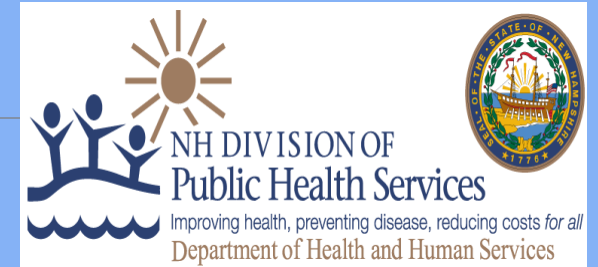


Private Wells

Know Your Water

BOW DRINKING WATER PROTECTION COMMITTEE

JULY 15, 2020



OVERVIEW

- ❖ Private Wells in New Hampshire and Bow
- ❖ Common Contaminants
- ❖ Testing
- ❖ Treatment
- ❖ Questions

1 - The Rundown on Private Wells

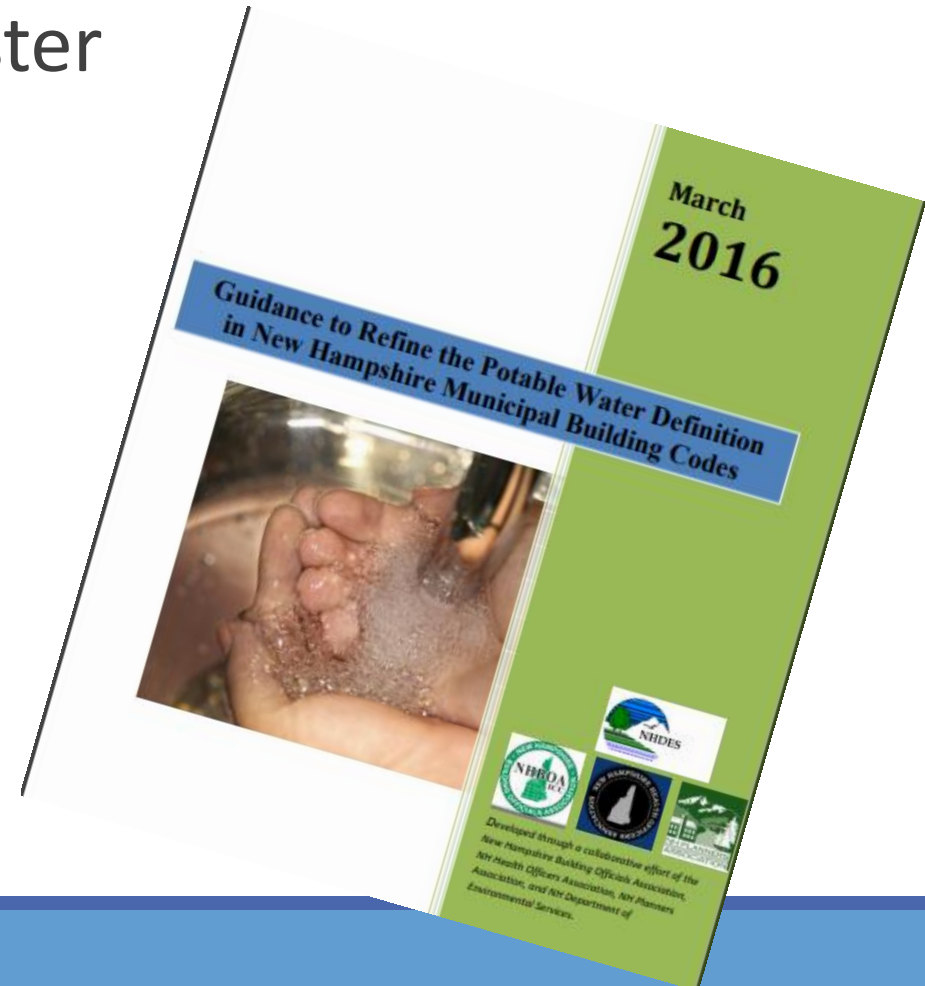
- Private wells serve half (46%) of New Hampshire's population and about 90% of Bow residents.
- There are no uniform testing or treatment requirements for private wells.
- Federal and state drinking water standards are not enforced for private wells.



Municipalities can Require Private Well Testing

Bow, Derry, Pelham, Salem, Windham, Chester

- Adopt 2016 guidance of “potable”
- Testing for Cert. of Occupancy
- Cite RSA 147:1 Public Health Authority
- Reference DES’ Standard Analysis + Radon
- Require testing pre and post treatment



