

Protecting Household Drinking Water



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This powerpoint will cover:

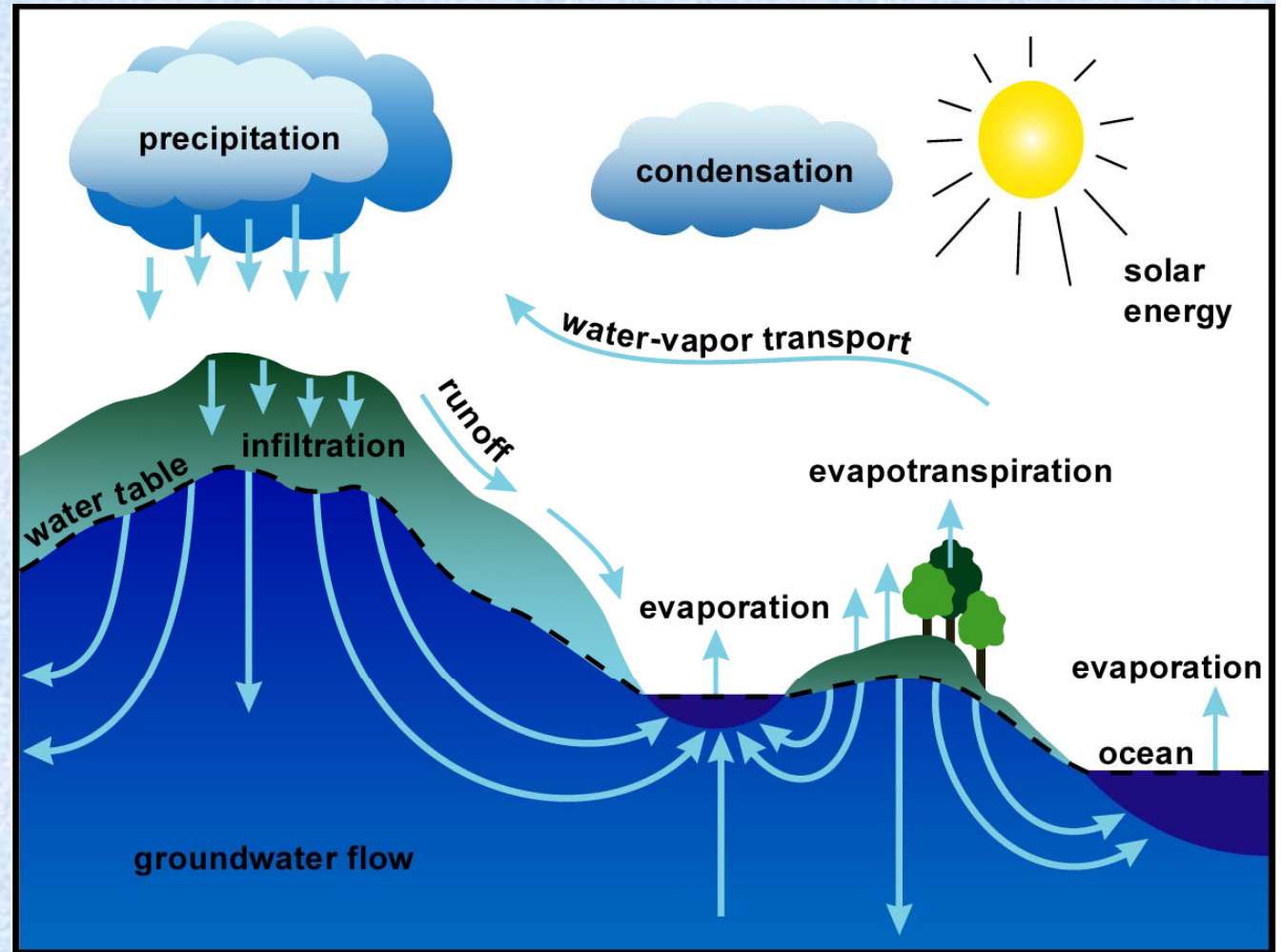
- **Watersheds and water pollution**
- **How wells work**
- **How to test drinking water**
- **Protecting well water supplies**

We all live in watersheds, which are the areas that drain to a common point in a river or lake. Our actions in a watershed determine the quality of water downstream.



