LIVING WITH YOUR DOMESTIC WELL AND SEPTIC SYSTEM

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What we’ll cover:

- Basics about groundwater
- Drinking water quality issues
- Wells: parts, protection
- Testing, Real Estate Transaction, health issues
- Septic system, function and maintenance
- Easy things you can do to protect your drinking water! (throughout & review)
Groundwater is...
Relationship of Surface Water & Groundwater

unsaturated zone

water table

groundwater flow

river
Why is Groundwater So Important?

- Groundwater is a major source of water for lakes, streams, rivers, and wetlands.
- 23% of all Oregonians and 90% of all rural residents in the state rely solely on groundwater for their drinking water.
- Groundwater is a significant source of irrigation water in Oregon.
How many wells are there?

- Roughly 350,000 active wells
- About 3500 to 3800 new wells are added each year.
- 27,769 domestic well listed in Lane County
- Very few wells are listed as abandoned and/or properly decommissioned.
Global Freshwater Resources
(< 3% of All Water on Planet!)

- Icecaps/Glaciers: 74.07%
- Groundwater: 25.92%
- Lakes, Rivers, Soil, Atmosphere: < 1%

(< 3% of All Water on Planet!)
Soil and subsurface materials "pre-treat" groundwater

- Physical filtration
- Biological degradation
  - Organic chemicals broken down
  - Pathogens eaten by soil predators
- Chemical reactions
  - Bind to soil
  - Chemicals change with time in soil environment

A Natural Water Treatment System!
Variations in Permeability & Adsorption

LARGE (GRAVEL)
Rapid drainage
Low adsorption

INTERMEDIATE
Moderate drainage
Moderate adsorption

FINE (CLAY)
Slow drainage
High adsorption
**Higher Risk Soil**

- Coarse texture
- Shallow
- Fast draining
- High permeability
- Low organic matter
- Low adsorption

**Lower Risk Soil**

- Medium to fine texture
- Deep
- High organic matter
- Slow permeability
- Greater adsorption
Water Quality
— the concerns from nature

• **Dissolved Minerals** — natural, from rocks
  • **Iron**   Orange staining
  • **Calcium Carbonate**   White staining
  • **Arsenic**   Invisible, tasteless, **health concern**

• **Dissolved Gasses** — from harmless bacteria living their lives without oxygen
  • **Hydrogen Sulfide**   Rotten egg smell
Nitrate - NO$_3^-$

- From fertilizers, septic systems, animal waste
- Connection between surface and groundwater
- Moves easily with water through soil
- Some health considerations
- Good indicator – What else could be in your water?
Nitrate above 2 ppm likely in well-drained unconfined aquifer with source

Nitrate above 1 ppm not expected in confined aquifer
What is a safe level of nitrate in drinking water?

- Health Standard designated by the EPA for PUBLIC DRINKING WATER SUPPLIES is **10 mg/l nitrate nitrogen**
- **No regulation** of PRIVATE DRINKING WATER SUPPLIES
- If nitrate is detected, learn more about risk to determine what YOU want to do
- We will talk about all the health risks together!
What are the health issues with nitrate in drinking water?

- Health risk for infants consuming the water.
- May cause a type of blue baby syndrome (methemoglobinemia).
- Possible risk for pregnant women.
- Suspected in some cancers and chronic gastric problems.
Contaminants that move through soil

- Nitrate
- Pesticide Components
- Fuels
- Industrial chemicals
Southern Willamette Valley Groundwater Management Area

- Declared because of high nitrate levels
- Action Plan developed to reduce nitrate
- Focusing on outreach, research & voluntary actions
- Next Meeting: Oct. 19 in Junction City – 8:30am to 11:30am
Nitrate Screening

• Check once a year, congratulations if you brought us a sample today!

• If elevated, have a lab test

• Keep records

• If above 3 ppm consider other risks to your water
Activated Carbon Filters

• REMOVE many metals and organic compounds, such as pesticides and fuel.

• Cheaper than testing.

• Do not remove nitrate, arsenic, bacteria.

• If using pitcher type, keep in fridge to prevent bacteria growth.
Coliform & E. coli

• Coliform
  • broad group of bacteria
  • very few are harmful
  • not naturally in groundwater
  • presence indicates surface contamination

• Fecal coliform
  • type of coliform that lives in animal intestines

• E. coli
  • one type of fecal coliform
  • some strains of E. coli cause illness, most do not.
Coliform Bacteria Testing

• Test every 1-3 years

• **Presence** of Coliform means that well water is NOT filtered by soil

• DO NOT drink water if fecal coliform is present ("positive")

• **Find problem**, fix, disinfect and retest.
Treating for bacteria

If you MUST use a source of water that contains bacteria then disinfect it!