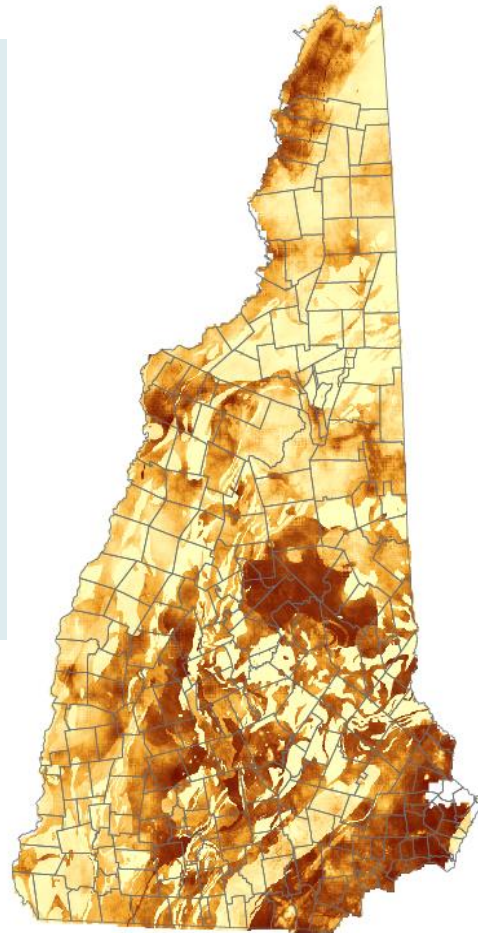
2 - Contaminants



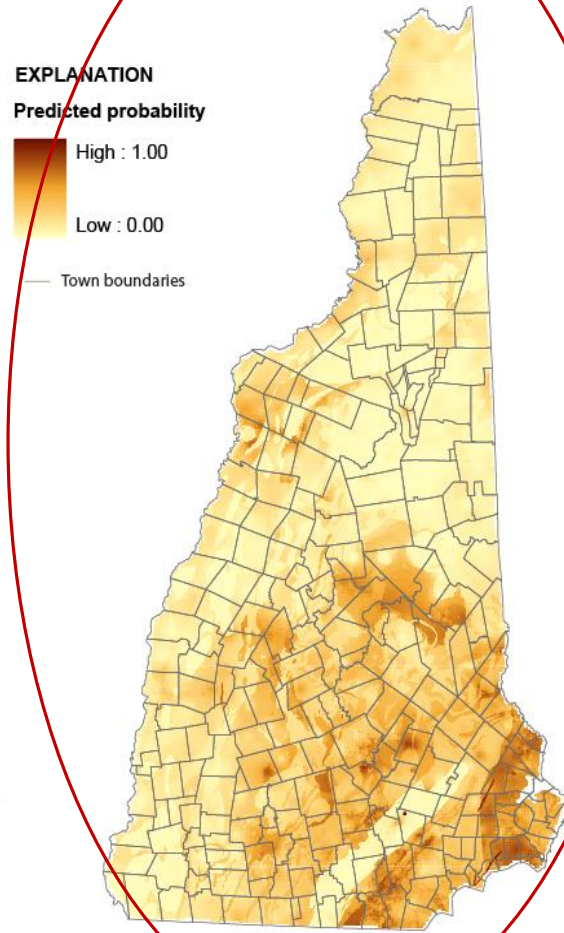
Contaminants
can be both
naturally occurring
and/or
human caused

Probability of Arsenic in New Hampshire

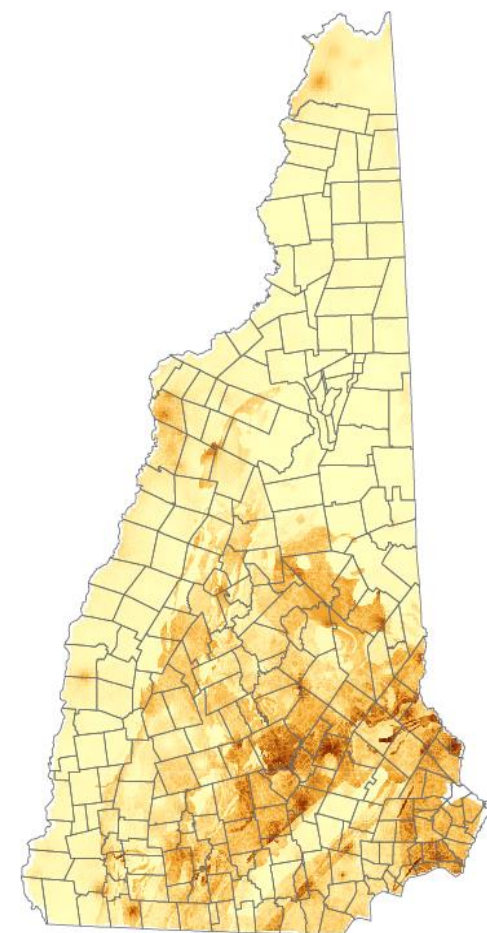
A. Arsenic ≥ 1 $\mu\text{g/L}$ model



B. Arsenic ≥ 5 $\mu\text{g/L}$ model



C. Arsenic ≥ 10 $\mu\text{g/L}$ model



EXPLANATION
Predicted probability
High : 1.00
Low : 0.00
— Town boundaries

0 20 40 60 MILES

Arsenic is an example of a naturally occurring contaminant

Health Impacts - Arsenic

Low dose, chronic, long term exposure to Arsenic in drinking water can lead to:

- Reproductive and developmental effects (mom/fetus)
- Cancers (bladder, skin, kidney, liver, prostate and lung)
- Vascular and cardiovascular disease
- Cognitive and neurological effects
- Diabetes and other metabolic disorders
- Neuropathy