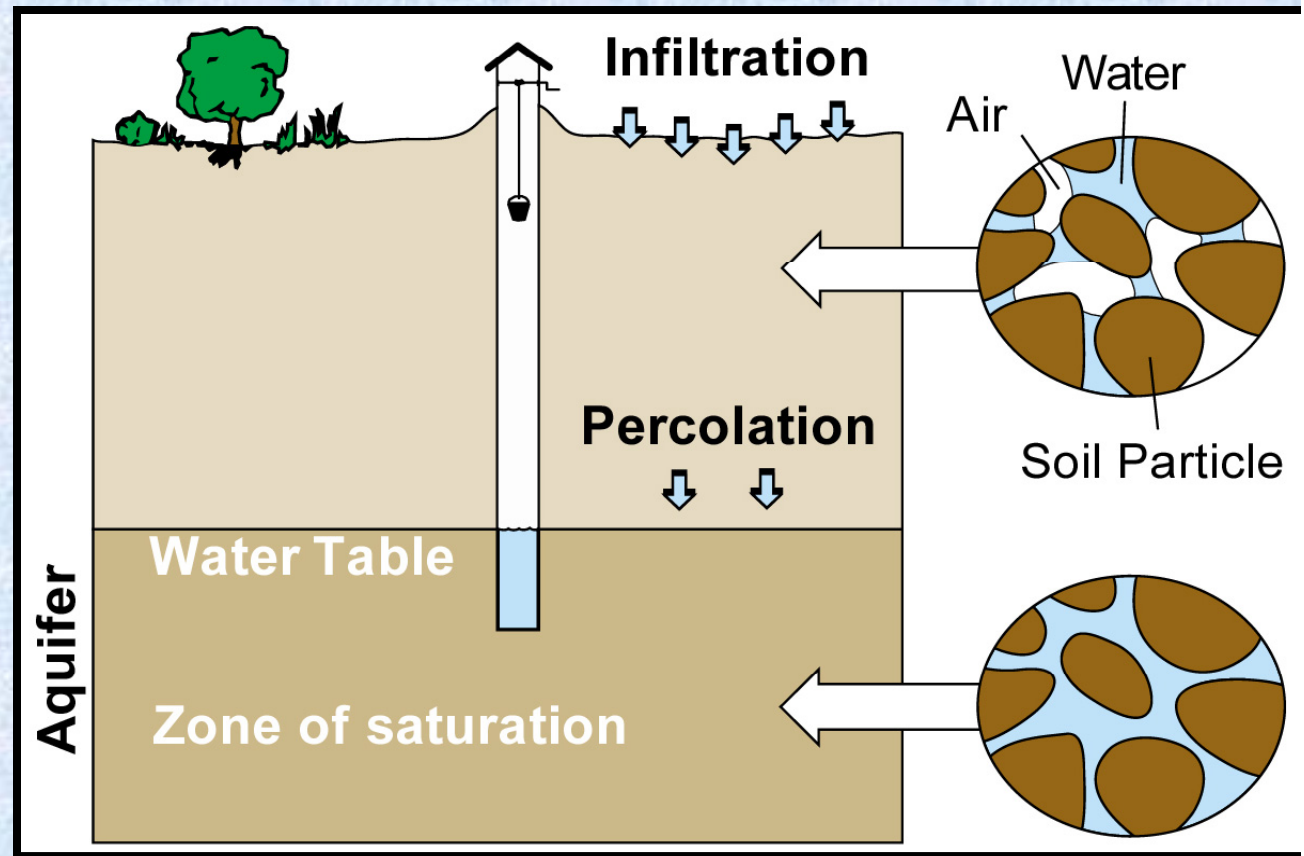
Water cycle: one of the oldest “recycling” schemes in nature.

Water vapor condenses into clouds, and returns to earth as precipitation (snow or rain). Some of this precipitation runs off the land surface and some soaks into the ground.



Ground water accumulates when surface water soaks into the soil and moves downward.

