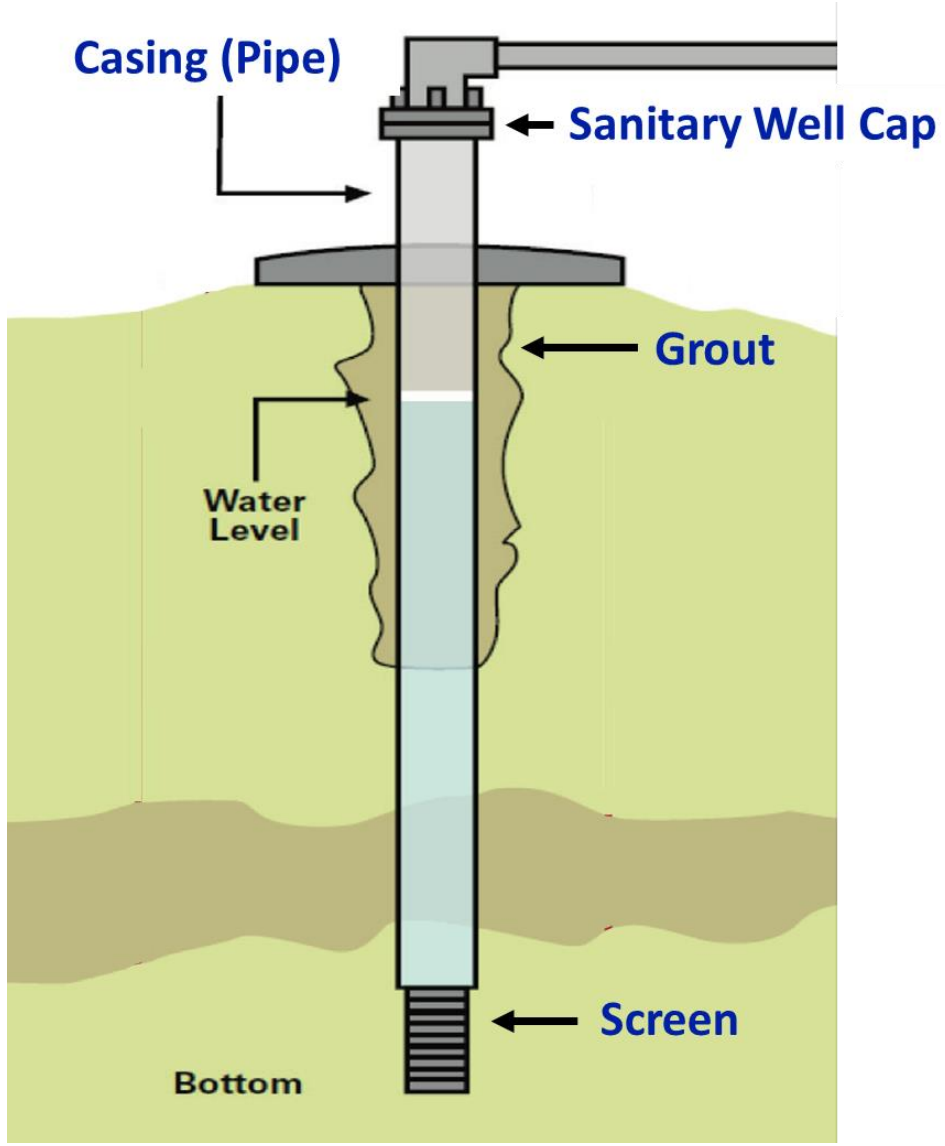


Photo: University of Georgia

Casing

- Maintains an open access in the earth
- Doesn't allow any entrance or leakage into the well
- Nontoxic and durable material
- Popular materials include black steel, galvanized steel, PVC pipe and concrete pipe.
- At least 12 inches above land surface.