- **In emergencies**
  - Boil for ONE MINUTE
  - Add liquid chlorine bleach (8 drops/gal)

- **Continual use**
  - Chlorination — follow with carbon filter
  - Ultraviolet
  - Ozone
Problems indicated by bacteria in well water

- Type
- Quality of construction
- Deterioration with age
- Depth
- Location near contamination source

The problem may be the well!
Minimum 18-Foot Seal Required Between Casing and Bore Hole
Casing Height
Well Inspection Points

- Vent pipe is screened
- Cap is secure
- Casing extends 12" above ground
- No cracks or holes in casing
- Never any surface water at base
Well Head Protection Tips

• Find Your Well Head
• Inspect it! – Vents, Sanitary Seal
• Protect it!
• Find the Well Log & Register your Well
  http://www.oregon.gov/OWRD
• Clean out the well house
• Protect the soil around the property from contamination (oils, gas, fertilizers, mixing pesticides, etc.)
• Cover Manure Piles
What to do about these problem wells?

- No cap?
- Casing below ground?
- Rusted out casing?

*Call Licensed Well Contractor*
TWO “SECRET” DIRECT RISKS TO WELL WATER:

Back flow & Unused wells
Always Maintain an Air Gap

Preventing Backflow

Pesticide Spray Tanks

Air Gap

No Air Gap
Examples of situations that put your water supply at risk of backflow contamination:

- Hose end submerged in animal watering trough
- Hose lying on ground when watering plants
- Pressure washer or power washer
- Tub or sink with faucet lower than water level
Install Backflow Devices on Taps
Forgotten Old Wells

Some clues:

- Rocks in depression
- Old windmills
- Cut off pipe
- History of property

Photos courtesy of Washington State University Extension Service
Unused wells pose a hazard
Found & “fixed” problems, or couldn’t find any!

Still have water quality issues!

NOW WHAT?
Consider Options

• New water source (*well or water system*)
• Bottled water for drinking
• Water treatment
  • There is no “BEST” treatment
  • Match treatment to water
  • Consider long-term costs
QUESTIONS?
BASIC SEPTIC TANK MAINTENANCE

Out of sight and out of mind, until...

surfacing effluent
Components of Basic Septic Systems
This is a septic tank!
These are not a septic tanks!
Separation Distance Requirements

100 feet

50 feet

Septic system drainfield

Wellhead

TANK

Graphics courtesy PA Extension
Average single family home in USA = 171 gallons (including outside use)

Image by The Home Depot with information from Alliance for Water Efficiency
Average single family home in USA = 71 gallons
Top 3 Reasons Why Systems Fail

• Failure to pump out solids (sludge)
• Excessive water use (leaks, etc...)
• Poor design or unsuitable soil conditions
NOT a drainfield alternative
Maintaining your septic system

• PUMP YOUR TANK!
• Keep the bacteria healthy and happy
Scum on Top & Sludge on the Bottom

As a septic tank fills with sludge and scum:

• Less space for separation
• Shorter tank retention time
• Waste is not treated as well
• Early drainfield failure could occur

Courtesy NAWT
### Suggested Pumping Interval (years)

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Number of people in your household
To pump... or not to pump?

- Pumping costs about $350 to $700 for the average 1250-gallon tank, every three years or so.

- A new drainfield costs from $5,000 for an in-ground system to as much as $30,000 for an engineered field.

Averages vary by region in Oregon.

That is the question.
What can I plant on or near a drainfield?

**OK to Plant**
- Grasses
- Perennial and annual flowers
- Many perennial groundcovers

**Avoid Planting**
- All trees
- Large shrubs
- Vegetable garden
Potential causes of septic failure

• Overloading. Don’t over-use water. Do only full loads of wash and try to limit the number of loads daily.
• Placement in poor drainage area
• Water leaks
• Irrigating the drainfield
• Driving over the drainfield
• Garbage disposals
• Tree roots
Other causes of septic failure

- Pouring kitchen grease into drains
- Failure to install according to septic codes
- Flushing inorganic materials down the toilet
- Dry laundry detergent
- Overuse of household chemicals
Avoid products with the following warnings on the labels:

- “Harmful if swallowed”
- “Avoid contact with the skin”
- “Do not get in open cuts or sores”
- “If product comes in contact with eyes, call a physician immediately”

Always read the product label!
What about additives?

• Enough bacteria are present in the tank from normal bodily wastes

• Additives cost $$$ and some actually increase the solid material in the tank by producing inert ingredients

• There is no substitute for pumping!
USE RID-X ONCE A MONTH

Occasional pumping may also be required for good septic system maintenance.
Tips for your Septic System

• Find it!
  don’t forget the drainfield

• Protect it!

• Pump it!
Easy things you can do to help protect your drinking water!
Locate your well
Find Your Well Log and Register Your Well

Oregon Water Resources Department

http://egov.oregon.gov/OWRD/
Locate septic system & drainfield
Pump septic tank, regularly
Test water for nitrate and bacteria (arsenic if you never have)
Check sanitary seal on wellhead
Check for vent screen
Backflow protection on outdoor faucets
Manage livestock manure piles

Cover piles during the wet season!
Protect the wellhead
(from livestock access and other risks)
Clean out your pump/well house
Designated concrete area for mixing chemicals and refueling equipment
Protection of drainfield from aggressive trees, shrubs and heavy objects
Wise use of lawn and garden fertilizers and chemicals

Who spilled the fertilizer?
Protect soil from contamination
(Like by oil, gasoline, paint thinner and/or household chemicals)
Use less household water (if possible)
QUESTIONS?