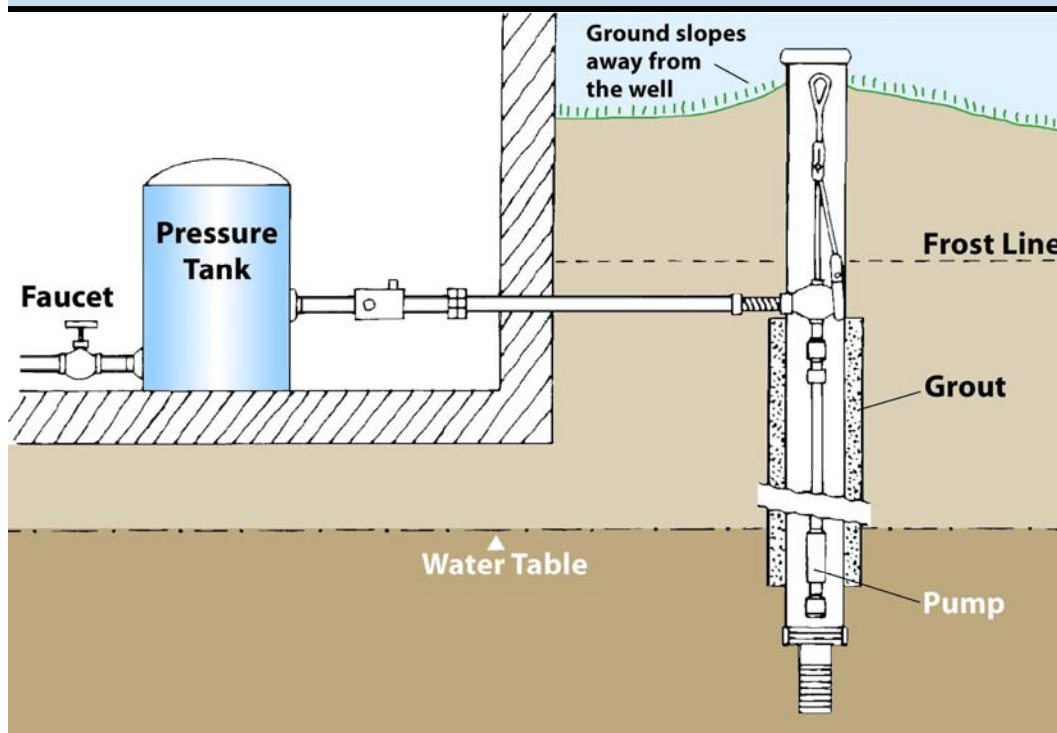
The water table is the upper most depth of the “zone of saturation”. Wells tap into the saturated zone, where all spaces between particles are filled with water.



Underground deposits of water in this saturated zone are called aquifers.

A drilled well consists of a hole bored into the ground, with the upper part being lined with a casing.

The casing prevents the borehole walls from collapsing and also prevents surface or subsurface contaminants from entering the water supply.



Below the casing, the lower portion of the borehole is the intake, through which water enters the well.

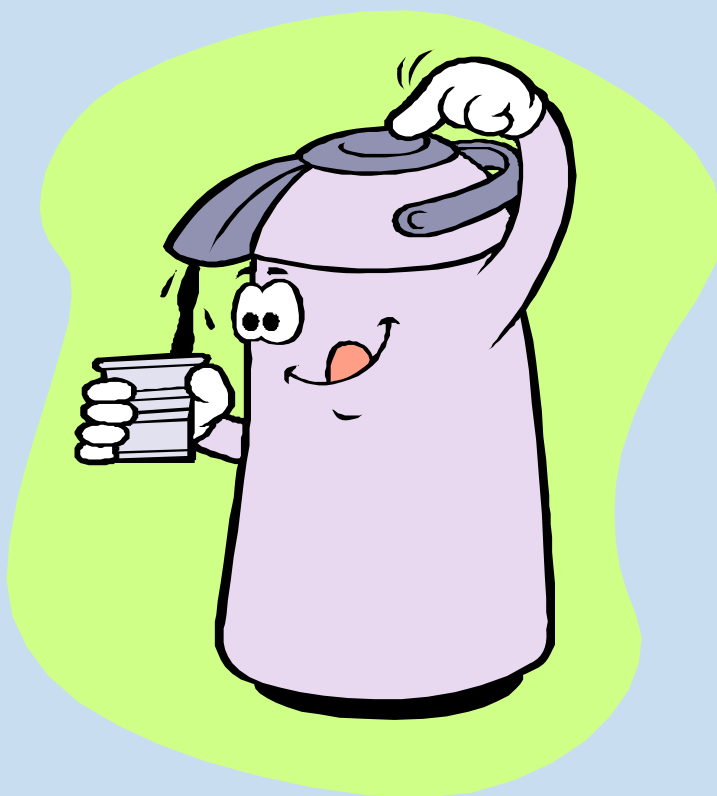
If groundwater is contaminated at that depth, the well will deliver contaminated water.



Who protects my drinking water?

- The Safe Drinking Water Act, first created in 1974, is the main federal law that regulates drinking water provided by municipal water suppliers
- The EPA sets standards and oversees water suppliers
- Ensuring safe water from private wells is the responsibility of the homeowner

How do I know if my water is safe to drink?



Water testing ensures that your water is safe.

Don't depend on your neighbor's water analysis, because even wells that are close together may draw water from separate aquifers.



Where can I have my water tested?

- Private labs vs. state health labs
- Make sure lab is certified for drinking water analysis
- Check with lab before you do the test to make sure you have all the necessary information
- Ask about costs and turnaround time



What should I test for?