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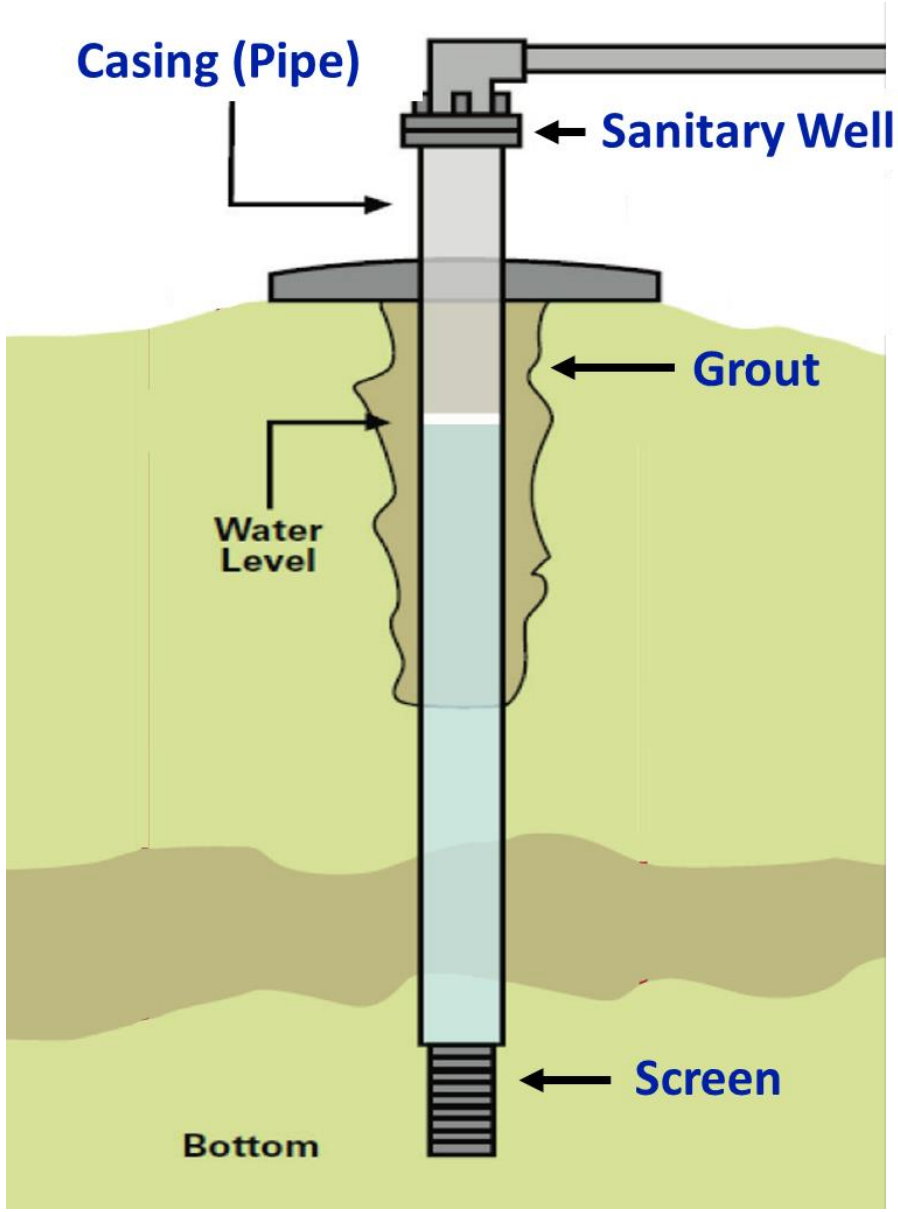
Screen

- Keeps sand and gravel out of the well
- Allows groundwater to enter into the well
- Popular materials are stainless steel and slotted PVC pipe.
- Used when wells are drilled into unconsolidated materials.

Photo: Y. Zhuang

Grout

- Sealant
- Used to fill in the spaces around the outside of the well
- Protects the well against the intrusion of contaminants
- Made of cement, bentonite, or concrete (each used separately)



