Contaminated Well Water: A Hidden Public Health Threat
90% rural OR depends on groundwater

23% of Oregonians are well dependent

350,000 Active wells

3,800 New wells drilled every year
Nitrate

- Nitrates are commonly found in agricultural areas
- Colorless, odorless, and tasteless
- Exposure to high levels can cause methemoglobinemia
  - Headache, dizziness, weakness or difficulty in breathing
  - Blueish tint to skin
  - Infants are most susceptible ("blue baby syndrome")
Sections with high concentrations of residential parcels smaller than 1 acre without septic system records in the Southern Willamette Valley Groundwater Management Area.
SWGWMA Focus Groups

Rural Residential
• Lacked a basic understanding of groundwater
• Hadn’t heard term GWMA
• Most had treatment system, but didn’t know why?
• Taste = Safe
• Barriers to Testing
• Barriers to Action

Commercial Agriculture
• High level of understanding
• Knew about GWMA
• Testing schedule and test plots of land
• Struggle with Economic Needs vs. Environmental ideals
• Urban contributions
• Lack of representation to general population
Nitrates Results

- 0-2 ppm
- 3-9 ppm
- 10+ ppm

Real Estate Transaction Data
Nitrates 1989 - 2015
Arsenic

- Arsenic is a naturally occurring element
- Colorless, odorless and tasteless
- Exposure over a long period of time is harmful to health
  - Bladder, liver, lung and skin cancer
  - Skin discoloration and keratosis
  - Premature birth and low birthweight
  - Type II diabetes
  - Susceptibility to infections
Arsenic rules have changed

- Drinking water standard was lowered from 50 µg/L to 10 µg/L. The lower standard was set at a level that protects consumers by maximizing health risk reduction benefits at a cost that is justified by the benefits.

- Oregon Senate Bill 739 requires any real estate sale that includes a well that supplies ground water for drinking water purposes shall be tested for arsenic, nitrates and total coliform bacteria (effective January 2010).
Arsenic is commonly found in groundwater.

It is odorless, colorless, and tasteless. The only way to know if it is there is to test for it.

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**National arsenic occurrence map**

Locations and arsenic concentrations for 31,000 wells and springs sampled between 1973 and 2000.
E. Coli

- E. Coli is a bacteria found in fecal material of animals and humans
- Presence of E. Coli in well water indicates recent sewage contamination (animals or septic tanks)
- Many strains of E. Coli are harmful to people
  - Diarrheal disease
Coliform Bacteria

- Surface to groundwater interaction
- Well Construction Issues
  - Missing Caps
  - Contaminant seepage through well casing
- Contaminant seepage along casing from improper grout seal.
- Flooding
- Manure sources
  - Failing septic systems
  - Uncovered manure sources
Tested 90 wells for levels of arsenic, nitrate, coliform, and E. coli
Examined each well for proper well maintenance
Review well logs and tagging of wells
Performed outreach events with the help of Oregon State Extension Services to promote the DWSP and proper well maintenance
## 2014 DWSP Results: Benton County

<table>
<thead>
<tr>
<th>Test Performed</th>
<th>Percent of Total Wells Containing Some Level of Contamination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrate</td>
<td>29%; (26/89)</td>
</tr>
<tr>
<td>Arsenic</td>
<td>16%; (14/89)</td>
</tr>
<tr>
<td>Coliforms</td>
<td>15%; (13/89)</td>
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</tbody>
</table>
### 2014 DWSP Results: Benton County

<table>
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<tr>
<th>Well Contaminant</th>
<th>Percent of Wells With Contaminant</th>
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<tbody>
<tr>
<td>Nitrate (0.5-9.9 ppm)</td>
<td>26%; (23/89)</td>
</tr>
<tr>
<td>Nitrate (≥10 ppm)</td>
<td>3%; (3/89)</td>
</tr>
<tr>
<td>Arsenic (0.001-0.009 ppm)</td>
<td>11%; (10/89)</td>
</tr>
<tr>
<td>Arsenic (≥0.010 ppm)</td>
<td>4%, (4/89)</td>
</tr>
<tr>
<td>Coliform (Present)</td>
<td>15%; (13/89)</td>
</tr>
<tr>
<td>E.coli (Present)</td>
<td>0%, (0/89)</td>
</tr>
</tbody>
</table>
All rural Oregonians deserve to drink clean, safe water that meets basic water quality standards and doesn’t threaten their health.

Help communities to better protect their groundwater aquifers.

Any new domestic wells that are constructed should at a minimum be required to be test for total coliforms, arsenic, and nitrate before being placed into service.

Knowing test results will help homeowners decide:

- What if any treatment is needed.
- When to install treatment.
- Health risks to all family members