NEW WELLS OR NEW HOMES:

- Test for bacteria
- Request a separate general water chemistry panel analysis

What's included in a standard chemistry panel?

- pH
- TDS
- Hardness
- Calcium
- Magnesium
- Sodium
- Potassium
- Chloride
- Nitrate
- Alkalinity
- Bicarbonate
- Carbonate
- Fluoride
- Arsenic
- Iron
- Manganese
- Copper
- Zinc
- Barium
- Color
- Turbidity
- Sulfate



What should I test for **every** year?


EXISTING WELLS:

- Test for bacteria
- Test for pH, nitrate and total dissolved solids (TDS)
- Test for any constituents that are at or near the drinking water standard



What should I test for **every five years**?

- Have a complete water chemistry analysis performed



**Always keep copies of
ALL results so you can
track changes in your
water quality over time.**



Also test your water if you:

- **Are considering the purchase of water treatment equipment**
- **Want to check the performance of existing water treatment equipment**
- **Are purchasing a new home, and want to know if the water supply is of good quality**



Also test your water if:

- **You have drilled a new well, and want to know if the water is safe to drink**
- **You are pregnant, are planning a pregnancy, or have an infant less than 6 months old**
- **Your septic system absorption field, or your neighbor's, is close to the well (within 100 feet)**



Also test your water if your well is located near a:

- **Gas station or fuel storage tank**
- **Retail chemical facility**
- **Gravel pit**
- **Mining operation**
- **Oil or gas drilling operation**
- **Dump, landfill, junkyard, or factory**
- **Dry-cleaning business**
- **Road-salt storage area, or heavily salted road**



Test your water and fix the system if:

- **Anyone in the household has recurrent gastrointestinal illnesses**
- **Your well does not meet construction codes**
- **Water leaves scaly residues and stains**
- **Water is cloudy or colored**



Test your water and fix the system if:

- **Pipes show signs of corrosion**
- **Water supply equipment wears out rapidly, including pumps or water heaters**
- **The area around the wellhead has been flooded or submerged**
- **Back-siphoning has occurred**
- **Water smells or tastes bad**



Test your water and fix the system if:

- **Your well is in or close to a livestock confinement area, such as a corral or feeding area**
- **You have mixed or used pesticides near the well, or have spilled pesticides or fuel near the well**
- **You have a heating oil tank or underground fuel tank near the well that you know has leaked**

**A poorly collected sample is
worse than no sample at all ...
and wastes your money!**



DNRC, Bozeman, MT



How do I take a water sample?

- First, call the lab for sample containers and procedures
- Use the appropriate container for the type of sample
- Store the sample carefully according to instructions before taking it to the lab



How do I take a water sample for bacteria?

- First, call the lab for sample containers and procedures
- Never rinse out the sample container, as it is sterile and contains a preservative
- Samples must be kept cool and delivered to the lab within a short period of time (often less than 24 hours) or they will not be analyzed



What do the results mean?

- Compare your lab report to the drinking water standards
- If any values exceed the standards, **DO NOT DRINK THE WATER!**
- Retest if bacteria, nitrate or organic parameters exceed the standards
- If concentrations are increasing between samples, try to determine and mitigate the source of pollutants