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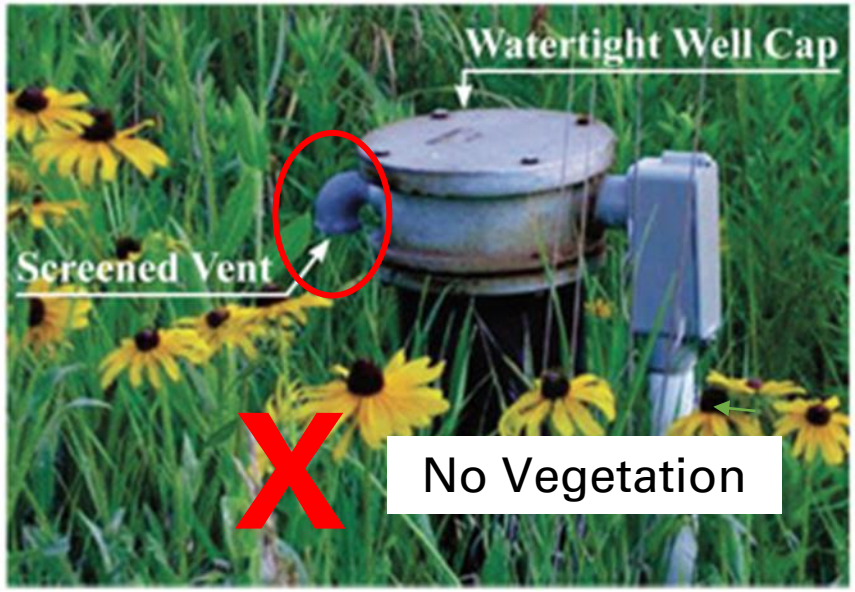
Well Cap

- Watertight well cap
- Prevents contamination from flowing down the inside of the well casing
- Aluminum or a thermoplastic
- At least 12 inches above the ground (or flood level)
- Sanitary Well Caps: https://extension.psu.edu/sanitary-well-caps

Photo: University of Georgia

Screened Vent

- Screened vent (on the cap)
- Wire mesh
- Equalizes the air pressure inside the well with that of the atmosphere



Well Development

- After drilling, contractor will remove excess grout, silt, or clay left over from the drilling operation.
- New drinking water wells must be disinfected to ensure that water is safe for drinking as soon as the disinfectant is flushed.
- Typically, household non-scented bleach is used for disinfecting a well.

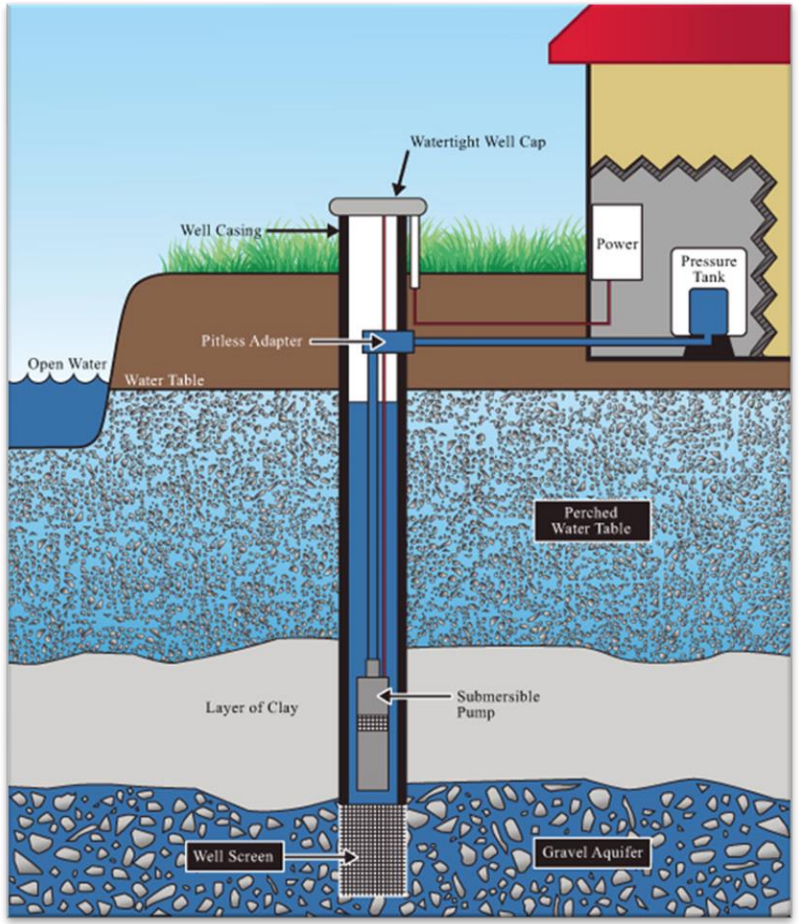


Photo: University of Nebraska-Lincoln

Are there any water testing requirements for new drilled drinking wells?

