

2018 Benton County Environmental Health Domestic Well Safety Program

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Southern Willamette Ground Water Advisory Committee (GWMA) Meeting
October 18, 2018



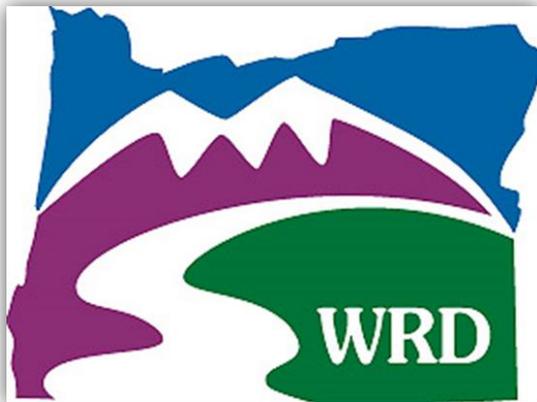
Worked with numerous partners



BENTON
SOIL AND WATER



CONSERVATION
DISTRICT



In Oregon

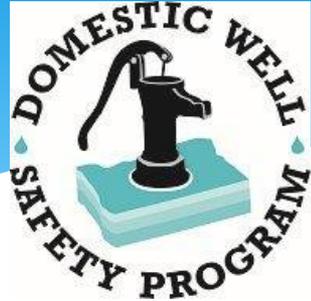
- * Approximately 23% of Oregonians rely on domestic wells, or private wells, as their primary source of potable water.

Domestic Well Safety Program Benton County

- * Pilot Program
- * Grant
- * Domestic Well testing
- * Visual Inspection of Well, assessment of hazards near the well
- * Home owner education

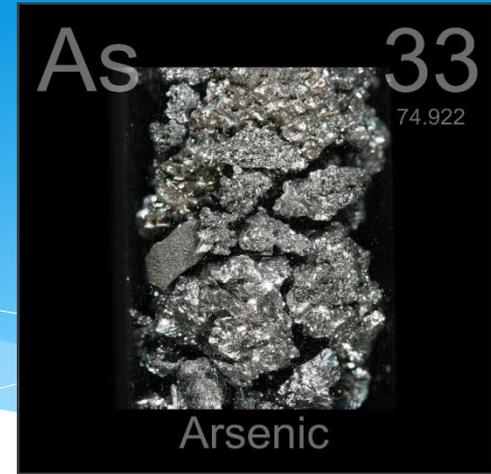


Benton County Environmental Health DWSP 2018

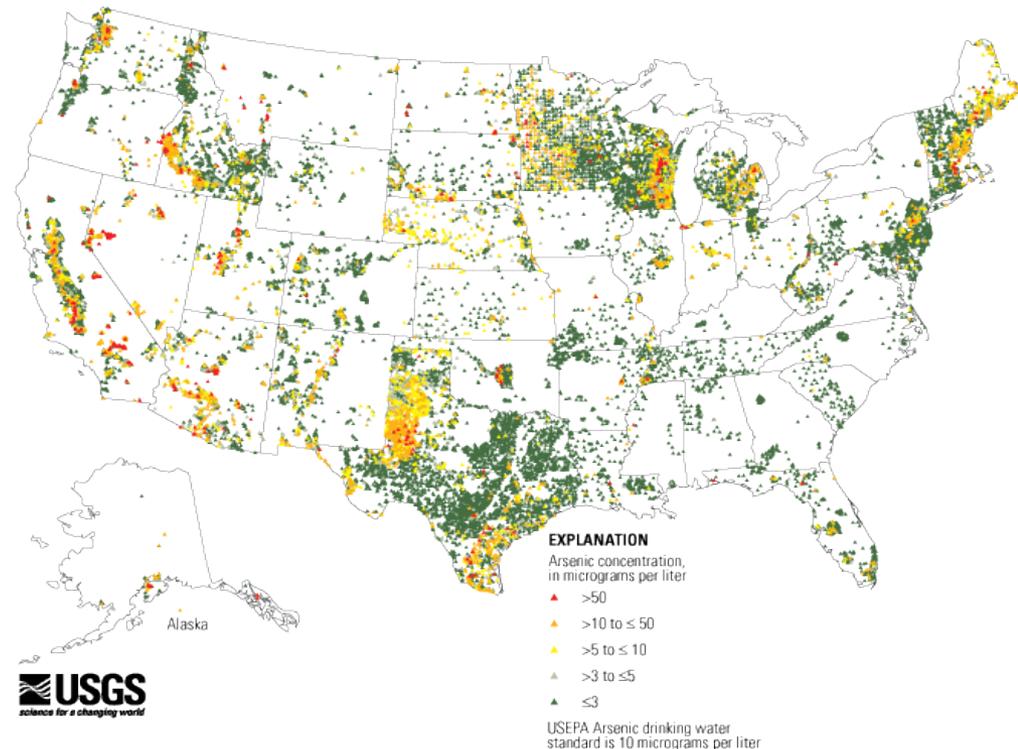


- * Performed well water testing and physical inspections on 40 domestic wells in Benton County (10 more than in the previous year, 2016)
- * Tested for Arsenic, Nitrate, and Total Coliforms
- * Focused on underserved populations
- * Provided area residents about with information well stewardship
- * Collected voluntary demographic information from participants
- * Created a Domestic Well Safety Program Website:
<https://www.co.benton.or.us/health/page/domestic-well-safety-program>

ARSENIC



- * Naturally occurring element
- * Long term exposure is harmful to health
- * Colorless, odorless, and tasteless
- * Drinking water standard was lowered from 50 $\mu\text{g}/\text{L}$ to 10 $\mu\text{g}/\text{L}$ in 2002
- * Commonly found in groundwater – only way to detect is through testing
- * Leaches into groundwater from natural geological sources
- * It can be a component of mine and smelting waste
- * It was used in pesticides and sheep dips



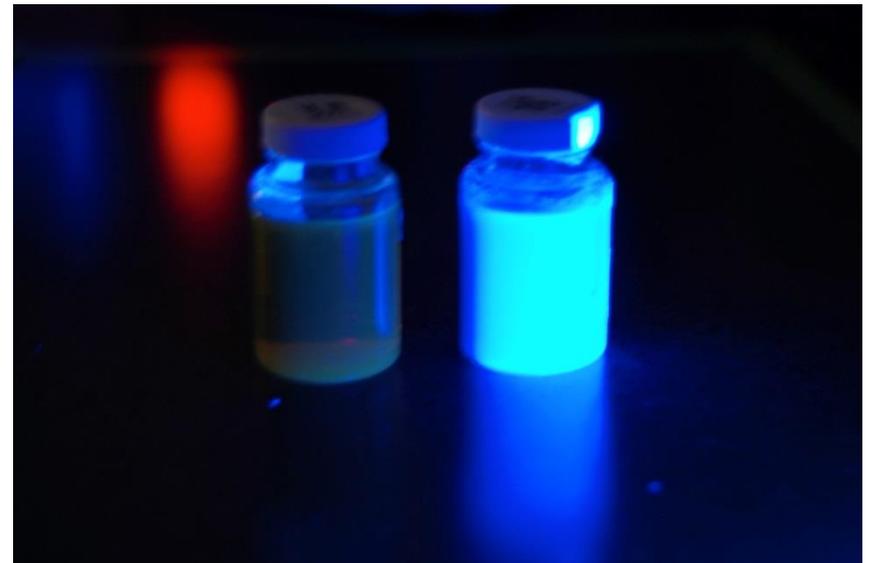
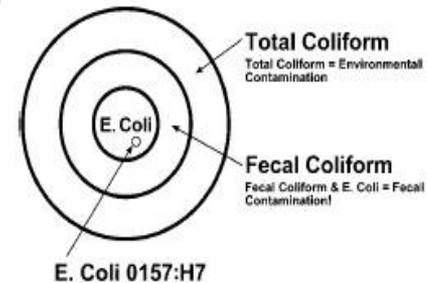
Human Health Concerns Arsenic