Units of measurement

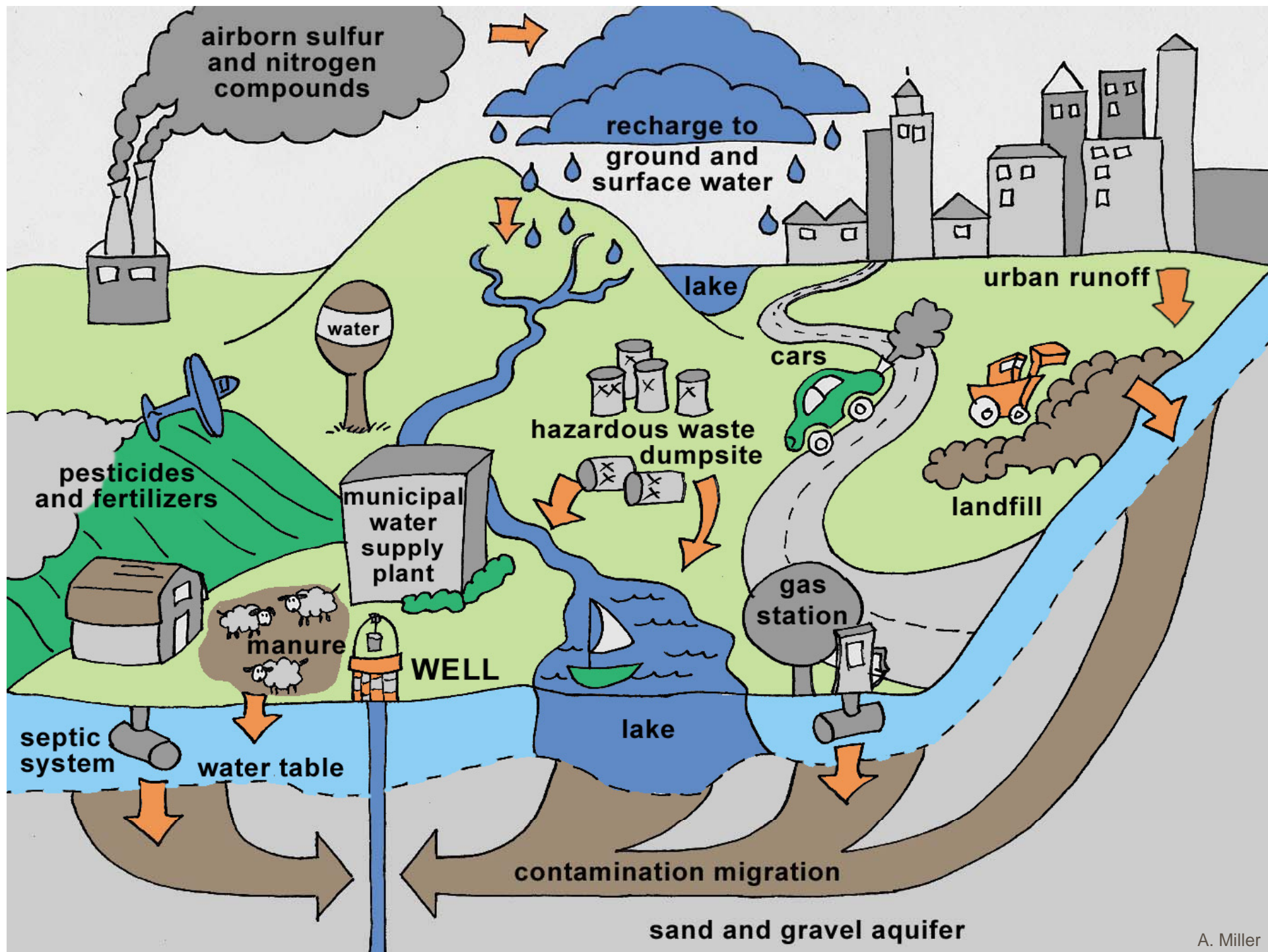
- ppm = parts per million
- That's one drop in one million drops of water
- Or, it's one pancake in a stack four miles high!

- ppb = parts per billion
- That's one drop in one billion drops of water
- Or, it's one penny in ten million dollars!



Units of measurement

- One part per million (ppm) is the same as one milligram per liter
- Milligram per liter is abbreviated as mg/l



How can I protect my well water supply?