- State law **does NOT require** require newly drilled drinking wells to be tested.
- Testing may be required by a lender for mortgage purposes.
- Some local jurisdictions do require that newly constructed or repaired drinking water wells be tested.
  - Typically, coliform bacteria is required, although some additional contaminants may be required, depending on the local conditions.
  - Contact your local health department.

Potential Groundwater Contamination

- If drinking water wells drilled in areas of known or suspected groundwater contamination, Department of Health (DOH) requires sampling and administered by DOH.
- Information on delineated area
  - https://floridadep.gov/water/source-drinking-water/content/delineated-areas
  - http://www.floridahealth.gov/environmental-health/drinking-water/Delineated-Contamination-Areas.html

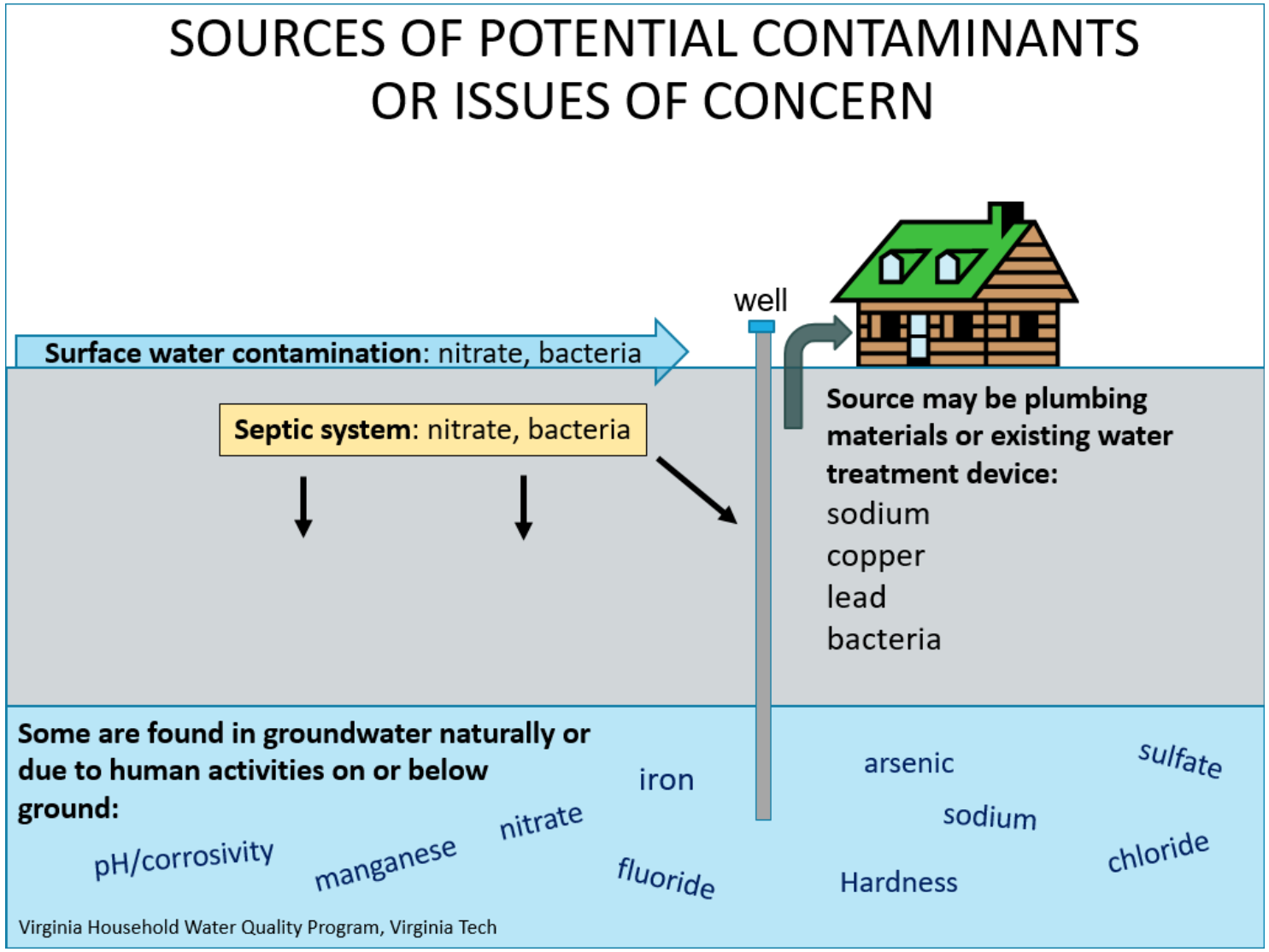
Remember to consider water table

- If you construct a well during a high water level period and stop drilling when you reach water, the well may not be deep enough to produce during low water levels (dry periods), especially if inadequate pumping equipment has been installed.

What can contaminate well water?

Potential Contaminants

- Inside your house
- Outside your house
- Naturally occurring
- Human activities



What should you have your water tested for?

EPA Safe Drinking Water Act

Primary Standards

- Also called Maximum Contaminant Level (MCL)
- Cause health problems
- Enforced for municipal systems
- Includes specific chemicals and pesticides
- Over 80 contaminants, including
  - Coliform and *E. coli* bacteria
  - Nitrate
  - Lead
  - Arsenic
  - Copper

Secondary Standards

- Also called SMCL (Secondary) or RMCL (Recommended)
- Cause aesthetic problems:
  - Staining
  - Taste
  - Odor
- Many naturally occur in groundwater
- About 15 contaminants, including:
  - Iron
  - Sulfate
  - Manganese
  - Hardness

Basic Water Testing Parameters

- Every year test for coliform bacteria, nitrate, lead, and pH.
  - It is best to test for these contaminants during the spring or summer following a rainy period.
  - These tests should also be conducted after repairing or replacing an old well or pipes, and after installing a new well or pump.