- * Long-term exposure to arsenic in drinking water is linked to higher risk for cancer of the bladder, lungs, skin, kidney, nasal passages, liver, and prostate.
- * Non-cancer effects of ingesting arsenic include cardiovascular, pulmonary, immunological, neurological, and endocrine (e.g., type 2 diabetes) effects.
- * Short-term exposure to high doses of arsenic can cause stomach pain, nausea, vomiting and diarrhea
- * Pregnant women and children are more vulnerable

COLIFORMS

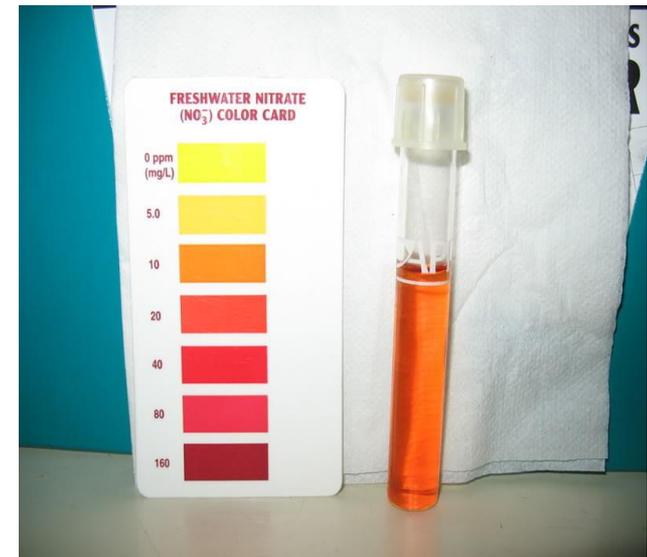
- * Coliforms may enter your well in a variety of ways.
- * Most coliforms are harmless
- * Those that are harmful are not detected by taste or smell. They have to be tested for.
- * The harmful coliforms include fecal coliform and E. Coli
- * E. Coli O157:H7 is the most dangerous form and is harmful to human health. Can cause severe hemorrhagic diarrhea and even death
- * Used as an indicator organism for the presence of other human pathogens

TOTAL COLIFORM, FECAL COLIFORM AND E. COLI



Nitrates

- * Essential source of nitrogen for plants
- * Common in many fertilizers
- * Nitrates may be carried by rain, irrigation and other surface waters through the soil into ground water
- * Human and animal waste may also be a contaminating source
- * Elevated nitrate levels may suggest the possible presence of other contaminants such as disease-causing organisms, pesticides, or other inorganic and organic compounds that could cause health problems.



Health Concerns Nitrate

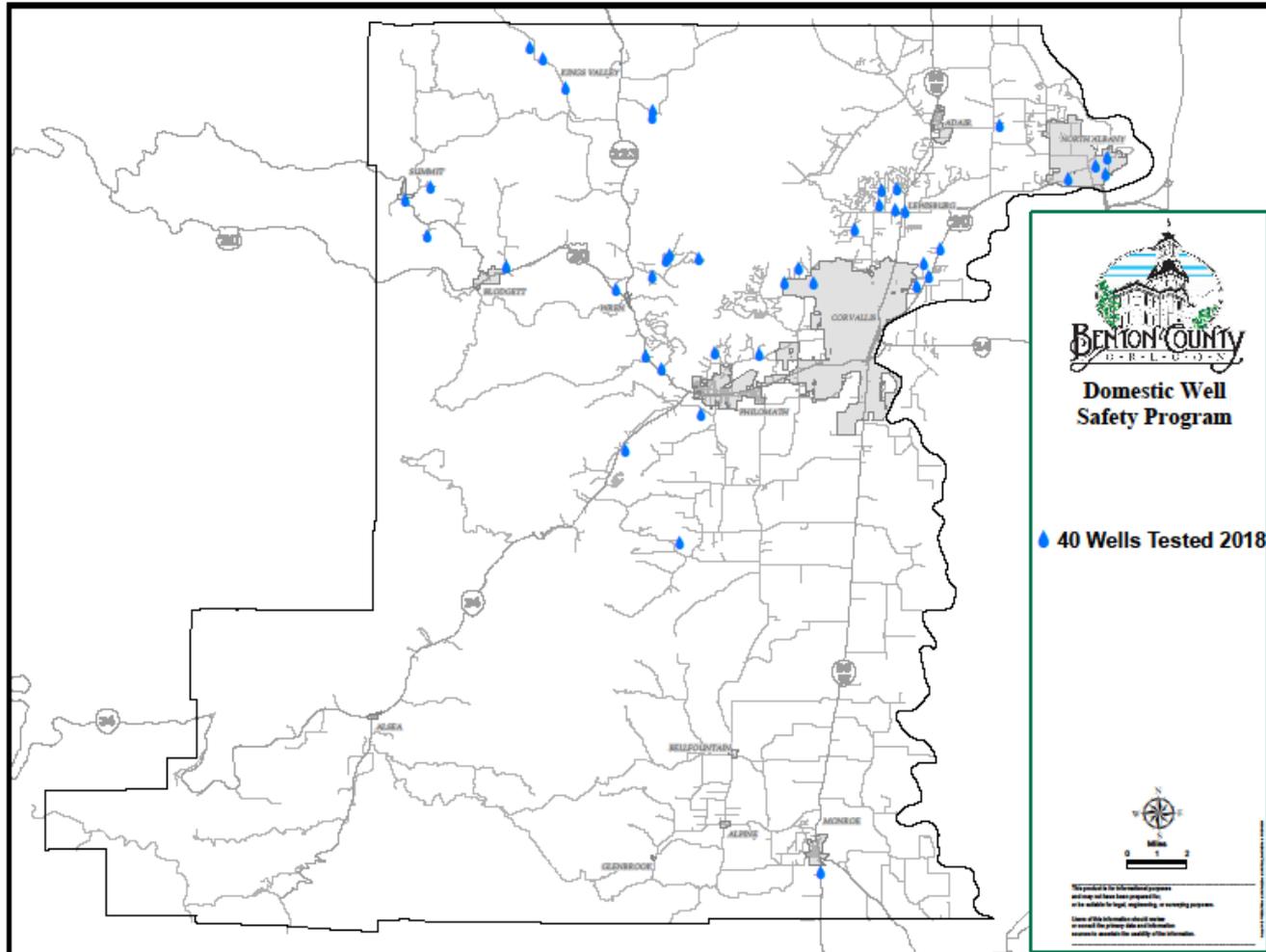
- * Nitrate can interfere with the ability of the blood to carry oxygen to vital tissues of the body in infants of six months old or younger. The resulting illness is called methemoglobinemia, or "blue baby syndrome".
- * Pregnant women may be less able to tolerate nitrate, and nitrate in the milk of nursing mothers may affect infants directly.
- * Nitrate may play a role in spontaneous miscarriages, thyroid disorders, birth defects, and in the development of some cancers in adults. Recent human epidemiologic studies have shown that nitrate ingestion may be linked to gastric or bladder cancer.