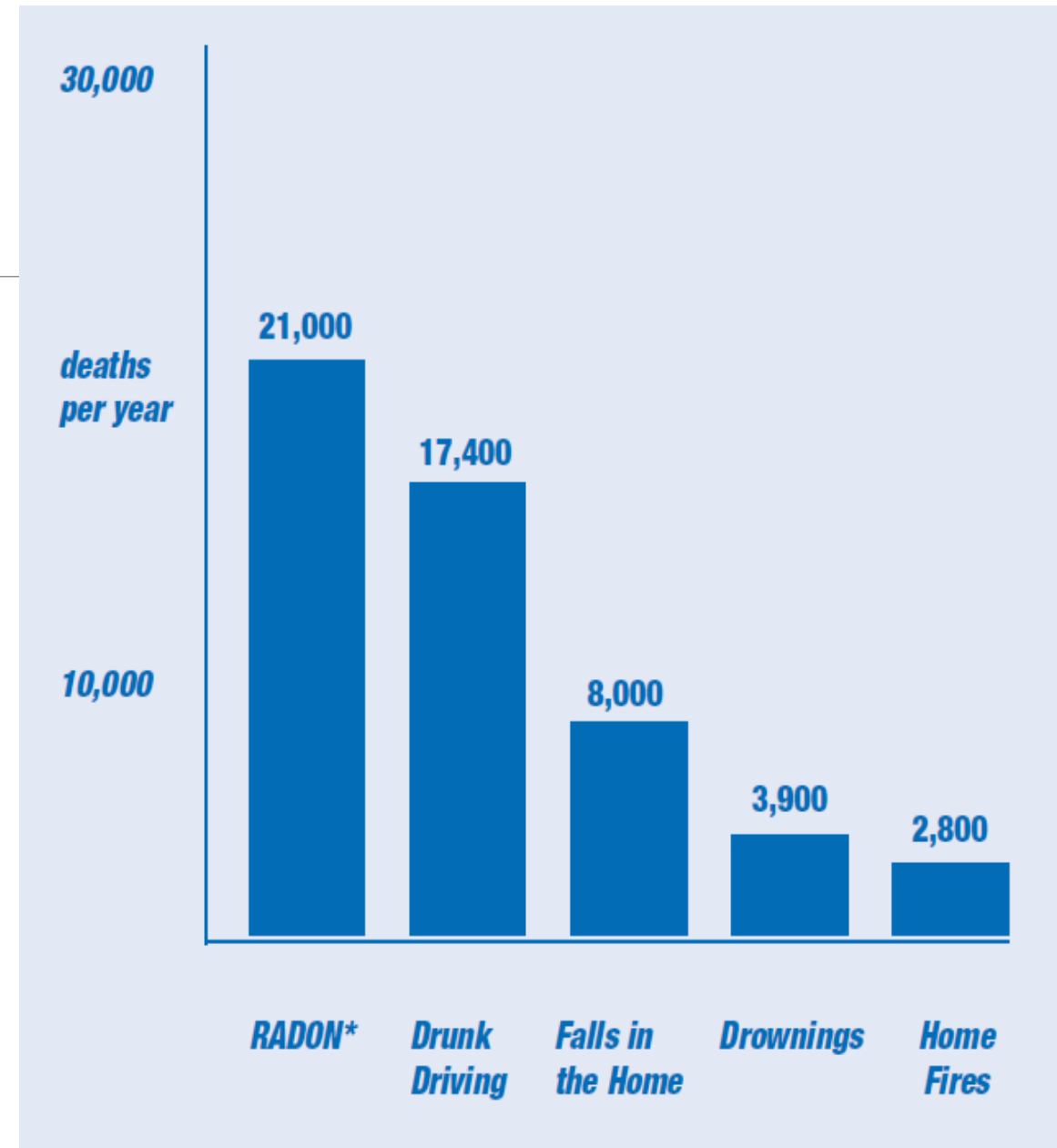
Hughes et al. (2011). "Arsenic Exposure and Toxicology: A Historical Perspective" *Toxicological Sci* 123(2): 305–332.

Health Impacts – Radon

Radon (air)

- 21,000 lung cancer deaths/yr in US
- 100 deaths/yr in NH

*Most of the risk from radon in water comes from breathing radon gas that is released into the air when water is used in the home.