- Contaminants of local concerns.

Where can you have your water tested?

Certified Water Labs

Florida Department of Health website

Private Well Testing

Welcome to the Florida Department of Health's Private Well Testing web site. Detailed information is found within the topics listed below.

Contact Water Programs

850-245-4250
AskEH@flhealth.gov
Fax
850-487-0864
Mailing Address
Bureau of Environmental Health, Water Programs
4052 Bald Cypress Way, Bin A-08
Tallahassee, FL 32399-1710

View a list of water testing Laboratories Certified by the Florida Department of Health

Comparison of Water Tests

Biodegradable	No	No	No
Brand Name	LABTECH	PRO-LAB	PurTest
Child safe	Yes	Yes	No
Commercial / Residential	Commercial / Residential	Commercial / Residential	Commercial / Residential
Detects/ Tests For	Chlorine,Nitrates,Nitrites,pH,Alkalinity,Iron,Copper,Iron,Bacteria,Hydrogen Sulfide,Lead,Pesticide	Bacteria, Lead, Pesticides, Nitrate, Nitrite, Iron, Alkalinity, Total Hardness, pH, Iron, Copper	11 contaminants bacteria pesticide lead iron alkalinity pH hardness chlorine copper nitrate nitrite
Number of Uses	2	1	1
Returnable		90-Day	90-Day
Time Until Results	Instantly / Seconds	5 Minutes or Less	Instantly / Seconds

Comparison of Water Tests

Parameters	Certified Lab	H2O Plus Kit	Pure Test Kit	Pro Lab Kit
Bacteria	-	10	10	10
Nitrate	1.14 mg/L	10	10	5
Nitrite	0.5 mg/L	1	1	1
Total Hardness	153.9 mg/L	100	N/A	120
pH	7.47 S.U.	9	8	7.5

Water Testing Frequency

- Test your water more than once a year if
  - Someone in your household is pregnant or nursing
  - There are unexplained illness in your household
  - Your neighbors find a dangerous contaminant in their water
  - You note a change in water taste, odor, color or clarity
  - You have a spill of chemicals or fuels into or near your well

Quick Checklist 1 – Visibility

- Scale or scum from calcium or magnesium salts in water
- Unclear/turbid water from dirt, clay salts, silts or rust in water
- Green stains on stinks or faucets caused by high acidity
- Brown-red stains on sinks, dishwasher, or clothes in wash points to dissolved iron in water
- Cloudy water that clears upon standing may have air bubbles from poorly working pump or problem with filters

