Q & A's from Private Well RCAP/Sherborn Groundwater Protection Committee (GPC) webinar event held on January 25, 2022 (Q&A rev 6-14-22)

1. Do you recommend home testing kits?

No, as the inexpensive "home" water test kits do not have the proper sensitivity, specificity, and accuracy of what is required and that can be provided by a commercial drinking water testing lab. The Sherborn BOH requires private well testing to be done by a MassDEP certified lab at the time a homeowner well is first installed or later repaired.

2. And who do you recommend for well water testing?

All MassDEP certified labs are listed at the MassDEP website: https://www.mass.gov/certified-laboratories and a shorter list can be found on the Sherborn BOH website:

https://www.sherbornma.org/sites/g/files/vyhlif1201/f/uploads/water_testing_companies_2021-2022.pdf

3. What do you suggest an owner do if the test identifies one of the items you listed?

If any contaminants are reported at concentrations above the MA action levels, it is highly recommended that you address the problem right away.

An excellent resource in general on MA residential well issues can be found at the UMASS-Amherst website: https://ag.umass.edu/cafe/fact-sheets/well-water

Here you will find many detailed fact sheets on the most common well issues encountered in Massachusetts.

The MassDEP also has a good website devoted to resources for private wells, see: https://www.mass.gov/private-wells#:~:text=Private%20wells%20typically%20provide%20water,proper%20practices%20for%20safe%20water

If you have further questions on your properties well testing report, please contact the Sherborn BOH.

4. If you have a water softener, does it change anything about the way we sample?

No, it does not. You will still sample from your kitchen sink faucet. You may observe higher sodium concentrations at the kitchen faucet due to the salts automatically added to the water softener system, as compared to the raw untreated water coming into the house.

Please note that MassDEP has identified instances in Massachusetts where there appears to be a link between the use of water softening systems and the level of salts even in the raw water of wells near a softening system's discharge to ground.

5. Do labs test for pesticides?

First, by the term "pesticides" we are referring to a wide class of commercial products, including herbicides, insecticides, and fungicides. Although the manufacturers are trying to target specific insects or plants, most of these products have very broad spectrum and negative effects on all living organisms, including humans.

Depends on the lab. You will need to have a conversation with the lab before any samples are taken, so that you and the lab can agree what specific pesticides and parameters are to be tested for. They may be able to test for certain pesticides if you know what specific pesticide you are looking for.

Some further guidance from the MA DEP website: "*Circumstances relative to your well may require additional testing not described here. For instance, MassDEP does not recommend frequent testing for things like pesticides, herbicides, or synthetic organic compounds, mainly because of the high cost. However, such testing might be warranted if your water has elevated nitrite/nitrate concentrations or significant amounts of pesticide have been applied near the well. These less-routine tests may not be performed at all state certified laboratories."* See:

https://www.mass.gov/service-details/protect-your-family-a-guide-to-water-quality-testing-for-private-wells

Pesticide/herbicide use in areas with drinking water wells is discouraged for obvious reasons. There have been hundreds of various chemicals registered as active ingredients for pesticide use in Massachusetts and the country over the last several decades. Pesticides may degrade into different chemicals over time but the break-down products are not necessarily less toxic and may even be more toxic.

6. How do you determine if you have any treatment system on your well?

If you are unsure, a good start would be to look in your basement, where the outside water supply line first enters your house. You may see one or more associated tanks, filter cartridges, and perhaps some treatment additives supply lines to a tank. Look around also for your systems manuals and if the treatment hardware components have any serial numbers and names/model numbers. Many missing manuals can be downloaded online from the companies that produce the treatment devices and may be able to answer your initial questions. Another potential source of well treatment systems could be comments added to any home inspection reports you may have received at the time you purchased your property. Consult with a well professional if questions remain.

7. **What are the effects of hard water on plumbing and impacts on human health (positive and negative)? Also, information about hard water treatments (the options, their pros and cons).**

Hardness is caused by the amount of dissolved mineral content in water, generally made up of Calcium (Ca), Manganese (Mn), and Magnesium (Mg). More details can be found at: https://ag.umass.edu/cafe/fact-sheets/iron-manganese-in-private-drinking-water-wells

A mineral of particular concern is manganese. At higher levels, which may be signaled by a blackish tint to the water, it is a health concern. It is also hazardous if inhaled, such as in spray/steam from showers. The MA secondary (advisory) MCL for manganese is 0.05 mg/l (milligram/liter) which is also expressed as 50 ug/L (micrograms/liter).

