To: Sherborn Select Board (Eric Johnson, SB Chair) **Date: 9-26-24**

From: Sherborn Groundwater Protection Committee (T Trainor, GPC Chair)

Subject: GPC Comments to the Select Board on our Sherborn Groundwater Quality Concerns – Nitrate and PFAS.

Summary

The Groundwater Protection Committee (GPC) has, over the past months, become increasingly concerned about the elevated levels of nitrate and PFAS in Sherborn's groundwater. Recent test results, ongoing conversations with experts at the MassDEP and USGS, and relevant publications from numerous agencies (MassDEP, USGS, US EPA, NH DES, NY DEC), all point to our existing septic systems, legacy cesspools, and areas of higher septic system density as significant factors in the ongoing contamination of the town's water supply.

Introduction

The co-location of drinking water wells and sub-surface waste management systems (septics, cesspools) has been widely recognized as a potential public health hazard for many decades (EPA 1984, ref 1). Most of the current local, state, and federal regulations and guidance in siting septic systems primarily focus on reducing the impact of biological (bacteria, virus, pathogens) contaminants on groundwater and drinking water, and tend to ignore chemical contaminants (both naturally occurring and synthetic organic chemicals) that are known to be present in septage.

Consequently, across many areas in MA and the country that rely on septic systems, the quality of nearby well water is becoming compromised. In addition to the risk of domestic wastewater impacting drinking water quality at the wells, we are increasingly aware of the lack of regular water quality testing and basic well maintenance by the average resident in Sherborn.

In addition to Sherborn's 1,500+ private wells and septic/cesspool systems, within Sherborn there are 14 "public water supply" wells (PWS) regulated by the MassDEP. The majority of these PWS wells were installed many decades ago and would probably not meet current MassDEP requirements in terms of adequately sized and protected wellhead zones. Most of our PWS may be compromised by septics/cesspools within the corresponding Zones 1, 2, and IWPA (Interim Wellhead Protection Areas).

We wish to share with you here some water quality testing data we have compiled on both private and public wells in Sherborn measuring two major contaminant threats – PFAS and nitrate. While the town's public wells have easily accessible, and publicly available testing data, unfortunately private wells in Sherborn are not required to conduct water quality testing except at the time of initial well installation. Hence the amount of testing data on private Sherborn wells is quite limited. We believe it is important to raise awareness of our groundwater quality concerns now to town boards, committees, staff, residents, and businesses.

Two Common Contaminants in Sherborn Groundwater

A. Nitrate (NO_3^-)

Nitrate is a common and naturally occurring ion (charged molecule) that can find its way into groundwater from three major sources in a semi-rural town like Sherborn: septic/cesspool

effluent, lawn fertilizer, and agricultural activities (crop fertilizer, animal manure). Nitrate is a component of the “nitrogen cycle” and is excreted by all animals. Absent any anthropogenic (human influenced) activities, studies in the continental 48-states by the US Geological Survey (USGS) predict general “background” levels of nitrate in undeveloped areas at a level of just under 0.1 mg/L (ppm) concentration in groundwater (see Figure 1, USGS 2003, reference 2).

Figure 1.

Nitrate – National Background Levels in Groundwater (USGS).

Nutrients in Shallow Ground Waters Beneath Relatively Undeveloped Areas in the Conterminous United States