Benton County Environmental Health DWSP 2018



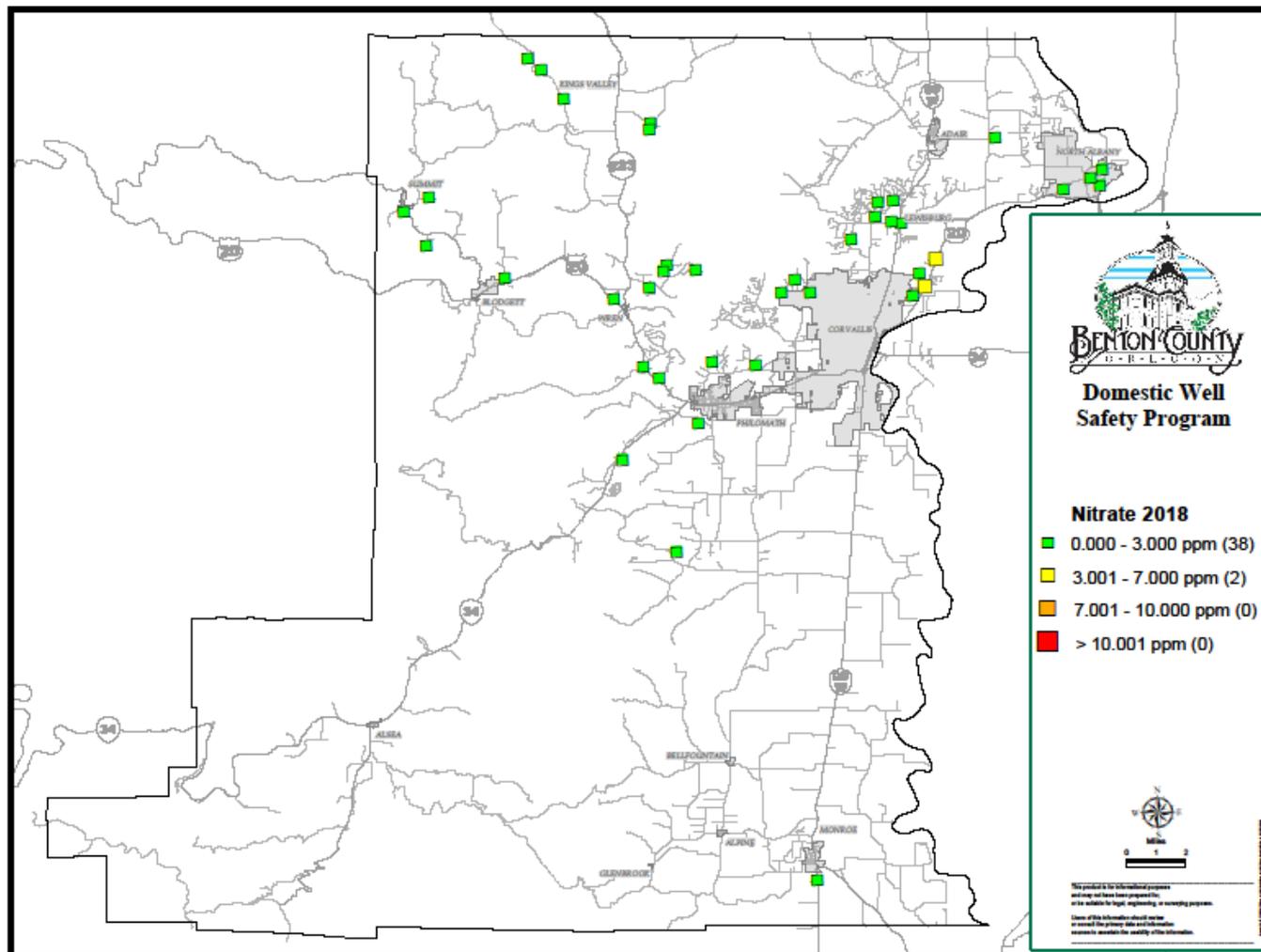
- * Participants received:
 - * Free well testing and inspection for hazards
 - * Education on proper well stewardship
 - * Information on future well testing and remediation strategies
 - * Guidance for well owners that emphasizes routine maintenance, tagging, and testing of domestic wells
 - * Untagged wells were tagged for WRD (with homeowner's permission)