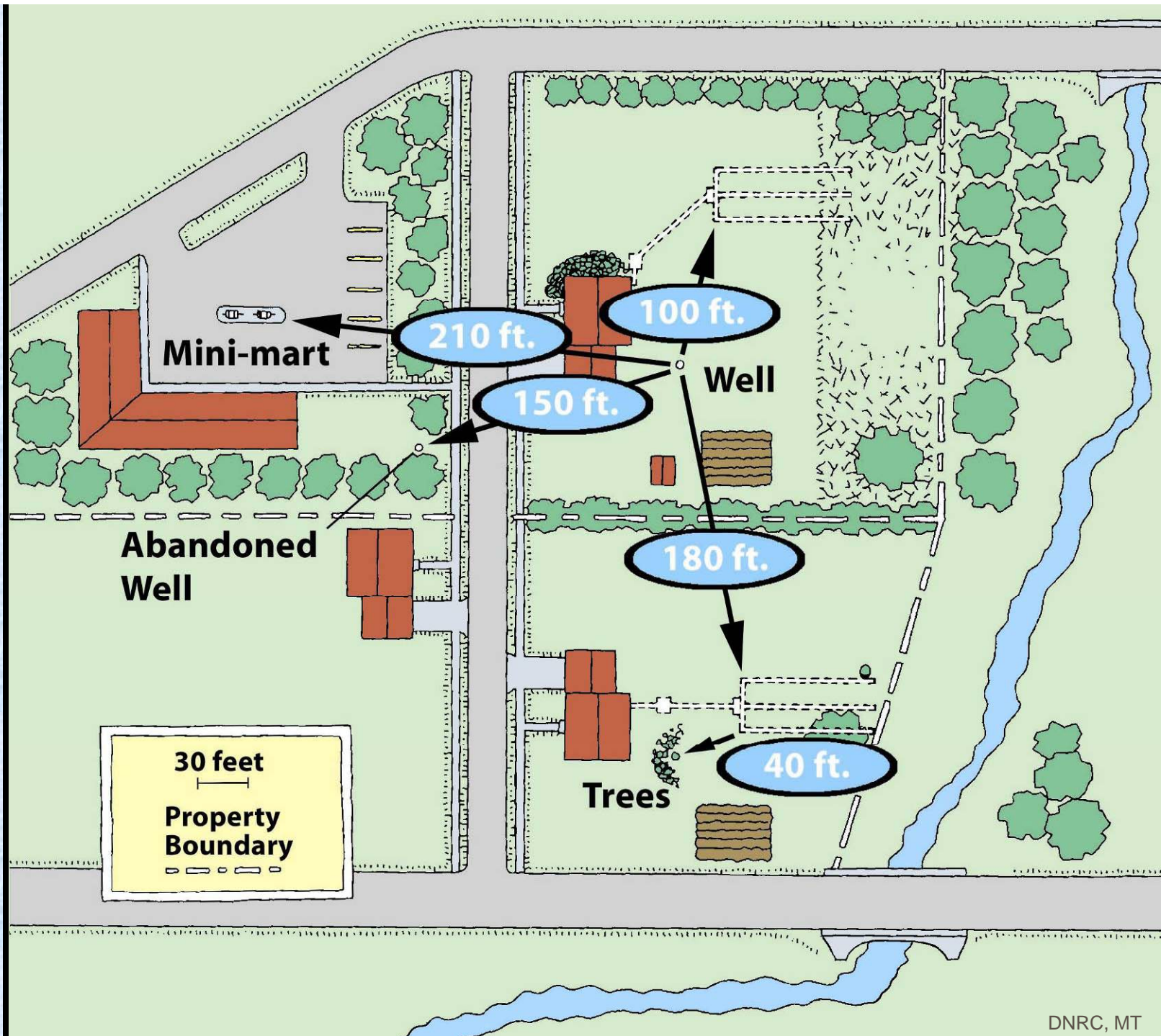
Consider:

- **Location**
- **Construction**
- **Condition**

**Can you
find the
wellhead?**



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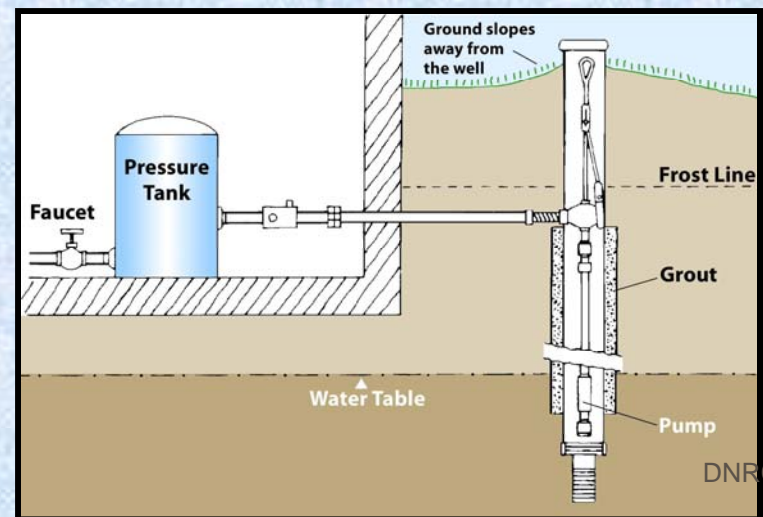