By Bernard T. Nolan and Kerie J. Hitt

U.S. GEOLOGICAL SURVEY

Water-Resources Investigations Report 02–4289

NATIONAL WATER-QUALITY ASSESSMENT PROGRAM

Denver, Colorado
2003

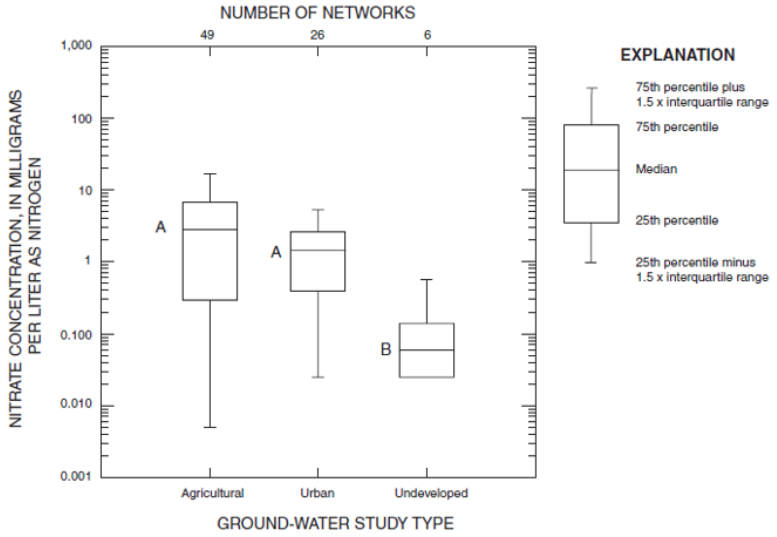


Figure 3. Relation between nitrate concentration in ground water and type of land-use study for National Water-Quality Assessment Program data collected during 1993–98. Box plots labeled with different letters (“A” and “B”) indicate statistically significant differences in nitrate concentration.

As shown in the above figure, the influence of urban land development typically leads to an increase in nitrate by 10X or more, to about 1.0 mg/L, and even higher in areas of heavy agriculture activities (mid-west US, approx. 3.0 mg/L).

Nitrate Health Impacts

The Sherborn BOH (for private wells) and the MassDEP (for public water supplies, PWS) regulations both utilize a maximum contaminant level (MCL) of 10 mg/L (equivalent to 10 ppm) for nitrate (NO3, which is also labeled as “nitrate-nitrogen” or NO3-N) for a concentration limit in potable drinking water. Please know that this 10 mg/L limit was first proposed in this country by the US EPA back in 1975 (five years after the agency was first formed). Continued health concerns have been raised by the medical community across the country since 1975 and have led many authorities to lobby for an updated and lower national nitrate drinking water MCL, with a limit of 5 mg/L nitrate suggested as far more protective of human health. Some towns in MA, including our neighbor Dover, now regulate private wells at the 5 mg/L nitrate concentration.

Additionally, medical professionals are now finding new troubling health concerns from even lower exposures of nitrate in drinking water, with peer-reviewed publications now identifying

water supplies with greater than 2 mg/L nitrate concentrations detrimental to human health (for one example see: "*Examining Relationships Between Groundwater Nitrate Concentrations in Drinking Water and Landscape Characteristics to Understand Health Risks"*, 2022, *GeoHealth*, Hamlin et al, https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2021GH000524 (reference 3).

The federal US EPA in 2017 began a new major assessment of the national nitrate in drinking water MCL. The overall objective of this ongoing assessment is to identify adverse health effects and characterize exposure-response relationships for nitrate and nitrite to support development of toxicity values. It is not yet known when the assessment will be completed, but it may be anticipated to result in a new and lower national MCL for nitrate in drinking water.

Nitrate in Sherborn Private Wells

In 2022 the GPC partnered with the non-profit RCAP Solutions (Worcester MA) to sample 41 private wells in Sherborn for 13 common contaminants/parameters, including nitrate, at no cost to the participating residents. A summary of the nitrate results is shown here in Table I:

Table I

Sherborn - RCAP Private Well Study - 2022, Nitrate only				
	mg/L, ppm			
Mean:	1.7		Range	mg/L, ppm
Std Dev:	1.3		Low	MDL, < 0.1
Median:	1.6		High	5.1
		Per Cent of Homes		
# < 1 ppm	13	31.7		
# > 1 and < 2 ppm	12	29.3		
# = or > 2 ppm	16	39.0		
Total:	41			

As shown, results ranged from below the method detection limit (0.1 mg/L) to a high of 5.1 mg/L nitrate. The latest health studies on nitrate drinking water exposure suggest effects at a concentration of 2 mg/L and higher (ref 3). For this small Sherborn sampling, 16 wells of the 41 tested, or 39%, were at the 2 mg/L or higher level. About 31.7% of the wells exhibited low nitrate impacts from human influences (<1 ppm), while 29.3 % showed some potential influence from septics (between 1 and 2 ppm). The mean (average) for the 42 wells was 1.7 ppm, again suggesting nitrate above background most likely from septic influence.

The RCAP study withheld from the GPC all the individual well location information, to keep the data completely anonymous. More details on this study, that showed 42% of the Sherborn private wells to have one or more parameters outside regulatory limits for public well supplies, are in the attached press release that was published in the local newspaper (Appendix 1, https://www.sherbornma.org/DocumentCenter/View/878/Sherborn-RCAP-Residential-Well-Testing-Results-January-3-2023-Press-Release-PDF?bidId=).