Some minerals may be considered secondary contaminants because they affect taste or color but not health. For more information on Massachusetts drinking water quality and health standards see: https://www.mass.gov/guides/drinking-water-standards-and-guidelines

8. **Can automatic lawn sprinklers dry up nearby wells?**

Given the general size of most property lots in Sherborn (1, 2, 3 and/or greater than 3 acres in size) a reasonable amount (once a week or less) of lawn watering is probably not a great risk to nearby wells in most years of average precipitation amounts, in most areas of Sherborn. However, the Board of Health has received an increasing number of well replacement or well deepening applications over the years, due to yields of existing Sherborn wells declining. It is difficult to pinpoint the reasons but could be due to expanding land development –and thus water use—within the town. Furthermore, given the expected increase in frequency and duration of drought conditions in this area from predicted future climate change, water conservation measures should be considered now by everyone. Towns with public water supply wells in MA are now required to initiate water conservation steps and limit/ban lawn watering during declared drought periods.

Established vegetation (e.g., grass, shrubs, trees) does not need watering by homeowners. In fact, frequent watering promotes shallow roots, which renders the vegetation less drought resilient. Droughts may challenge vegetation but, since Sherborn residents are drawing from a shared groundwater resource, irrigation during times of droughts can reduce drinking/cooking/cleaning water availability.

Outdoor watering is most efficient if conducted between the hours of 5 pm and 9 am. Sunlight significantly increases evaporation, meaning that water that was intended to reach your lawn is lost instead to the air. Many area towns recommend outdoor watering between the hours of 5 am -7 am to maximize uptake and limit the amount of residual surface moisture, which can leave your plants susceptible to mold.

To reduce the need to irrigate lawns you can also mow your lawn less frequently, keeping the grass at a taller height (4-inch vs 3-inch), reduce the overall lawn area on your property, and plant more native shrubs and trees, use drip irrigation, and/or use a rain barrel to collect water

from your house roof for plant watering. More background information "Water Conservation for MA Residents" at: https://www.mass.gov/guides/water-conservation-for-ma-residents

9. **My bacteria count came back quite high (160K cfu/100mL). Wondering if that's a result of the very wet summer we had or another factor. Have others experienced this? Nothing has changed with my well. Head is sealed properly, haven't opened it. Thanks!**

Bacteria in drinking water should be completely absent. This past 2021 summer's wet weather did see a larger number of bacterial issues in Sherborn resident wells. Most common source of bacteria in well systems are from air or water leaks somewhere in the system. Excellent additional information on these issues can be found at:

https://ag.umass.edu/cafe/fact-sheets/bacteria-in-private-drinking-water-wells

10. **Polymer tubing seems to be increasingly common (to move water from a well to a house) and I recall that BPA (Bisphenol A) and other plastic/rubber constituents had been found to be leaching into the supplied water. European countries are considering banning PVC from use with drinking water. Do you have recommendations for preferred compositions of piping or tubing used in private wells (e.g., from the pump into the house)?**

There will hopefully be updates in the future as science is further explored by federal and state regulatory authorities as to the pros/cons of various water piping materials. Choice of piping materials is dictated by state building codes.

11. **We see seasonal (in summer) brown deposits on the walls of the toilet tank. Should we be worried?**

This deposit is most likely iron oxide and/or manganese that is naturally found in well water. It does not usually pose a health problem. It can cause laundry and water fixtures to stain brown. It sometimes settles out in toilet bowls and tanks. Whole-house particulate filters are recommended that will remove the iron oxide particles from well water first entering the house.

See also question # 7. Further information can be found here:

https://ag.umass.edu/cafe/fact-sheets/iron-manganese-in-private-drinking-water-wells

12. **Please define toxins for septic systems in more detail?**

Some common household disinfectants and antibiotic pharmaceuticals are toxic to the natural bacteria that are needed for, and live in, your septic system to properly function and breakdown the wastes and solids. These deleterious toxins can enter the septic system through materials rinsed into sinks, drains, and toilets. Unused or expired over the counter and all prescription medicines ***should not*** be disposed in the sink/toilet, but rather brought to the Sherborn Police station for their special prescription drug disposal bin or disposed with your trash. Large amounts of undiluted cleaning agents like bleach should not be disposed of through drains or

toilets. Small volumes of dilute bleach solutions used for cleaning and disinfecting may be OK but should be limited in the amounts and frequency of disposal to the septic system. Please also remember no paints (oil or water-based) or anything else you would care not to eventually drink!