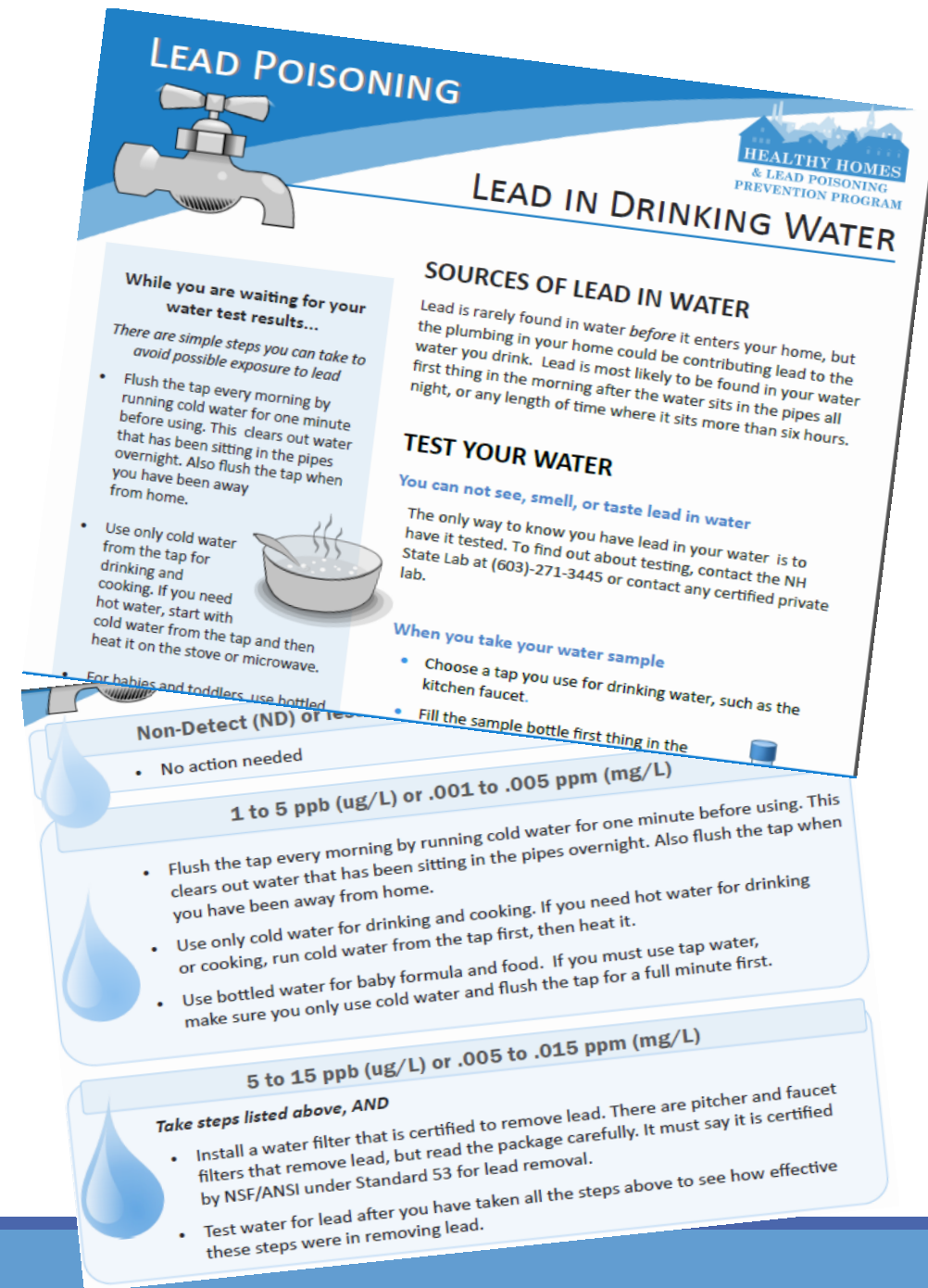
Lead – No Safe Level

HEALTH EFFECTS

Slowed body growth, lower IQ, reduced attention span, aggressiveness and behavior issues, premature birth, lower birth weight, delayed mental and physical development.

REDUCING EXPOSURE

- Flush your tap **every morning** before using water for consumption
- Use **alternate water for infants** and children if levels are 5 ppb or higher.
- Install a new **LOW-LEAD** faucet.



3 - Testing



What to Test

NH DES Standard Analysis

Test Every 3-5 Years

14 in the “Standard Analysis” package
including Uranium

Additional Tests for Private Wells

Volatile Organic Chemical including MTBE

Semivolatile Organics

Radiologicals – Radon, Gross Alpha

NHDES recommends having the following tests done every 3 to 5 years, except for bacteria and nitrate, which are recommended annually.

Standard Analysis

Arsenic	Lead
Bacteria	Manganese
Chloride	Nitrate/Nitrite
Copper	pH
Fluoride	Sodium
Hardness	Uranium*
Iron	

Radiological Analysis

Analytical Gross Alpha
Radon
Uranium*

Volatile Organic Compounds (VOCs)

*Please note: Uranium is part of both the standard and radiological analysis for the State of NH Lab.

Where to test

Accredited Testing Laboratories

OneStop - Home Owner Container Request

Home Testing Guide Suggested Water Quality Testing Fact Sheet DES Lab Contact

Fill in the information for ALL items in RED. If any test is "OTHER", please provide an explanation. When completed, click the SUBMIT button. To clear the form, click the RESET button.

Submit Reset

Name:

Address:

Town:

Phone:

First Test: Standard Analysis

Second Test: Optional

Third Test: Optional

State: Zip Code:

of Kits: 1 Max. 10

of Kits: Max. 10

of Kits: Max. 10

Other:

Other:

Other:

New Hampshire Department of Environmental Services | PO Box 95 | 29 Hazen Drive | Concord, NH 03303-0095
603.271.2955 | TDD Access: Relay NH 1.800.735.2964 | Hours: M-F, 9am-4pm

WI.gov | privacy policy | accessibility policy

The Department of Environmental Services is dedicated to making more environmental information more readily available to more people while maintaining user confidence in the information. The information is the best available according to the procedures and standards of each of the contributing programs and is regularly maintained. The information is periodically being updated to respond to user needs. As a result, the system may not always provide access to all existing information, and it may occasionally contain operational inaccuracies. The Department information is clear and understandable only for a variety of users. We can not be responsible, however, for the misuse or misinterpretation of the information presented by this system.