Nitrate in Sherborn Public Water Supply (PWS) Wells

PWS wells are regulated by MassDEP and require regular water quality testing. Frequency of the testing depends on the class of PWS well, and prior history and trends of test results for each specific PWS well, and is decided by the MassDEP. Testing results are posted at a public website and available for download at: https://eeaonline.eea.state.ma.us/portal#!/search/drinking-water . Nitrate values posted as of 9-2-24 for the 14 Sherborn PWS wells over the period covered by the MassDEP database, 1993 to 2024, are summarized in Table II:

Table II

	Sherborn PWS Wells - Nitrate Concentrations								
MassDEP						NITRATE RESULTS, mg/L, ppm			
PWS ID	PWS Name	Street #	Street Name	Class	Contamina	Last Sampling Date	Last sampling	Low	High
3269017	ANEMOTIA REALTY	27	North Main Street	NC	Nitrate	10/24/2023	1.83	0.09	3.26
3269032	FIELDS AT SHERBORN CONDO TRUST	247A	Washington Street	COM	Nitrate	08/14/2024	1.23	0.56	1.23
3269027	FISKE PROPERTY	20	North Main Street	NC	Nitrate	7/8/2024	1.29	0.7	5.1
3269024	Fireside Tavern	33	North Main Street	NC	Nitrate	07/08/2024	2.73	0.09	6.3
3269028	LELAND FARMS		Village Way	COM	Nitrate	04/01/2024	0.37	< 0.1	1.62
3269030	PILGRIM CHURCH	25	South Main Street	NTNC	Nitrate	07/08/2024	0.99	0.17	2.9
3269011	PINE HILL ELEMENTARY SCHOOL		Pine Hill Lane	NTNC	Nitrate	10/16/2023	0.69	0.08	1.1
3269031	SHERBORN CROSSING	19	North Main Street	NC	Nitrate	07/08/2024	1.7	1.7	8.96
3269026	SHERBORN MARKET	21	South Main Street	NC	Nitrate	11/06/2023	< 0.1	< 0.1	0.2
3269025	SHERBORN PLAZA	11	South Main Street	NC	Nitrate	07/08/2024	< 0.1	< 0.1	1.9
3269019	SHERBORN TOWN OFFICES; POLICE; LIBRARY	19	Washington Street	NTNC	Nitrate	10/16/2023	1.08	0.17	3.2
3269003	UNITARIAN UNIVERSALIST AREA CHURCH	11	Washington Street	NC	Nitrate	07/08/2024	1.61	0.119	4.03
3269002	WOODHAVEN ELDER HOUSING COMMITTEE		Village Way	COM	Nitrate	04/01/2024	0.4	0.1	1.4
3269029	MARYSTAR SPA AND SALON	24	North Main Street	NC	Nitrate	7/25/2018	1.52	0.04	3.36
	Legend:								
	> 5 mg/L Nitrate								
	> 2 mg/L Nitrate								
	NT = Not tested								
	ND = Not detected								
	Low/High - range of historical values (1993 to 2024, date ranges vary by PWS well).								

In terms of the most recent sampling results for each well, one PWS was above 2 ppm, and eight were above 1 ppm nitrate. Looking across all the historical testing results, three PWS were above 5 ppm nitrate, three were between 2 and 5 ppm, and five were between 1 and 2 ppm. Again, nitrate values above 1 ppm suggest influence from septics.

One concerning trend for the newest PWS well in Sherborn, at the 36-unit “Fields at Sherborn” property, is the increasing level of nitrate in just 4 years of existence, as shown in Table III (on next page):

Table III

Fields at Sherborn PWS	
Sampling Date	**Nitrate, mg/L**
7/16/2020	0.56
8/10/2021	0.92
8/4/2022	0.92
8/30/2023	1.05
8/14/2024	1.23

Septic systems meeting MA Title V can be anticipated to produce on a continual basis effluent at about 35 mg/L nitrate concentrations. This level creates a large plume, which migrates with groundwater flow laterally and vertically from the leach field into the surrounding groundwater, raising the nitrate levels over a wide area (Cape Cod Commission, 1992, https://www.capecodcommission.org/resource-library/file/?url=/dept/commission/team/Website_Resources/regulatory/NitrogenLoadTechbulletin.pdf , ref 4).