40 Wells Tested in 2018



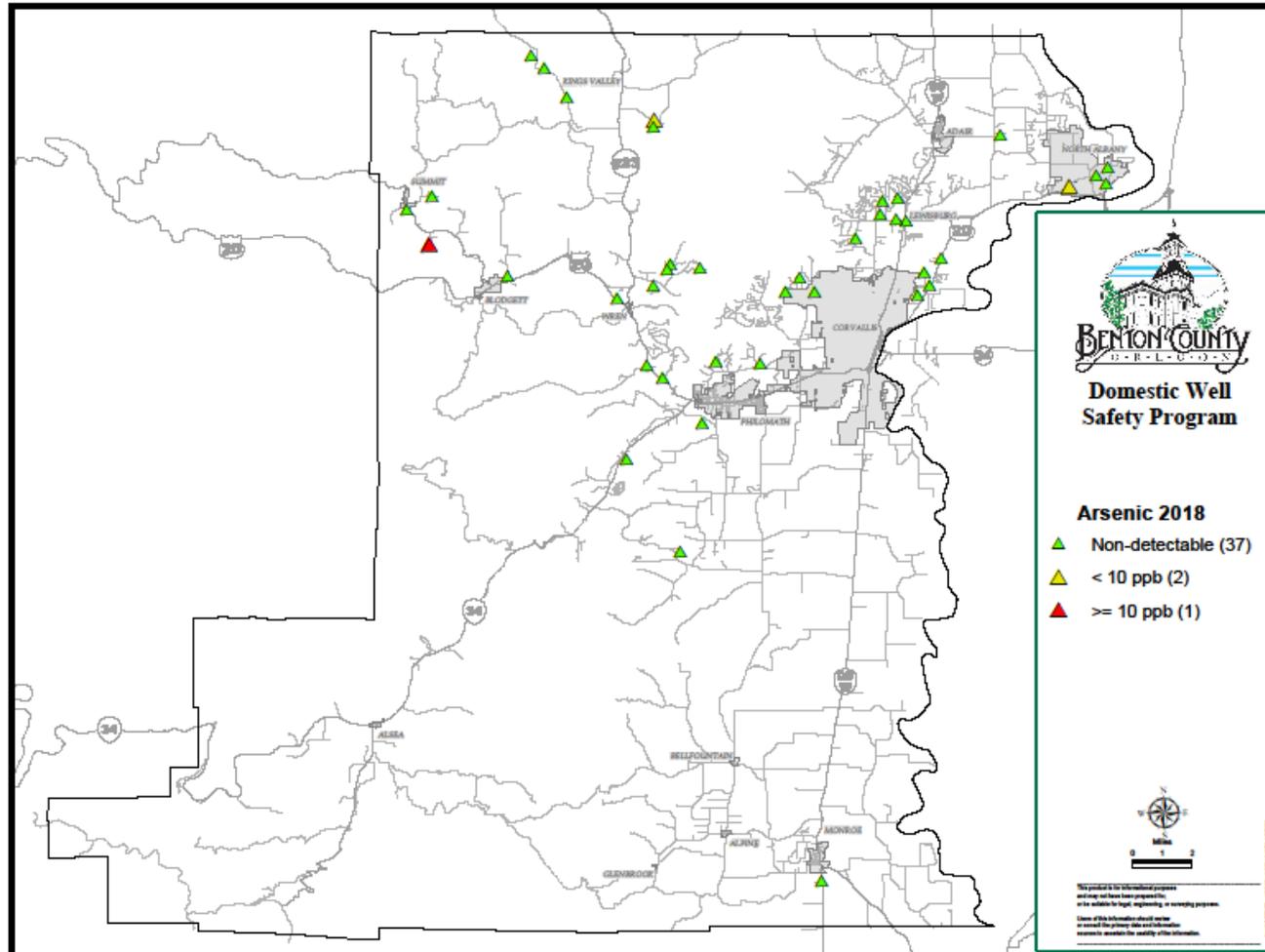
Wells with Nitrate Detected

2018

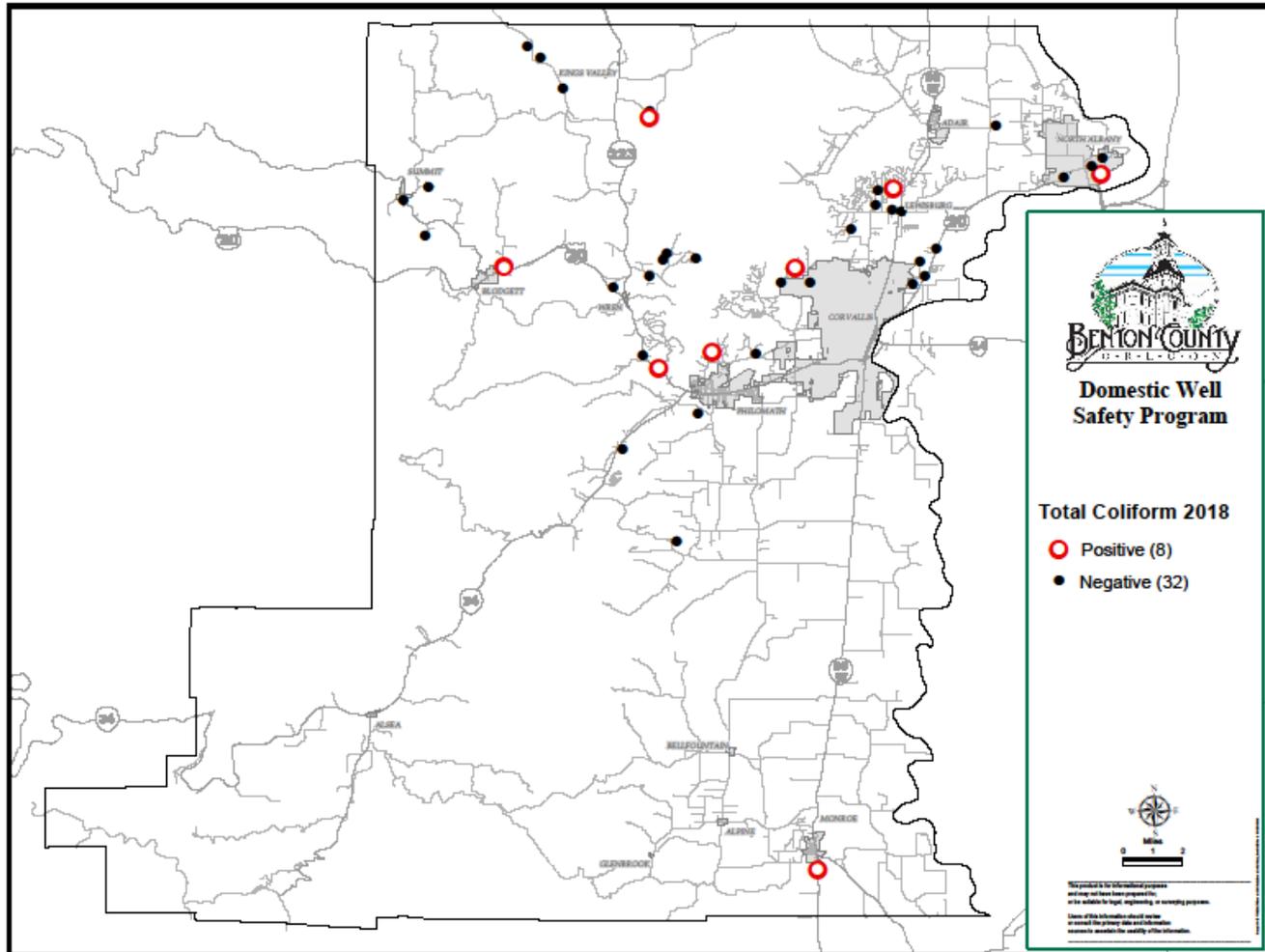


Wells with Arsenic Detected

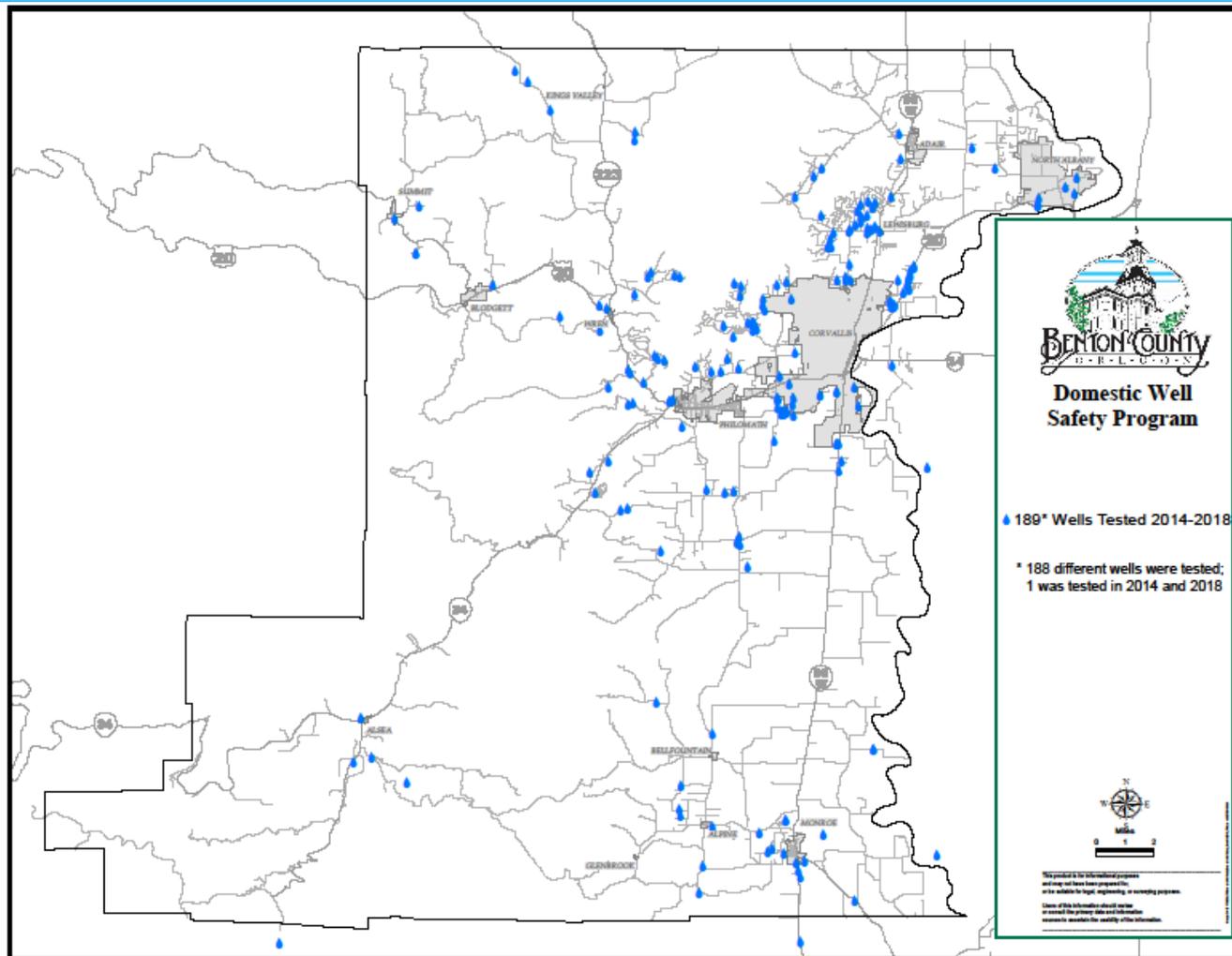
2018



Wells positive for Total Coliforms 2018

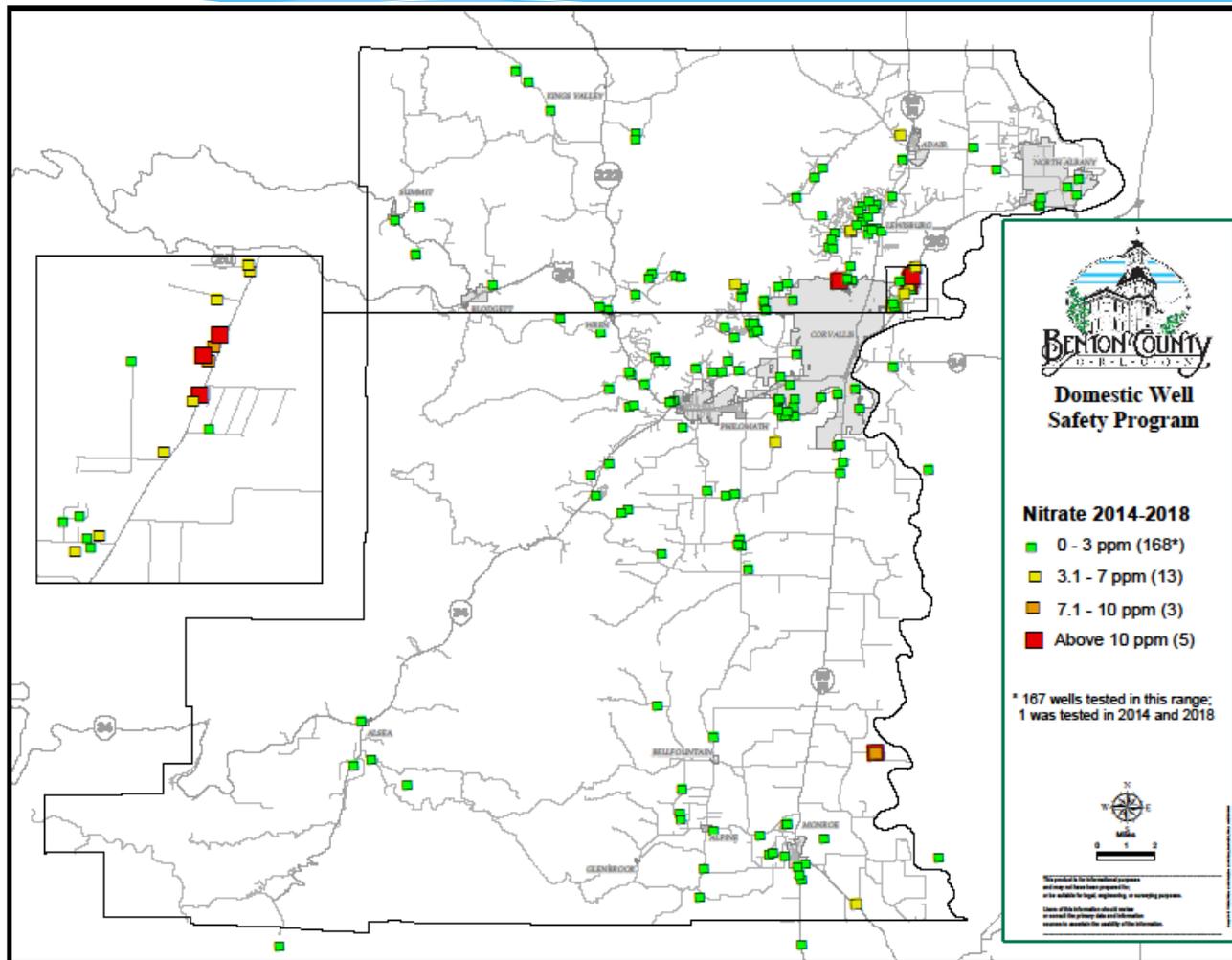


189 Wells Tested from 2014-2018

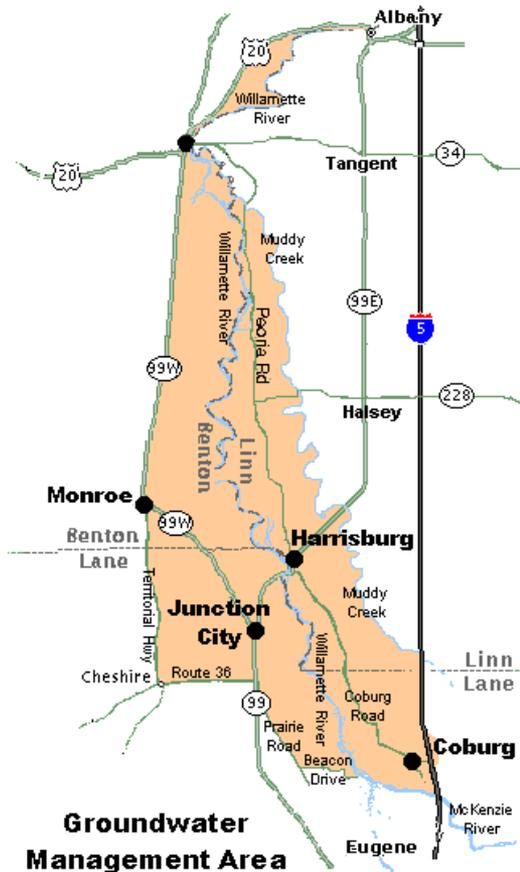


Wells with Nitrate Detected

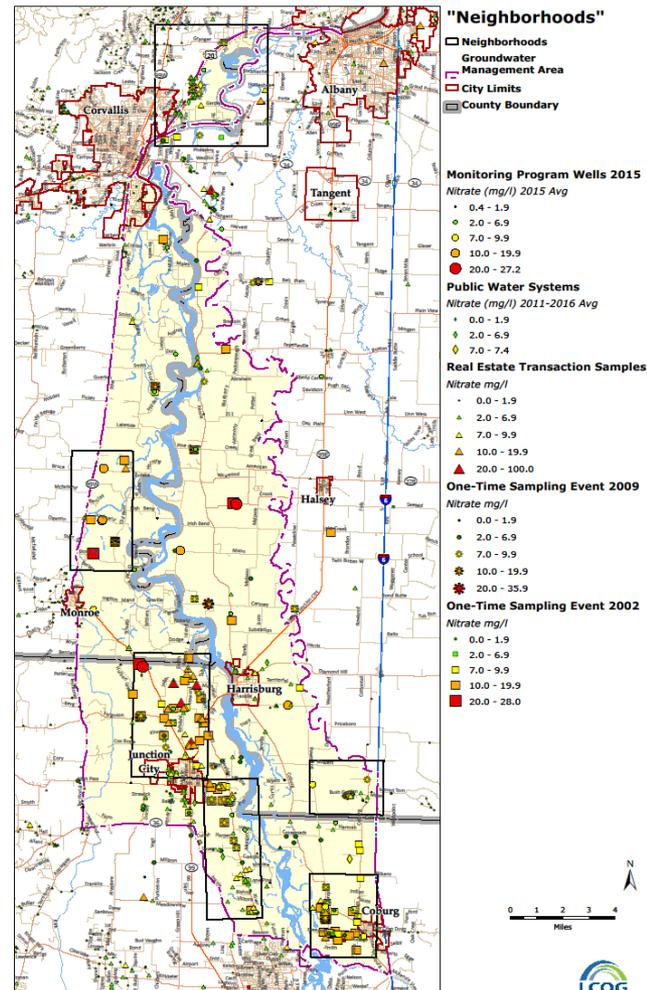
2014-2018



Southern Willamette Valley Groundwater Management Area

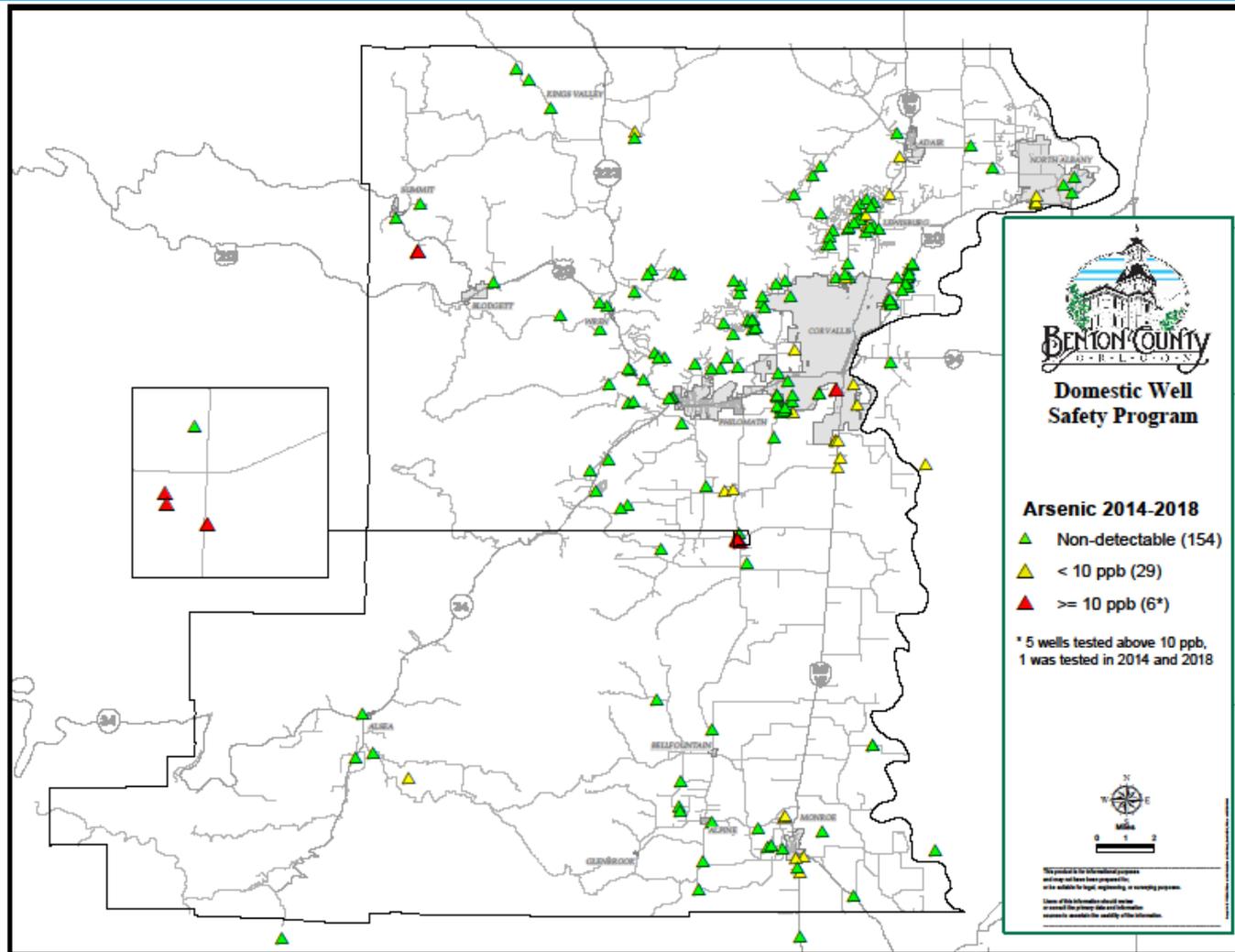


Southern Willamette Valley Groundwater Management Area

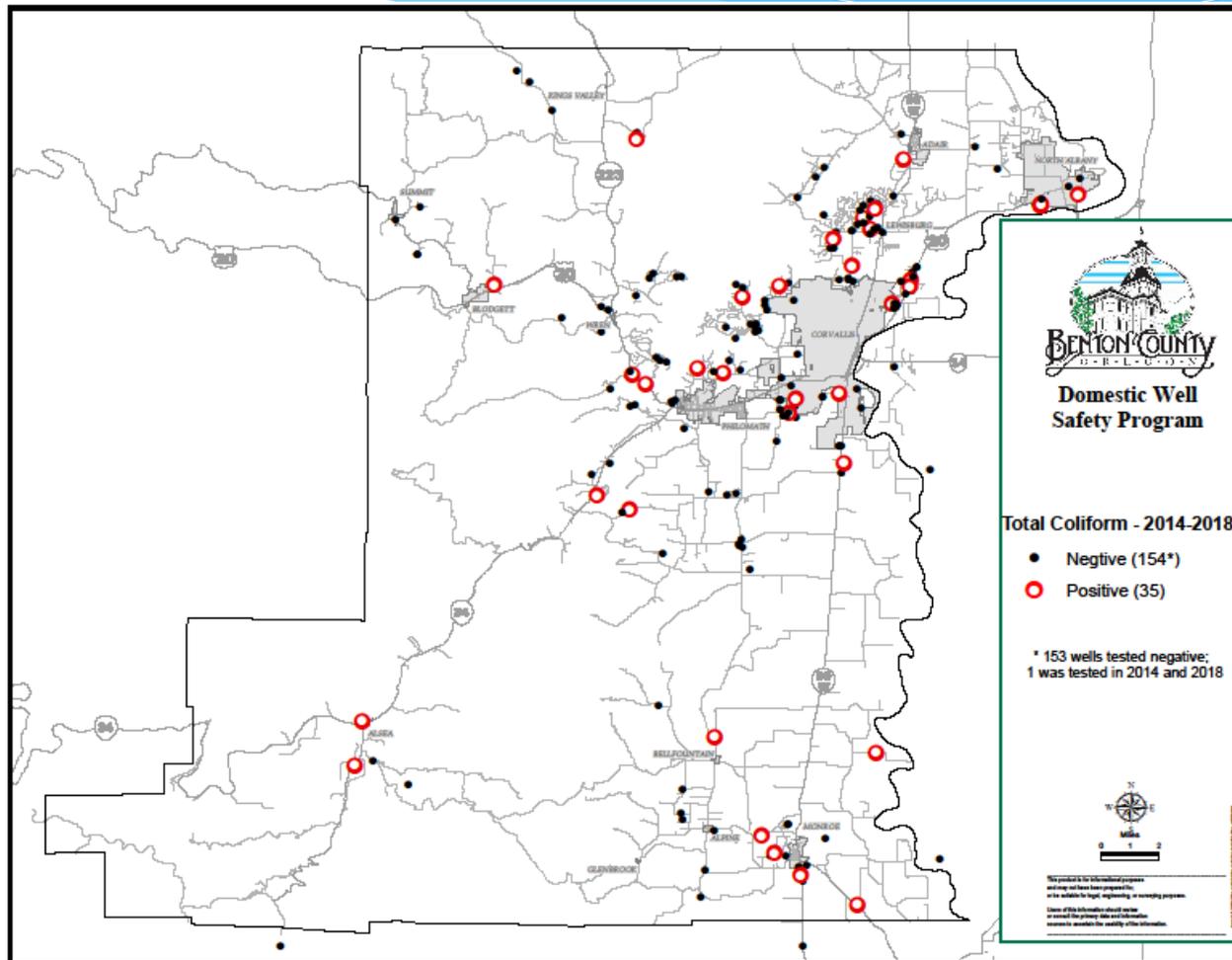