13. Can you talk about cesspools?

A cesspool is an older obsolete system for disposing of septic waste. It consists of a bottomless and/or perforated sides buried stone, concrete or steel tank/pit that receives solid and liquid waste from the home. Unlike modern septic systems, there is no mechanism for treating the wastes (no settling in a septic tank, no leach field). The liquids leak out the bottom and often sides of the cesspool and solids accumulate until the system eventually fails. Cesspools do not meet MA Title V regulations and are no longer permitted for new construction and existing cesspools are being phased out under Sherborn Board of Health regulations and replaced with modern septic systems (with an approved septic tank and leach field). If your property still has a cesspool please test the quality of your well water regularly.

For more information: https://www.epa.gov/septic/septicsmart-homeowners

14. Do you think elevated nitrates in your water could be due to a well that is 800 feet deep? I guess it could be getting nitrates from more shallow bedrock fractures…"

Contamination can happen in wells of any depth. Nitrates above background levels in drinking water wells are most caused by nearby and malfunctioning septic systems and should be a cause for great concern by the homeowner. Adjacent agriculture and homeowner activities (animal manure, fertilizer applications/storage) also can be a nitrate source to consider. More important details can be found here: https://ag.umass.edu/cafe/fact-sheets/nitrate-nitrite-in-private-drinking-water-wells

15. How do you chlorinate your well?

The task of well disinfection via chlorination should be performed by a well professional and followed by re-testing for bacteria. Improper chemical treatment can damage well components or pose water quality risks. The MassDEP "Private Well Guidelines" publication has a section on "Disinfection" starting on page 68 of the guide available at:

https://www.mass.gov/doc/private-well-guidelines/download

MassDEP also has a procedure for doing this if your well head has been potentially contaminated by being submerged by recent flooding, see:

https://www.mass.gov/service-details/recommendations-for-private-wells-inundated-by-flooding

Related information can also be found at: https://ag.umass.edu/cafe/fact-sheets/bacteria-in-private-drinking-water-wells

16. If you are overdue (15+ years) for a full testing, should you do it now (Feb 2022) or wait until August 2022?

Yes, you are way overdue! You could test right now and possibly re-test for just Total Coliform in the summer for a more representative bacteria result when conditions (warmer temperatures) are more conducive to bacterial issues appearing. But please do test your well soon!

17. If your well is found to have coliform bacteria, how would you recommend remediation? I've read (and done) the bleach treatment, but I've read that might not be the best option. Also, this assumes we've identified the root cause.... thanks!

See answer above on related question # 15, and the web references provided.

Any sign of bacterial contamination in your well may warrant a discussion with a professional well contractor.

18. We had a borderline reading on radon in our water; I believe it was 18. Our air reading was about 2. How serious a health threat is a high radon in water reading? Can radon levels change year to year?

Massachusetts geology does cause at times elevated levels of radon in well water and home air, particularly the air in basements for homes in our area. Radon levels can change over time. Please read a very informative fact sheet at: https://ag.umass.edu/cafe/fact-sheets/radon-in-private-drinking-water-wells

Radon occurs naturally in Massachusetts. It is a radioactive, colorless, odorless, and tasteless gas. The major health concern for radon is from breathing elevated amounts in the air, which can cause lung cancer. Although, there is a slight risk associated with ingesting water with elevated levels of radon, the primary concern is release of radon from normal water use, particularly from showering when the radon may become aerosolized into indoor air. The first step is to arrange to test your house indoor air for radon. The treatment options for radon in water are aeration and the use of granular activated carbon filters.

Radon standard in water is 10,000 pCi/L. It can be a health hazard when showering with waters above this level. The U.S. Environmental Protection Agency (EPA) has set an advisory "action level" of 4 pCi/L for radon gas in indoor air. While not a mandated health standard, this level is a guideline for people to use in assessing the seriousness of their exposure to airborne radon. Concentrations noticeably lower than 4 pCi/L are desirable, and are usually readily achieved with installing in the basement a radon mitigation vacuum pump system.