B. PFAS

PFAS in Sherborn Private Wells

MassDEP, concerned by the growing number of public and private wells found to be contaminated by PFAS (Per- and Poly-Fluorinated Alkyl Substances) across the country in recent years, provided in 2021-22 a free MA residential well PFAS testing program. All MA towns with 60% or greater per cent of the populations on private wells were offered free PFAS testing. In Sherborn, 34 property owners availed themselves of the program. A final 79-page report was issued in late 2023 (MassDEP PFAS state-wide PWS and private well testing results: https://www.mass.gov/doc/massdep-free-pfas-analysis-program-final-report/download , ref 5).

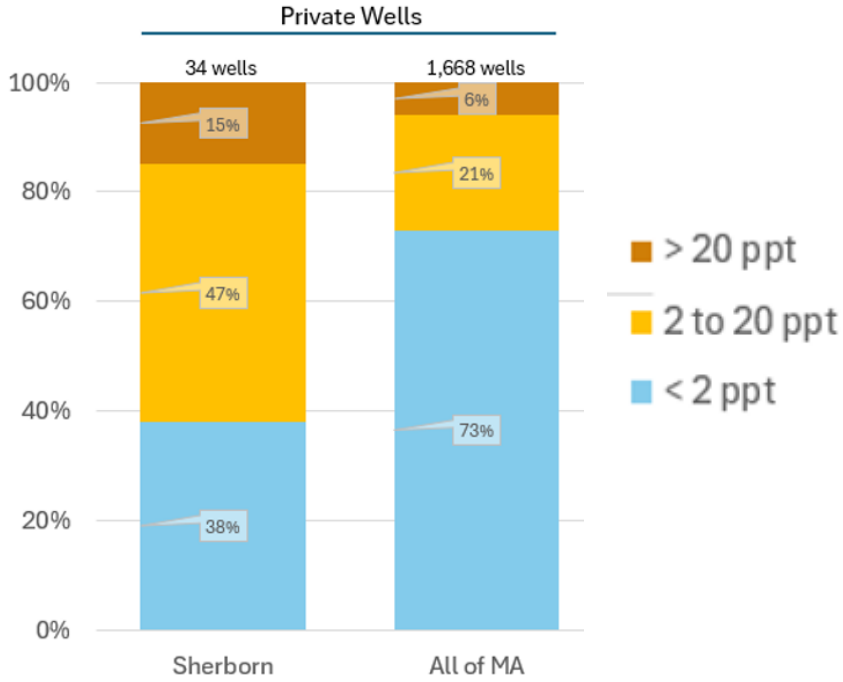
Sherborn results from the study are summarized in Table IV:

Table IV – MA PFAS6 Concentrations, Sherborn Homes:

	# of Sherborn Homes:	
ND, < 2 ppt	13	38%
> 2 but <10 ppt:	13	38%
>10 but < 20 ppt	3	10%
> 20 ppt	5	15%
Totals:	34	1.01

Five properties were above the current MassDEP MCL for PFAS6 (20 ppt, sum of six specific PFAS chemicals), and 21 properties had detectable amounts (> 2 ppt) of PFAS6. A comparison of Sherborn results to that for all the private wells sampled in MA under this study (1,668 private wells) revealed the breakdown depicted in Figure 2:

Figure 2 – Comparison of Sherborn to MA-wide PFAS6 Concentrations in Private Wells:



Sherborn, unfortunately, showed a larger percentage of private wells above the 20 ppt MCL (15%) vs the state-wide value (6%). Moreover, Sherborn showed a larger percentage of private wells at the 2 to 20 ppt level (47%) vs state-wide (21%), and a much lower percentage of private wells with non-detectable PFAS6 (38%) vs state-wide (73%).

Since this MassDEP residential well PFAS study was conducted, the US EPA has proposed a new set of PFAS limits in public drinking water supplies in early 2024. All states are required to adopt these new and lower MCL's. **The new EPA MCL for two of the most common PFAS constituents, PFOA and PFOS, are now each at the 4 ppt (4 ng/L) concentration.** For the 34 Sherborn private wells, 11 exhibited levels of PFOA and/or PFOS at 4 ppt or higher, which represents 32% of the Sherborn wells tested.