Table 1
Accredited Labs Providing Well Water Quality Testing Services
in New Hampshire and Neighboring States¹

LABORATORY NAME	TELEPHONE	ADDRESS	TOWN	STATE	WEBSITE
ABSOLUTE RESOURCE ASSOCIATES LLC	(603) 436-2001	124 HERITAGE AVE	PORTSMOUTH	NH	WWW.ABSOLUTERESOURCEASSOCIATES.COM
AQUARIAN ANALYTICAL INC	(603) 783-9097	153 WEST RD	CANTERBURY	NH	WWW.AQUARIANLABS.COM
CHEMSERVE INC	(603) 673-5440	317 ELM ST	MILFORD	NH	WWW.CHEMSERVELAB.COM
ENDYNE INC	(603) 678-4891	56 ETNA ROAD	LEBANON	NH	WWW.ENDYNELABS.COM
ENDYNE INC	(802) 879-4333	160 JAMES BROWN DR	WILLISTON	VT	WWW.ENDYNELABS.COM
GRANITE STATE ANALYTICAL SERVICES LLC	(603) 432-3044	22 MANCHESTER RD, UNIT 2	DERRY	NH	WWW.GRANITESTATEANALYTICAL.COM
NELSON ANALYTICAL LLC	(603) 622-0200	490 E INDUSTRIAL PARK DRIVE	MANCHESTER	NH	WWW.NELSONANALYTICAL.COM
NEW ENGLAND RADON LTD	(603) 893-4260	11 A INDUSTRIAL WAY UNIT 3	SALEM	NH	WWW.NEWENGLANDRADON.COM
NH DHHS PUBLIC HEALTH LABORATORIES	(603) 271-3445	29 HAZEN DR	CONCORD	NH	http://des.nh.gov/organization/commissioner/lsu/index.htm
SEACOAST ANALYTICAL SERVICES	(603) 868-1457	72 PINKHAM RD	LEE	NH	SEACOASTANALYTICAL.COM
NELSON ANALYTICAL LLC	(207) 467-3478	120 YORK STREET	KENNEBUNK	ME	WWW.NELSONANALYTICAL.COM
EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL	(717) 656-2300	2425 NEW HOLLAND PIKE	LANCASTER	PA	WWW.LANCASTERLABSENV.COM
NATIONAL TESTING LABORATORIES	(800) 458-3330	556 SOUTH MANSFIELD ST	YPSILANTI	MI	WWW.NTLABS.COM

Private Wells With Contaminants Above Limit or Advisory

PARAMETER		Percent Exceeding Standard or Advisory	
	Standard	STATEWIDE (2016)	BOW (2015-2018)
Arsenic	10 / 5 ppb	20%	42 / 57%
Bacteria	Absent	19%	21%
Lead (stagnant)	15 ppb	15%	8%
Lead (flushed)	5 ppb	2%	3%
Radon	4,000 / 10,000 pCi/L	24%	27% / 18%
Uranium	30 ppb	~10%	6%
Manganese	0.05 mg/L	40%	24%