More information available from the MassDEP:

https://www.mass.gov/doc/radon-in-the-homes/download

19. May I ask how many methods are there I can use to locate my well? I have a well without visible well cap. So, I am not able to find the well's location. Who can I ask for help from? Thank you.

The metal/plastic pipe that enters your basement and connects to the water pressure tank will usually run in a straight line through the house foundation towards the location of the outside well, which is usually within 10 to 100 feet of the house. The well drilling plan approved and filed with the Sherborn Board of Health when the well and septic system were installed should clearly indicate the well location, so please contact the Sherborn BOH to see if their files have a copy of these plans. In case copies of the installation plans cannot be located, which is sometimes the case for older properties, a well professional service company can locate the well for a fee.

https://www.sherbornma.org/board-health

20. Are ground water flow maps available for Sherborn? If so, how do we access them?

Yes. The Sherborn Groundwater Protection Committee (GPC) website, at: https://www.sherbornma.org/groundwater-protection-commmittee

has posted copies of two past Town of Sherborn groundwater reports (2003 Woodard & Curran, 1989 Lycott Env), with some basic groundwater flow pattern the entire Town The more detailed 2003 report has a series of high resolution/large file size color maps that are not on the GPC website, due to file size. If interested, contact the GPC to obtain pdf copies of these maps, email address: gpc@sherbornma.org.

21. Is there any evidence of groundwater contamination near the transfer station and old Natick dump?

Yes, as all unlined municipal landfills ("dumps") leach contaminants into groundwater. The Towns of Sherborn and Natick are each required by the MassDEP to sample for contaminants on a regular basis from several groundwater monitoring wells installed around these two former landfill sites.

22. Have lawn chemicals been found in wells?

Although it is assumed that most wells are not tested for these chemicals, several households have reported finding such chemicals in their wells. Nitrogen compounds (nitrate/nitrite) in wells are not uncommon and can be related to septic effluent and lawn chemicals. It is advisable to test your well on an annual basis for nitrate/nitrite and coliform bacteria.

Anything we apply to our lawns and our properties has the chance of ending up eventually in our groundwater and drinking water wells. Please consider reducing/eliminating all use of pesticides, herbicides, and fertilizers on your Sherborn property.

23. Does the Sherborn Board of Health collect any data, perhaps volunteered by homeowners, about well water testing that has been done? A spatial map of nutrient levels in groundwater, e.g., nitrate, would be useful to put homeowner's tests in context.

The Sherborn Board of Health keeps a file folder of information for each property in Sherborn. These files include any associated well water testing results submitted to the BOH. No spatial mapping of water quality testing data from all these records in Sherborn has been done to date. Groundwater moves and is a dynamic system, so conditions may be expected to change over time. Also, the MassDEP regulates all 14 public water supply wells in Sherborn (Town and privately owned public wells) and requires at least annual testing. All public water supply testing results can be viewed online at:

https://eeaonline.eea.state.ma.us/portal#!/search/drinking-water

24. Can we share the Jan 25, 2022, recording with neighbors?

Yes, you can! A link is posted on the Groundwater Protection Committee website, and is listed again here:

https://www.youtube.com/watch?v=SYaIvi8bXrI

The video is almost two hours long, with the second hour being an interactive question and answer session. Additional related resources from the Jan 25 2022 event (copy of slide set, additional short well construction and well operation videos, plus this full set of written Q/A's with web-linked resources):
https://www.sherbornma.org/sites/g/files/vyhlif1201/f/uploads/for_gpc_webpage_-_jan_25_2022_well_water_workshop_resources.docx_2.pdf

25. We have a neighbor who is in the process of developing a new parcel and has been running his well nearly non-stop during daylight hours for the last six weeks apparently to clear some bacteria or similar problem, pumping probably more than 30,000 gallons of bedrock groundwater to waste. Does it seem prudent to establish some kind of cap on this type of action to avoid such wasteful practices in an area where neighbors rely on this shared resource for their own potable water?

Because this was the first time such action has been noted in Sherborn, the Board of Health is working to develop new regulations to address these types of issues.

26. Do you know how many residents in Sherborn have bedrock-based wells?

Currently there is not an exact tally of the various types of wells in Town, but the vast majority are bedrock wells since overburden supplies are limited and regulations have required bedrock wells for some time. However, the Groundwater Protection Committee has recently been awarded some federal ARPA funding for a specific 2-year project to determine and record the locations and details of all 1500+ residential wells in Sherborn (where records exist in Town files), and the types of well will be one of the many parameters documented. The project is expected to be completed by Dec 31, 2023.