In the case of this MassDEP PFAS study, the Sherborn BOH was provided the actual well locations and full lab reports. One member of the GPC was permitted to review the information. An initial observation when mapping the various well locations was that 8 of 11 wells that had PFOA and/or PFOS > 4 ppt were located within the more densely developed section of Sherborn, in the zoning district RA (1-acre min lot size), see Table V.

Table V – Sherborn Results, MassDEP private well PFAS testing.

	Sherborn Residential Wells - Free MassDEP PFAS Testing, 2021-22						
	11 of 34 wells tested (32%) above MassDEP 20 ppt PFAS6 and/or US EPA PFOA/PFOS 4 ppt propsed MCL.						
	8 of these 11 wells (73%) are located in the RA (1-acre) Zoning district.						
	PFAS, ng/L, ppt:						
Home #	MA PFAS6	PFOA	PFOS	Zoning			
	> 20	> 4	> 4				
1	5.36						
2	10.1	4.94	6.03	RC, 3-acre			
3	ND						
4	5.06						
5	9.97	4.42	5.55	RA, 1-acre			
6	23.3	13.1	7.37	RA, 1-acre			
7	6.34			RA, 1-acre			
8	ND						
9	7.38						
10	ND						
11	ND						
12	ND						
13	3.45						
14	26	8.37	6.43	RA, 1-acre			
15	7.4	5.02		RA, 1-acre			
16	23	8.14	10.5	RA, 1-acre			
17	ND						
18	ND						
19	2.28						
20	2.15						
21	2.57						
22	ND						
23	12.8	6.06		RB, 2-acre			
24	19.4	13.1		RA, 1-acre			
25	ND						
26	ND						
27	24.6	9.49	12.8	RB, 2-acre			
28	21	8.53	7.59	RA, 1-acre			
29	ND						
30	ND						
31	8.56	5.88		RA, 1-acre			
32	5.87						
33	6.53						
34	ND						

The 1-acre RA zoning district is comprised of properties along North and South Main Street, Coolidge Street and surrounding neighborhoods, and is shown in Figure 4 (map available at: https://www.sherbornma.org/DocumentCenter/View/2775/Zoning-Map-for-OSRP):

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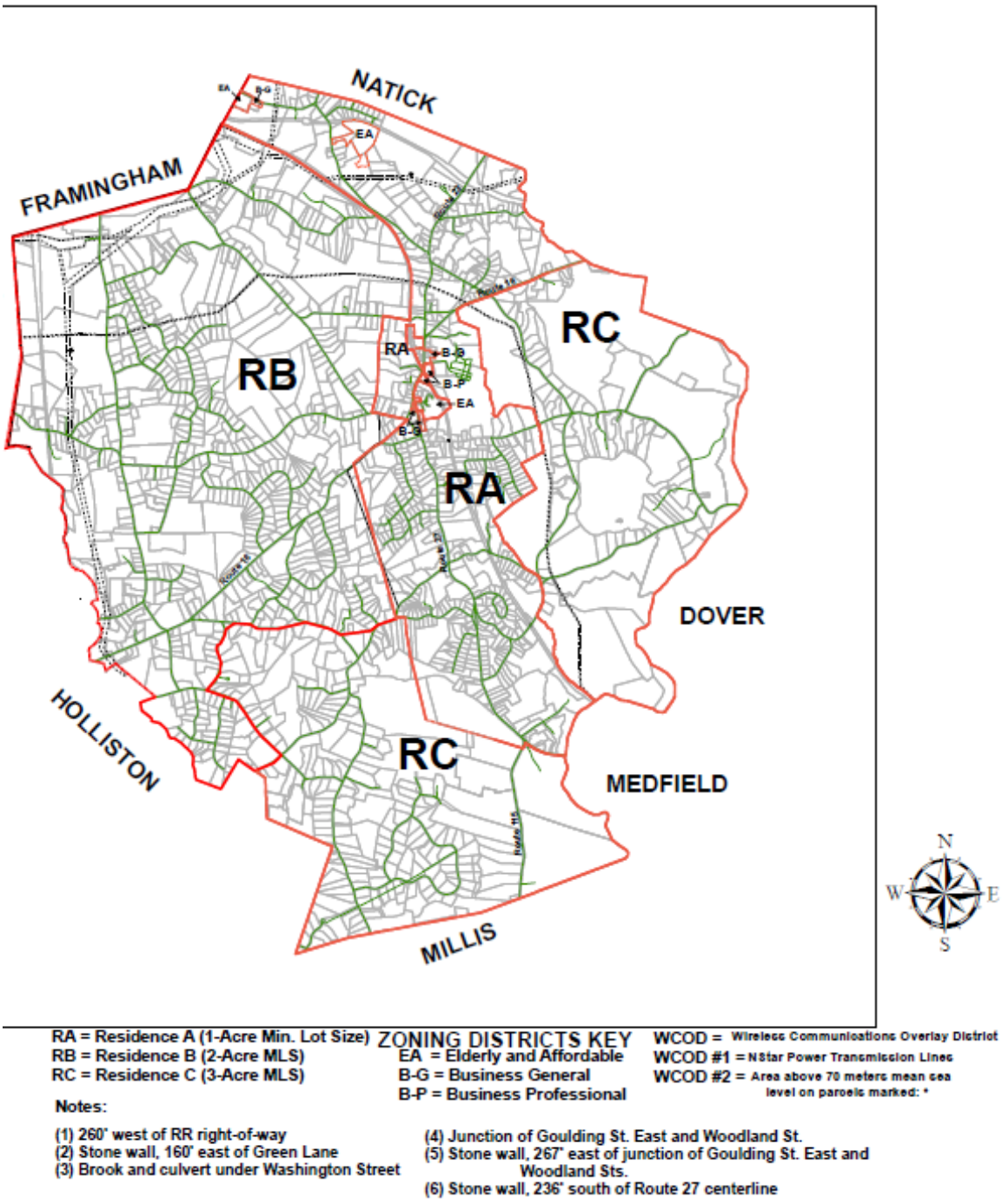
Figure 4 – Sherborn Zoning map, 2017