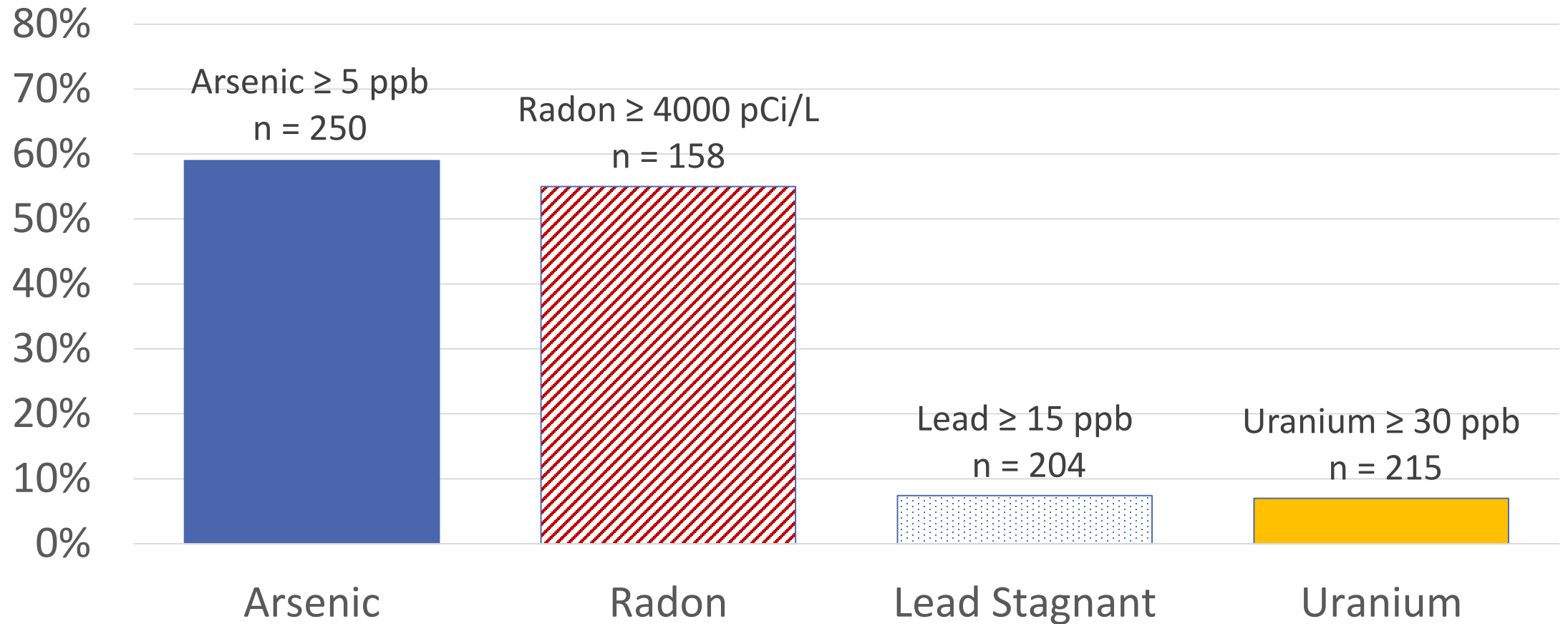
Bow Private Well Data 2015-2019

Parameter	units	Standard	Average	Median	Maximum	Count	% Above
Arsenic	ppb	5	18.1	7.6	176	250	59 %
Lead Stagnant	ppb	15	10.4	1.3	482	204	7 %
Lead Flushed	ppb	5*	1.4	<1	171	211	3 %
Manganese	ppm	0.05	0.12	<0.01	3.3	215	26 %
Radon	pCi/L	4,000*	11,080	5,235	99,275	158	55 %
		10,000*	--	--	--	--	32 %
Uranium	ppb	30	8	2	210	215	7 %

* Recommended guideline

Bow Private Well Testing, 2015-2019

State of New Hampshire Laboratory, Jan 2015 to July 2019



4 - Treatment



Dartmouth's Private Well Survey (2014) revealed that **1 IN 4** people did not understand their lab report, and **1 IN 3** did not know what actions to take.



Point of Use (POU) Water Treatment

Treats water at a single tap:



Contaminants treated at Point of Use include:

- Arsenic
- Uranium
- Gross Alpha
- Taste
- PFAS

Whole-House Water Treatment

Treats all the water entering the house



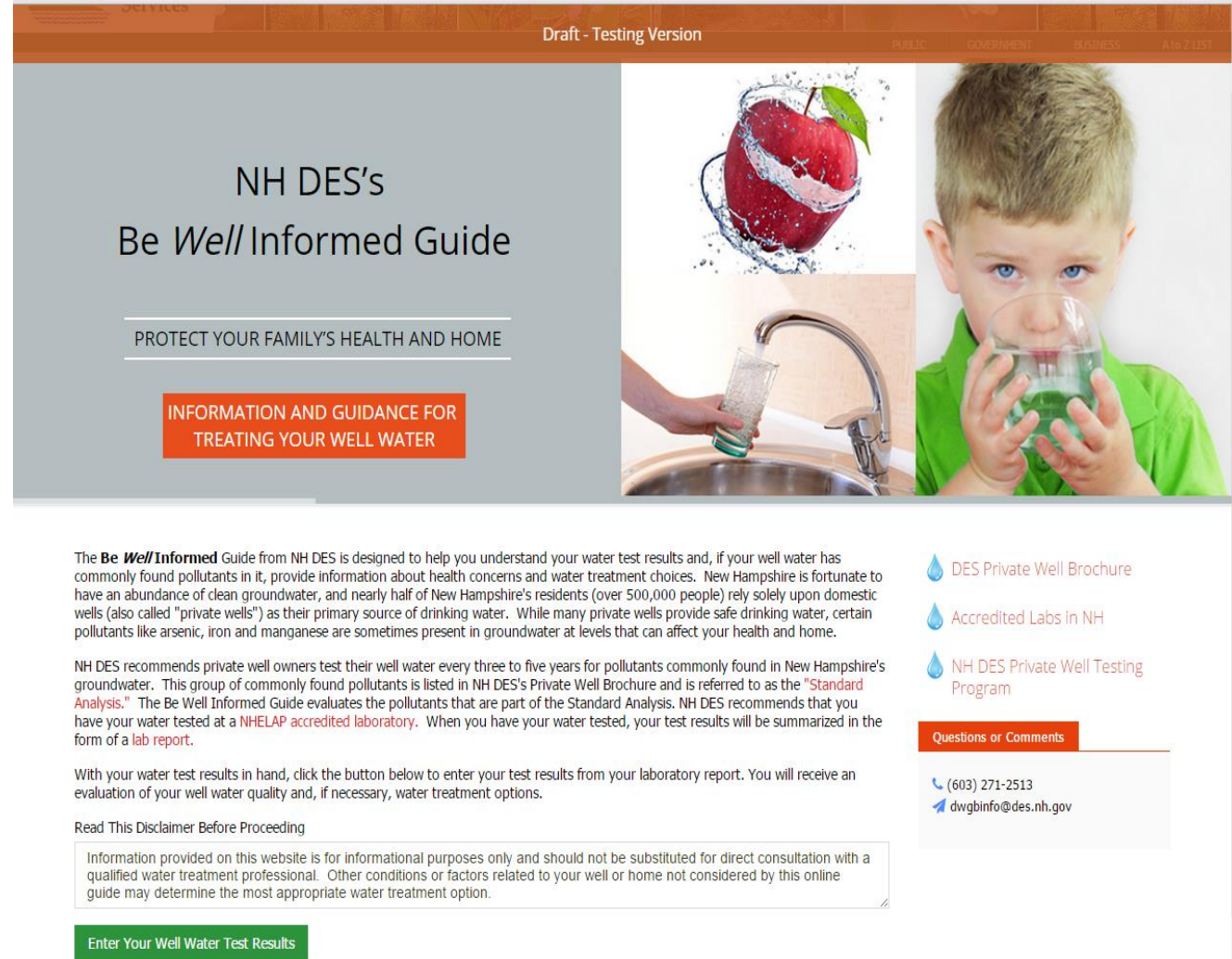
Whole House treatment is used for:

- Radon
- Staining - Iron, Manganese
- Corrosivity – Lead, Copper
- Odor - Sulfide
- Scaling- Hardness

NHDES Fields Many Private Well Treatment Questions by Phone and Email

Be *Well* Informed Web Tool

- Interprets your lab results
- Compares to water quality standards
- Recommends treatment steps for multiple contaminants
- Lists health effects



The screenshot shows the homepage of the "Be Well Informed Guide" website. The header is orange with the text "Draft - Testing Version" and navigation links for "PUBLIC", "COMMUNITY", "BUSINESS", and "ABOUT". The main content area has a grey background with the title "NH DES's Be Well Informed Guide" and the subtitle "PROTECT YOUR FAMILY'S HEALTH AND HOME". Below this is an orange button that says "INFORMATION AND GUIDANCE FOR TREATING YOUR WELL WATER". To the right of the text are three images: a red apple with water splashing, a hand pouring water from a glass into a sink, and a young boy drinking from a glass. Below the main content area, there is a paragraph of text explaining the purpose of the guide, followed by a paragraph about testing recommendations. At the bottom, there is a green button that says "Enter Your Well Water Test Results". On the right side, there are three links with water drop icons: "DES Private Well Brochure", "Accredited Labs in NH", and "NH DES Private Well Testing Program". Below these links is a box labeled "Questions or Comments" with contact information: "(603) 271-2513" and "dwgbinfo@des.nh.gov".

Draft - Testing Version

NH DES's
Be *Well* Informed Guide

PROTECT YOUR FAMILY'S HEALTH AND HOME

INFORMATION AND GUIDANCE FOR
TREATING YOUR WELL WATER

The **Be *Well* Informed** Guide from NH DES is designed to help you understand your water test results and, if your well water has commonly found pollutants in it, provide information about health concerns and water treatment choices. New Hampshire is fortunate to have an abundance of clean groundwater, and nearly half of New Hampshire's residents (over 500,000 people) rely solely upon domestic wells (also called "private wells") as their primary source of drinking water. While many private wells provide safe drinking water, certain pollutants like arsenic, iron and manganese are sometimes present in groundwater at levels that can affect your health and home.

NH DES recommends private well owners test their well water every three to five years for pollutants commonly found in New Hampshire's groundwater. This group of commonly found pollutants is listed in NH DES's Private Well Brochure and is referred to as the "**Standard Analysis**." The Be Well Informed Guide evaluates the pollutants that are part of the Standard Analysis. NH DES recommends that you have your water tested at a **NHCLAP accredited laboratory**. When you have your water tested, your test results will be summarized in the form of a **lab report**.

With your water test results in hand, click the button below to enter your test results from your laboratory report. You will receive an evaluation of your well water quality and, if necessary, water treatment options.

Read This Disclaimer Before Proceeding

Information provided on this website is for informational purposes only and should not be substituted for direct consultation with a qualified water treatment professional. Other conditions or factors related to your well or home not considered by this online guide may determine the most appropriate water treatment option.

Enter Your Well Water Test Results

DES Private Well Brochure

Accredited Labs in NH

NH DES Private Well Testing Program

Questions or Comments

(603) 271-2513
dwgbinfo@des.nh.gov


Enter your lab
test results on
Be *Well* Informed

Parameter list is
the Standard
Analysis + Rads

Be sure to select
the correct units

**Please Read
Before You Continue**

- Your lab report may show that a certain pollutant was "Not Detected" in your water. This may be indicated in your report by a "ND" (Not Detected), "BD" (Below Detection), "BDL" (Below Detection Limit) or a less than symbol ("<") next to the result. In these cases, enter a "0" for that parameter.
- If your lab report doesn't show a test result for a certain pollutant, do not enter a zero; leave the box blank.
- Only enter numbers (not letters) for your test results unless otherwise noted. Do not add commas.