Wells with Arsenic Detected

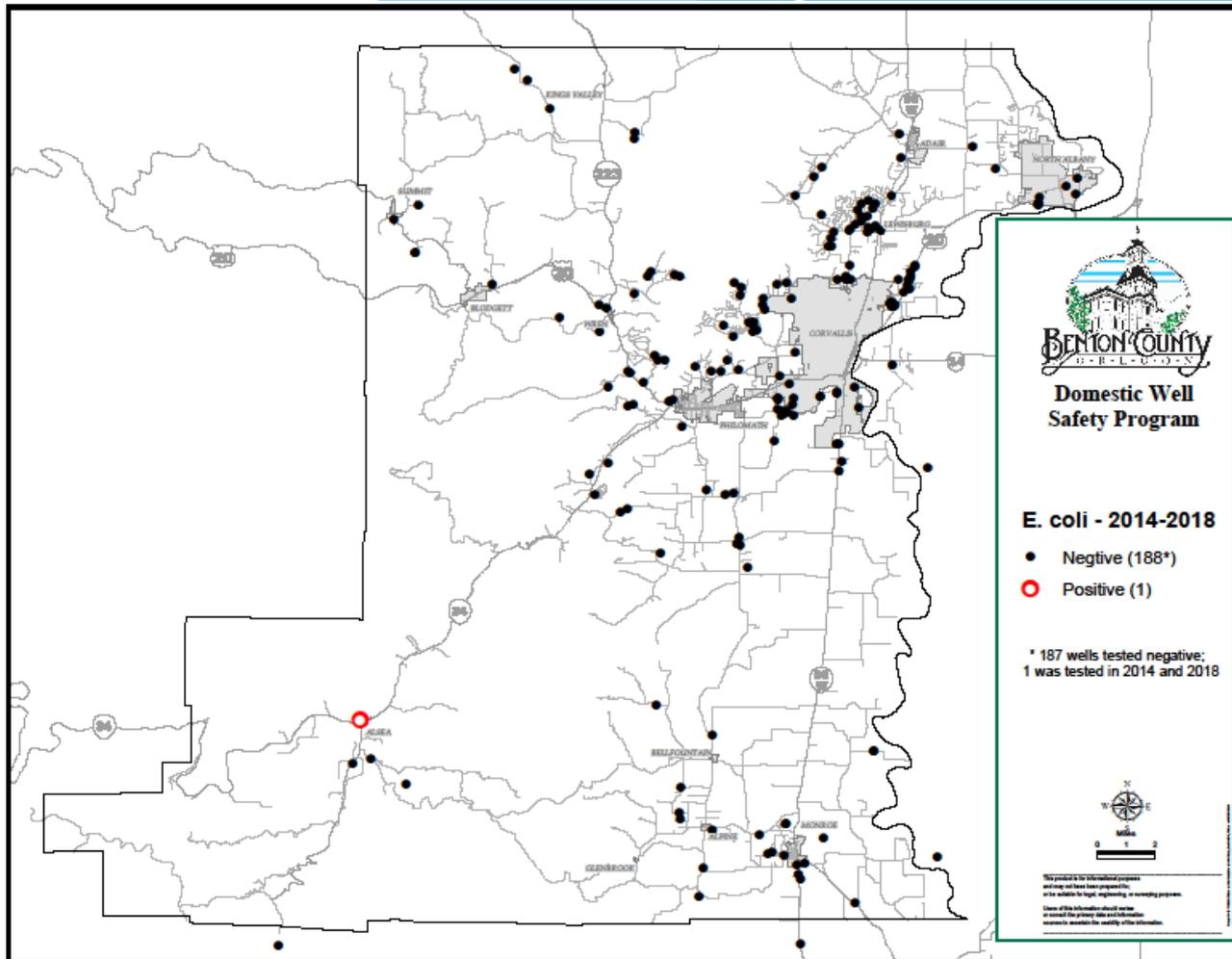
2014-2018



Wells positive for Total Coliforms 2014-2018



Wells Positive for E. coli 2014-2018



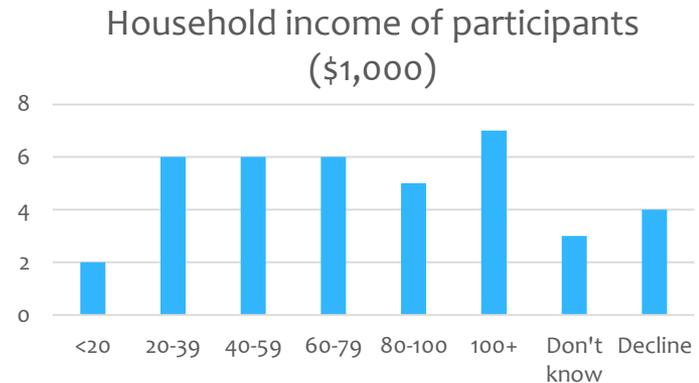
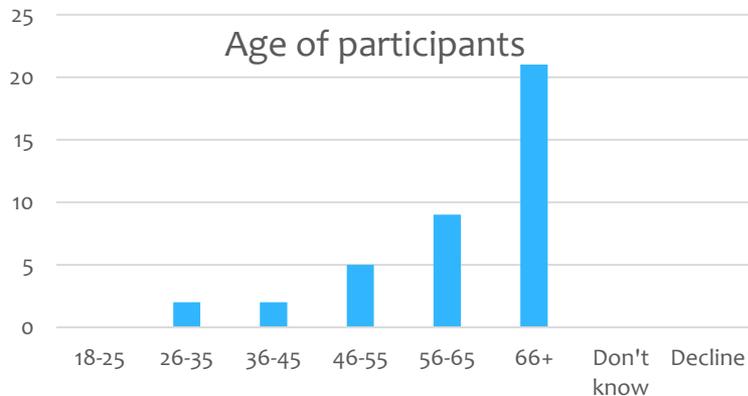
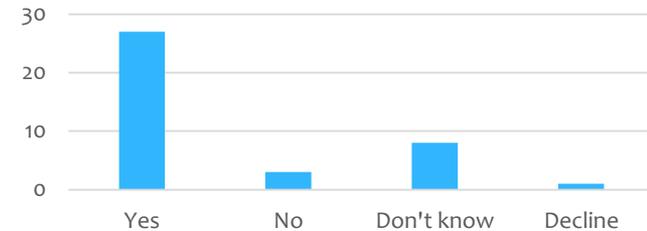
Overview of Well Data, 2014-2016

	2014	2015	2016	2018	Total
Arsenic detected	14 (16%)	11 (37%)	6 (20%)	3 (7.5%)	34 (18%)
Arsenic above MCL	4 (4.5%)	1 (3%)	0	1 (2.5%)	6 (3%)
% of As detects	4 /14 (28.6%)	1/11 (9.1%)	0	1/3 (33%)	6/34 (18%)
Nitrate detected	26 (29.2%)	5 (16.7%)	11 (36.7%)	16 (40%)	58 (31%)
Nitrate above MCL	3 (3%)	0 (0%)	2 (7%)	0	5 (3%)
% of Nitrate detects	3/26 (11.5%)	0 (0%)	2/11 (18.2%)	0	5/58 (9%)