Of the 34 MassDEP PFAS tested private wells, 14 were in RA (1-acre min), 16 were in RB (2-acre min), and 4 were in RC (3-acre min) zoning districts.

PFAS is a known component of residential septic effluent, and a recent MassDEP study, and others, have shown a correlation between private well PFAS concentrations and the number of properties on septic systems per amount of land area, or “septic density” (ref 6).

PFAS in Sherborn Public Water Supply Wells

The GPC first became aware of PFAS groundwater issues in Sherborn from testing results reported in 2020-21 from some of the 14 Sherborn public water supply (PWS) wells, as they were first required to start PFAS testing by the MassDEP. Since that time, the GPC has checked on a monthly basis the posting of new PFAS results on the MassDEP website (https://eeaonline.eea.state.ma.us/portal#!/search/drinking-water).

Table VI lists the 14 PWS wells in Sherborn, showing the highest value of MA PFAS6 concentrations for each well, along with the corresponding sampling date, and concentration values for the specific PFAS chemicals now in the new 2024 EPA PFAS public drinking water regulations.

Table VI

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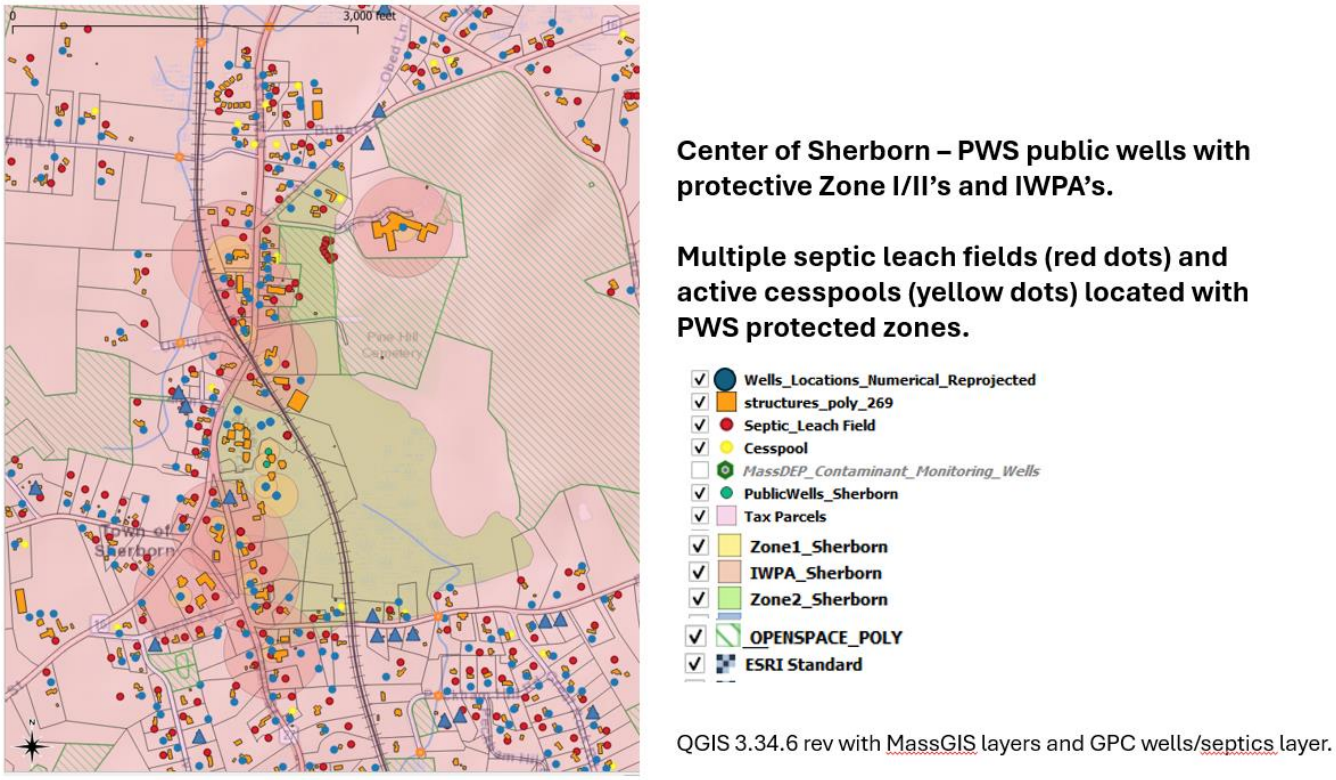
	Sherborn Public Water Supply Wells		4/11/2024										
	Highest PFAS6 level observed to date for each PWS well (one sampling event):												
MassDEP						RESULTS, ng/L, ppt:							GenX
PWS ID	PWS Name	Street #	Street Name	Class	Contam	Collected Date	MA PFAS6	PFOA	PFOS	PFNA	PFHxS	PFBS	HFPO-DA
						Limits:	> 20	> 4	> 4	> 10	> 10	> 2000	> 10
3269017	ANEMOTIA REALTY	27	North Main Street	NC	PFAS	07/19/2022	13.2	6.98	4.18	ND	2.05	1.84 J	ND