 Invalid Entry – Please try again

NH Town or City *

Anonymous

 Please Make A Selection

Routine Water Analysis

	Units		Units
Arsenic (As)	<input type="text" value=".009"/> mg/L	Lead (Pb)	<input type="text" value=".016"/> mg/L
Chloride (Cl)	<input type="text" value="251"/> mg/L	Lead, Stagnant (Pb)	<input type="text"/> mg/L
Copper (Cu)	<input type="text"/> mg/L	Manganese (Mn)	<input type="text"/> mg/L
Copper, Stagnant (Cu)	<input type="text"/> mg/L	Nitrate-N	<input type="text" value="11"/> mg/L
Fluoride (F)	<input type="text"/> mg/L	Nitrite-N	<input type="text" value="1.1"/> mg/L
Hardness as CaCO3	<input type="text"/> mg/L	pH	<input type="text"/> units
Iron (Fe)	<input type="text"/> mg/L	Sodium (Na)	<input type="text"/> mg/L

Bacteria

	Units
Total Coliform	<input type="text"/> CFU/100 mL
or choose	<input type="radio"/> Present <input type="radio"/> Absent
E. coli	<input type="text"/> CFU/100 mL
or choose	<input type="radio"/> Present <input type="radio"/> Absent

Radionuclides

	Units
Radon (Rn)	<input type="text"/> pCi/L
Uranium (U)	<input type="text"/> µg/L
Gross Alpha	<input type="text"/> pCi/L

Submit

Reset

Printable Report

Part 1: “Results Summary”

[Click Here To Start Over](#)



Results Summary

✔ Value entered meets the Drinking Water Limit.

⚠ Value entered is close to the Drinking Water Limit.

✘ Value entered exceeds the Drinking Water Limit.

🧪 Routine Analysis	✎ Water Test Value Entered	🚰 Drinking Water Contaminant Limit or Radon Advisory Level	? About Your Well Water?
✘ Arsenic	.011 mg/L	0.01 mg/L	The value entered exceeds the drinking water standard
✔ Iron	.2 mg/L	0.3 mg/L	The value entered meets the drinking water guideline
✘ Lead Stagnant	.15 mg/L	0.015 mg/L	The value entered exceeds the drinking water standard
✘ Manganese	400 mg/L	0.05 mg/L	The value entered exceeds the drinking water guideline
✘ Nitrite-N	2 mg/L	1 mg/L	The value entered exceeds the drinking water standard. YOUR WATER IS NOT SAFE FOR BABIES UNDER SIX MONTHS OLD TO CONSUME.

Part 2: Treatment “Train”

Recommended Water Treatment To Remove Arsenic, Lead Stagnant, Manganese

The following recommended water treatment is based on the water quality information you entered. [Details concerning water treatment are below.](#)

Treatment Order

Step 1



Whole House Oxidizing
Filter System

OR

Whole House Cation
Exchange Water
Softener

Step 2



Whole House Acid
Neutralizer System

Step 3



Point-of-Use (POU)
Arsenic Adsorption
Media Filter System

OR

Point-of-Use (POU)
Reverse Osmosis (RO)
System

Part 3: Interpretation, Health, Treatment

Results Detail

✔ Value entered meets the Drinking Water Limit. ✖ Value entered exceeds the Drinking Water Limit.
! Value entered is close to the Drinking Water Limit. ● A Value was Not Entered

🧪 Routine Analysis	📝 Water Test Value Entered	🚰 Drinking Water Contaminant Limit or Radon Advisory Level	? About Your Well Water?
✖ Arsenic	.011 mg/L	0.01 mg/L	The value entered exceeds the drinking water standard

Interpretation of Results:

Does my well water meet the drinking water standard for arsenic? No, your water does not meet federal and state drinking water standards as it contains more than 0.010 mg/L of arsenic.

Treatment Options:

How can I reduce the level of arsenic in my water? In addition to arsenic, your water contains more than 0.1 mg/L of iron and manganese, which must be considered in your system. Install one of the following water treatment systems to reduce the level of iron and manganese in your water:

1. An NSF/ANSI Standard 42 certified whole house oxidizing filter system that uses a catalytic oxidizing agent to reduce the level of iron and manganese. This type of system will also reduce the level of arsenic in your water, though by how much depends on the levels of iron, pH, and arsenic.

Health Concerns:

Can consuming water containing arsenic affect my health? Consuming water containing more than 0.010 mg/L of arsenic is associated with an increased risk of cancer of the skin, bladder, lungs, kidneys, nasal passages, liver, or prostate as well as diseases of the nerves, lungs, heart, and immune and endocrine (hormonal) systems. Your individual health risk depends on the amount of arsenic in your water, how much of the water you drink each day, and the number of years you drink the water. To reduce your exposure to arsenic in your well water, treat the water that you use for drinking and cooking to a level less than 0.010 mg/L. You can continue to use your water for washing food and dishes, brushing your teeth, bathing, showering, and for other uses.

Be *Well* Informed Summary

- ❖ Identifies treatment technologies, not products.
- ❖ Addresses multiple or single contaminants.
- ❖ Yields PDF report to save or print.
- ❖ Provides links and offers phone support from DES.
- ❖ Link provided on most lab reports or found via web search for “Be Well Informed”.
- ❖ Developed by NHDES and shared with other states via EPA portal.

Questions



Please contact us anytime at
Bowdrinkingwater@bownh.gov