Total coliforms present	13 (14.6%)	6 (20%)	9 (30%)	8 (20%)	36 (19%)
E. coli present	0	0	1 (3.3%)	0	1 (0.5%)
% of total coliform detects	0	0	1 (11.1%)	0	1/36 (3%)
Total wells tested	89	30	30	40	189

Demographic Targeted

- * Underserved populations of Benton County:
 - * Chronic medical hardships
 - * 65+ years old
 - * Rural geographical location
 - * Difficulty accessing health services
 - * Limited transportation
 - * Low annual income
 - * Food insecurity
 - * Limited English proficiency

Willing to share experience w/DWSP



Extrapolating Results Countywide

- * One estimate puts the number of domestic wells in Benton County at about 10,000. If true then approximately:
 - * 600 home have their wells contaminate with either arsenic or nitrate that exceeds the safe drinking water level.
 - * 50 home with E. coli contamination (indicator for human pathogen)
 - * Another 300 homes wells are contaminated with coliforms indicating contamination of some kind may be affecting their drinking water well (may or may not be a health hazard)

Recommendation

- * Testing as required under state law for real-estate transaction – Laws are weak and compliance is questionable.
- * Education of home owners at every opportunity to test:
 - * Annually for coliforms.
 - * Annually for nitrate. Twice a year (wet and dry season) if between 7 to 9.9 ppm
 - * At least once for arsenic. If present, routine monitoring at least every three years. Arsenic from human source tend to fluctuate while natural sources tend to remain constant.
 - * Proper well maintenance

For more information visit

- * Benton County Environmental Health Domestic Well Safety Website:
<https://www.co.benton.or.us/health/page/domestic-well-safety-program>
- * Oregon State University Well Water Program:
<http://wellwater.engr.oregonstate.edu/>
- * Oregon Health Authority Domestic Well Safety Website:
<https://www.oregon.gov/oha/PH/HEALTHYENVIRONMENT/S/DRINKINGWATER/SOURCEWATER/DOMESTICWELLSAFETY/Pages/index.aspx>



Questions?