3269032	FIELDS AT SHERBORN CONDO TRUST	247A	Washington Street	COM	PFAS	04/20/2022	ND	1.1 J	0.797 J	ND	0.797 J	0.683 J	ND
3269027	FISKE PROPERTY	20	North Main Street	NC	PFAS	7/25/2022	21.8	10.9	6.21	1.67 J	2.34	1.6 J	ND
3269024	HERITAGE OF SHERBORN	33	North Main Street	NC	PFAS	07/12/2022	16.8	9.39	4.89	ND	1.78 J	3.93	ND
3269028	LELAND FARMS		Village Way	COM	PFAS	09/07/2022	16.7	7.65	6.71	0.722 J	1.62 J	5.88	ND
3269030	PILGRIM CHURCH	25	South Main Street	NTNC	PFAS	11/26/2021	11.6	6.4	3.07	ND	1.78 J	3.66	ND
3269011	PINE HILL ELEMENTARY SCHOOL		Pine Hill Lane	NTNC	PFAS	07/25/2022	7.88	2.48	2.26	0.766 J	3.14	0.912 J	ND
3269031	SHERBORN CROSSING	19	North Main Street	NC	PFAS	11/20/2021	23.3	8.91	7.51	ND	4.49	4.83	ND
3269026	SHERBORN MARKET	21	South Main Street	NC	PFAS	07/05/2022	32.8	15.7	9.68	0.861 J	1.9 J	3.51	ND
3269025	SHERBORN PLAZA	11	South Main Street	NC	PFAS	07/05/2022	19.4	8.83	7.16	1.45 J	1.24 J	7.56	ND
3269019	SHERBORN TOWN OFFICES; POLICE; LIB	19	Washington Street	NTNC	PFAS	03/13/2023	25.3	11.6	10.1	0.823 J	1.82 J	2.82	ND
3269003	UNITARIAN UNIVERSALIST AREA CHUR(	11	Washington Street	NC	PFAS	07/05/2022	17.2	7.3	7.7	2.2	1.08 J	6.76	ND
3269002	WOODHAVEN ELDER HOUSING COMMITTEE		Village Way	COM	PFAS	01/09/2023	9.75	5.1	2.58	ND	1.24 J	2.98	ND
3269029	MARYSTAR SPA AND SALON	24	North Main Street	NC	PFAS	No PFAS reports on MassDEP website							
											J = estimated concentration		
	Others Town owned, not PWS wells:												
	Fire Station # 1	22	North Main Street		PFAS	1/23/2023	66.7	19.8	32.8	3.22	5.15	4.38	ND
	DPW Garage	7	Butler Street		PFAS	1/23/2023	7.52	4.55	2.97	0.716 J	1.36 J	1.86 J	ND
	Well Locations in Red = at least one sampling event with a PFAS level over MassDEP PFAS6 current limits and/or over new April 2024 US EPA PFAS limits.												