27. Does the Sherborn BOH have well logs? Does the town require well logs and beginning when? Please give us the web address for access to the State well diggers records, to search for well logs.

Some, but not all Sherborn BOH property files have well drilling logs**.** There are a sub-set of Sherborn residential wells listed in the MassDEP online database, see:

https://eeaonline.eea.state.ma.us/portal#!/search/welldrilling/results?TownName=SHERBORN

See also answer to question # 26.

28. Could you also please explain how groundwater in bedrock fractures acts entirely different (travelling much faster) than typical overburden wells. The town observes a default protective radius for our private residential water supply wells - is that a one-size-fits-all approach where these wells are all set in rock?

See also answer to question # 29.

In Sherborn, the minimum setback of a septic system from a private well is 125 feet. If the well is downgradient (downhill) from the septic system, add 25 feet to the distance. If the percolation rate in the soil is fast, add 25 feet to the distance. Thus, we have 3 distances depending on circumstances, including possible minimum setbacks of 150 or 175 feet. The minimum protective radius for a public water supply (PWS) regulated by MassDEP is 100 feet, and can grow larger depending on pumping rates.

The complexity of bedrock conditions and dynamics make it impractical to develop customized setbacks for every situation. However, treating our land and septic systems with care is an effective method for maintaining good groundwater quality.

29. Could you address the difference in movement in a fracture compared with an overburden well? What are the issues to consider and how do they differ?

A fracture is more like an open pipe – it is a relatively unimpeded opening in the rock that would likely be filled with air if not water. Water moving through soil (the overburden) is slowed by the organic and mineral particles; sand slows it less, organic material can act like a sponge, and clay can stop it near completely. Private overburden wells are not currently permitted in Sherborn,

30. If your well has low refresh rate are there tradeoffs between fracking/drilling deeper? Ways to evaluate the success of each option?

Details of subsurface conditions are largely a mystery and the success of the different methods for increasing yield of a well is influenced by those conditions. In general terms: (i) fracking is more likely to introduce a number of problems (e.g., clogged fractures, contamination) or have a temporary effect; and (ii) drilling deeper is counting on intersecting with more fractures from which to draw water.

Consider installing a larger holding tank so that it can fill up slowly over time and then have a reserve for heavier draws (such as showering).

31. In the end, is the well/septic system a closed loop? Is the water we take out of our well into our bathtub and then it drains into our septic, does it replenish the groundwater? (In MWRA towns, they need to save water -- do we in a town where everyone has well/septic?)

While not a completely "closed loop", yes, the infiltration from our septic systems recharges our groundwater, and the quality of our groundwater/drinking water is impacted by what we dispose of in our septic systems and anywhere on our property. Quantity and quality of our groundwater is impacted by the amount of precipitation Sherborn receives, plus by the extent of evaporation, transpiration, the amount of water we and our neighbors are withdrawing, and the presence of any sources of contaminants. The most common sources of contamination to residential wells in Sherborn and nationwide are nearby septic systems. An excellent source of basic groundwater science and water cycle information can be found at: https://www.usgs.gov/special-topics/water-science-school/science/groundwater-information-topic

Bedrock fractures and flows, from which most homes draw their water, are nearly impossible or impractical to map and measure. Some uses are consumptive (e.g., evaporation). See also Q/A #8.

32. Can you speak more about PFAS? (Too complicated for this? Maybe a link?)

Very important question and timely topic. The GPC and BOH is staying abreast of PFAS concentrations now being found in our downtown Sherborn public water supplies, residential wells, surface waters, and nearby major PFAS sources (closed municipal landfills, septic systems, General Chemical/Framingham site, Course Brook, etc). Some excellent resources include MA DEP fact sheet:

https://www.mass.gov/doc/massdep-fact-sheet-pfas-in-drinking-water-questions-and-answers-for-consumers/download It lists many links to more MassDEP PFAS information resources.

Also, a very comprehensive national PFAS technical resource website: https://pfas-1.itrcweb.org/ It includes several informative videos and fact sheets.

Thank you for your questions!

For more questions on well maintenance please contact:

the Sherborn BOH:

health@sherbornma.org

508-651-7852

or the Sherborn Groundwater Protection Committee: **gpc@sherbornma.org**