Quick Checklist 2 - Taste

- Salty or brackish taste from high sodium content in water
- Alkali/soapy taste from dissolved alkaline minerals in water
- Metallic taste from acidity or high iron content in water
- Chemical taste from industrial chemicals or pesticides

Quick Checklist 3 - Smell

- A rotten egg odor can be from dissolved hydrogen sulfide gas or certain bacteria in your water. If the smell only comes with hot water, it is likely from a part in your hot water heater
- A detergent odor and water that foams when drawn could be seepage from septic tanks into your ground water well
- A gasoline or oil smell indicates fuel likely seeping from a tank into the water supply
- Methane gas or musty/earthy smell from decaying organic matter in water
- Chlorine smell from excessive chlorination

What should you do if your well is flooded?

Flooding

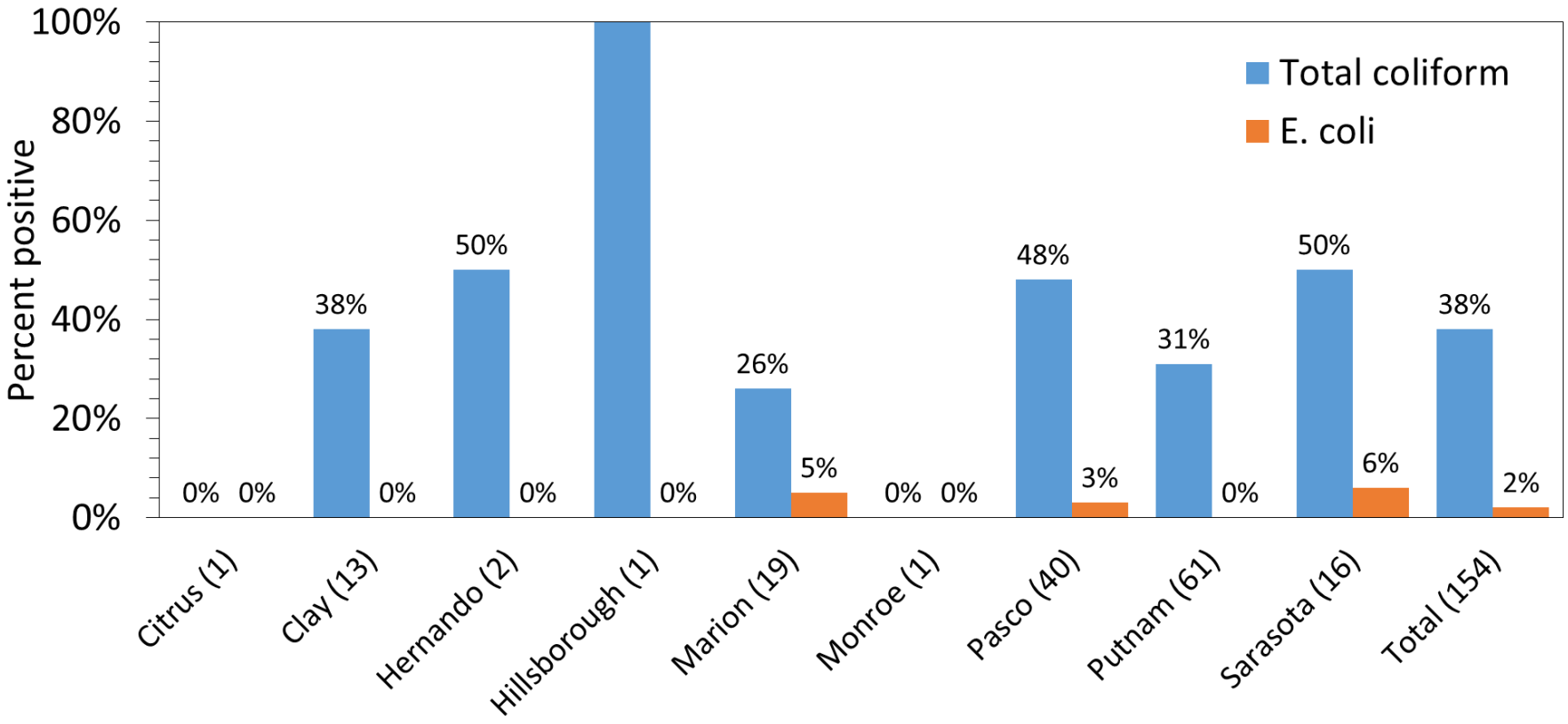
- Flooding places your private well in danger of contamination from pollutants found in floodwaters and especially at risk of bacterial contamination.
- Wellhead was surrounded by floodwaters, or it was submerged in floodwaters.
- Sometimes you may also notice the change of color or odor in your well after a storm event.