**Don't do this! Fence
your well out of your
pasture or holding area.**

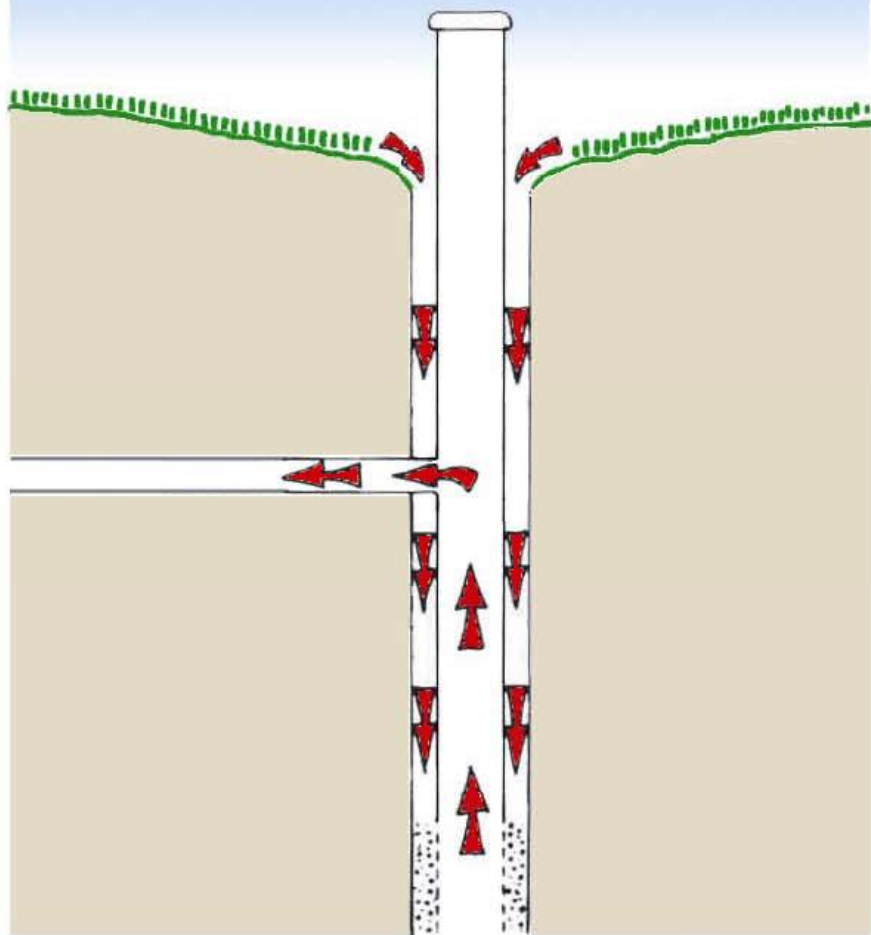
Well construction makes a big difference in protecting your water.

Wells over 50 years old may not be deep enough or properly sealed.

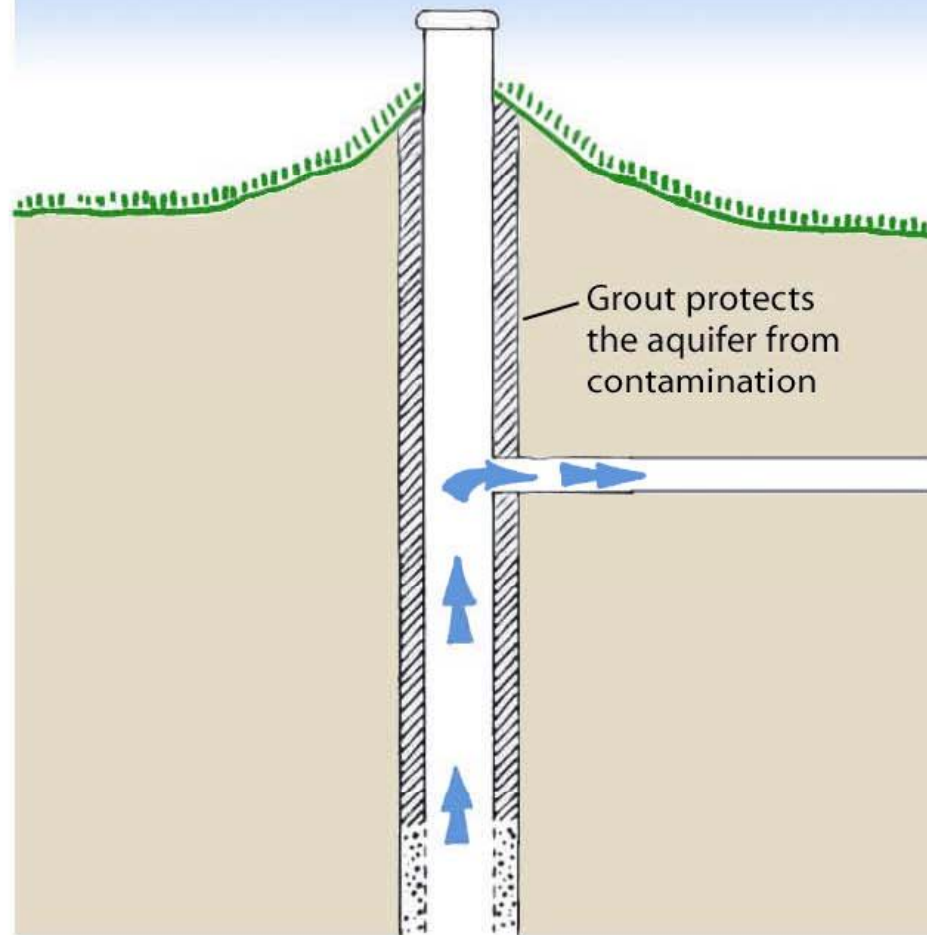
Hire a qualified well driller or repair company to inspect these wells.





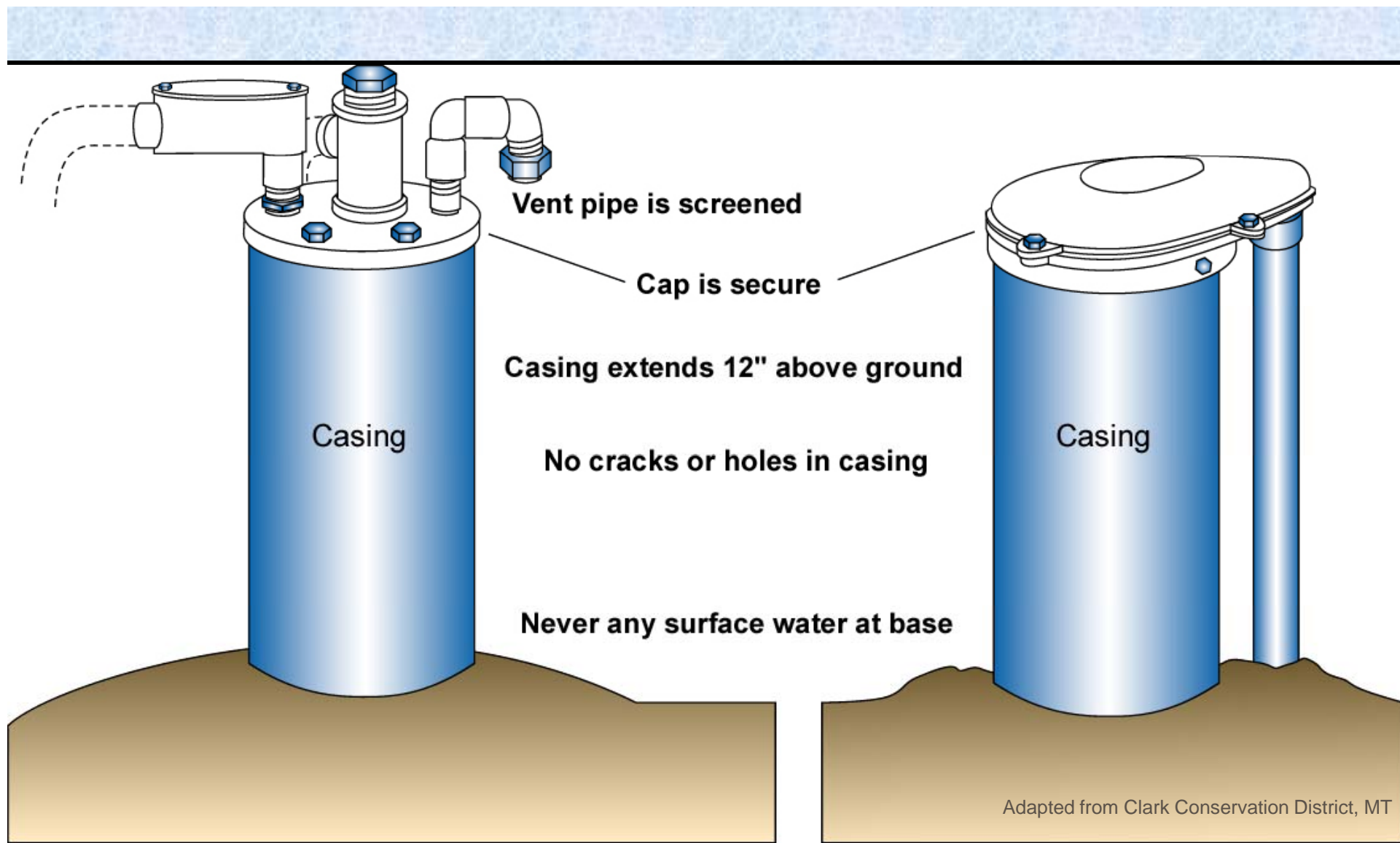
POORLY PROTECTED WELL



PROPERLY PROTECTED WELL



Uncontaminated water 
Contaminated water 



There should be antibackflow devices in place to prevent the flow of contaminated fluids into the ground water. Keep good records of all well inspections, repairs and water testing.