Test Your Water

- The only way to know if your well water is contaminated or not.
- Tested by a certified lab.
- Before receiving your test results, be sure to use alternative safe water sources (such as bottled water) for drinking, making beverages, cooking, brushing your teeth, washing dishes, and washing areas of the skin that have been cut or injured.

What should you have your water tested for?

After Hurricane Irma



While Waiting for The Result

- Be sure to use alternative safe water sources (such as bottled water) for drinking, making beverages, cooking, brushing your teeth, washing dishes, and washing areas of the skin that have been cut or injured.

- Boiling water: only for bacterial contamination

What should you do if your well water testing result reveals bacterial contamination?

Bacterial Contamination

- Your well and water system must be disinfected.
- Also flush out all household plumbing, including the water heater.
- If you have water treatment systems or devices, remove all membranes, cartridges, and filters, and replace them after the disinfection process is completed.

Chlorine Bleach

- ONLY use non-scented bleach: 5%–6% sodium hypochlorite
- **Do NOT** use splashless bleach: 1%–5% sodium hypochlorite
- Check “sell-by date”
- pH between 6.5 and 7

Shock Chlorination Disinfection

- Pump out the well to remove any potential contaminants.
  - Pump out at least three well volumes of water from a faucet near the wellhead.
  - At a minimum, pump the well for at least 1 hour before beginning the disinfection process.
- Flush out household plumbing including water heater. Make sure the water is clear and free of sediment.

Shock Chlorination Disinfection

- Turn off electric power to the pump and remove the well cap.
- Prepare a solution of bleach and water and pour the solution into the top of the well.
  - The amount of bleach depends on the depth of water in the well and the diameter of the well casing.
  - The bleach should be diluted with 10 parts of water. For example, 1 cup of bleach with 10 cups of water before pouring it into your wells.

6% Sodium Hypochlorite Rates Relative to Well Depth and Diameter

Well Depth in Feet	Well Diameter in Inch			
	2″	4″	5″	6″
50′	1 cup	2 cups	2 cups	3 cups
80′	1 cup	2 cups	4 cups	4 cups
100′	1 cup	3 cups	4 cups	6 cups
150′	2 cups	4 cups	8 cups	10 cups
200′	3 cups	6 cups	10 cups	12 cups

Shock Chlorination Disinfection

- Recirculate the water by connecting a hose to a faucet and spraying the water back into the well for at least 10 minutes.
- Open every faucet in the system and let the water run until the smell of chlorine can be detected. Then close all the faucets and seal the top of the well.

Shock Chlorination Disinfection

- Allow the chlorinated water to stand in the system for at least 12 hours but no longer than 24 hours.
- The next day, operate the pump by turning on all faucets, beginning with outside and flushing out the water until there is no chlorine odor.

Shock Chlorination Disinfection

- Test well water again in 5 to 10 days to make sure there is no bacterial contamination.
  - If bacteria are still present, you may need to repeat the process to remove long-established bacterial colonies.
  - If the problem persists, you need to contact a water treatment professional familiar with bacterial contamination in wells.

Additional Resources

- Laboratories Certified Under NELAP by the Florida Department of Health
  http://appprod.dep.state.fl.us/labs/cgi-bin/aams/index.asp
- Private Well 101: Drinking Water Standards
  https://edis.ifas.ufl.edu/publication/SS297
- Private Wells 101: Bacterial Contamination and Shock Chlorination
  https://edis.ifas.ufl.edu/publication/SS700
- UF/IFAS Septic System
  https://water.ifas.ufl.edu/septic-systems/

Questions and Comments

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