Of the 14 PWS wells, 4 had at least one sample above the 20 ppt MA PFAS6, and 11 of the 14 had shown PFOA and/or PFOS above the new federal 4 ppt MCL. All but the Fields at Sherborn PWS are in the more densely developed RA zoning district, and most are clustered in the “downtown Sherborn” area.

The GPC, through a Town ARPA funded project, has been mapping the locations of all PWS and private wells, and all public and private septic systems and cesspools. The challenges of protecting water quality at the downtown wells, public and private, can be appreciated by viewing a map of this densely developed area, showing public and private wells close to septic leach fields and cesspools, Figure 5.

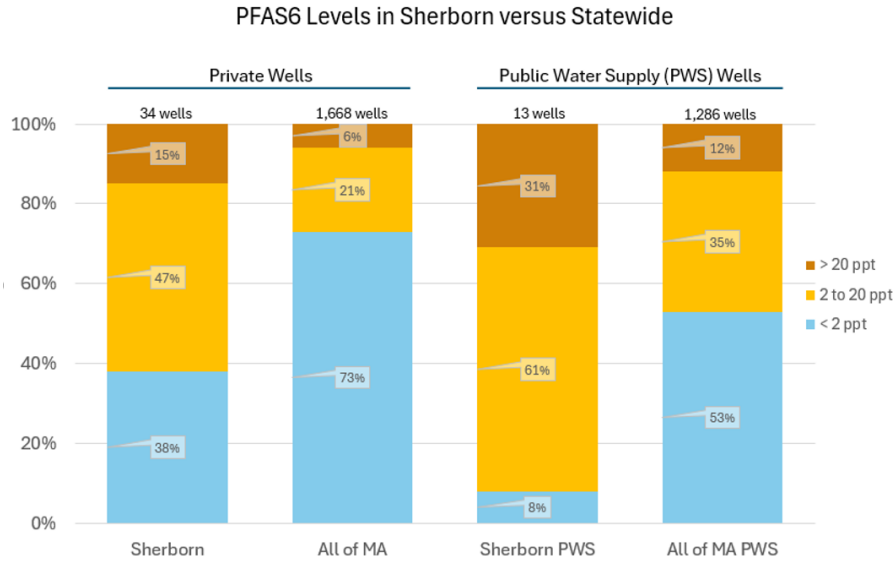
In addition to septic influence, groundwater in the downtown area has been compromised from historic hazardous waste practices at former automotive service stations, the railroad, and other former commercial storage operations (MassDEP, 21E site inventory for Sherborn, ref 7). PFAS production began in the 1940’s and PFAS found their way into many commercial products since that time and their use continues today.

Figure 5 – Sherborn downtown area, map of wells and septics.



Like the comparison for PFAS in private wells in Sherborn versus state-wide data, a contrast can be made between Sherborn PWS wells PFAS levels versus statewide results (ref 5). Figure 6 combines both data sets in a graph format:

Figure 6 – Comparison of Sherborn PWS wells to MA-wide PFAS6 PWS Concentrations:



As was the case for private wells, for all three PFAS6 concentration ranges, Sherborn public water supply wells fare much worse than those exhibited state-wide.

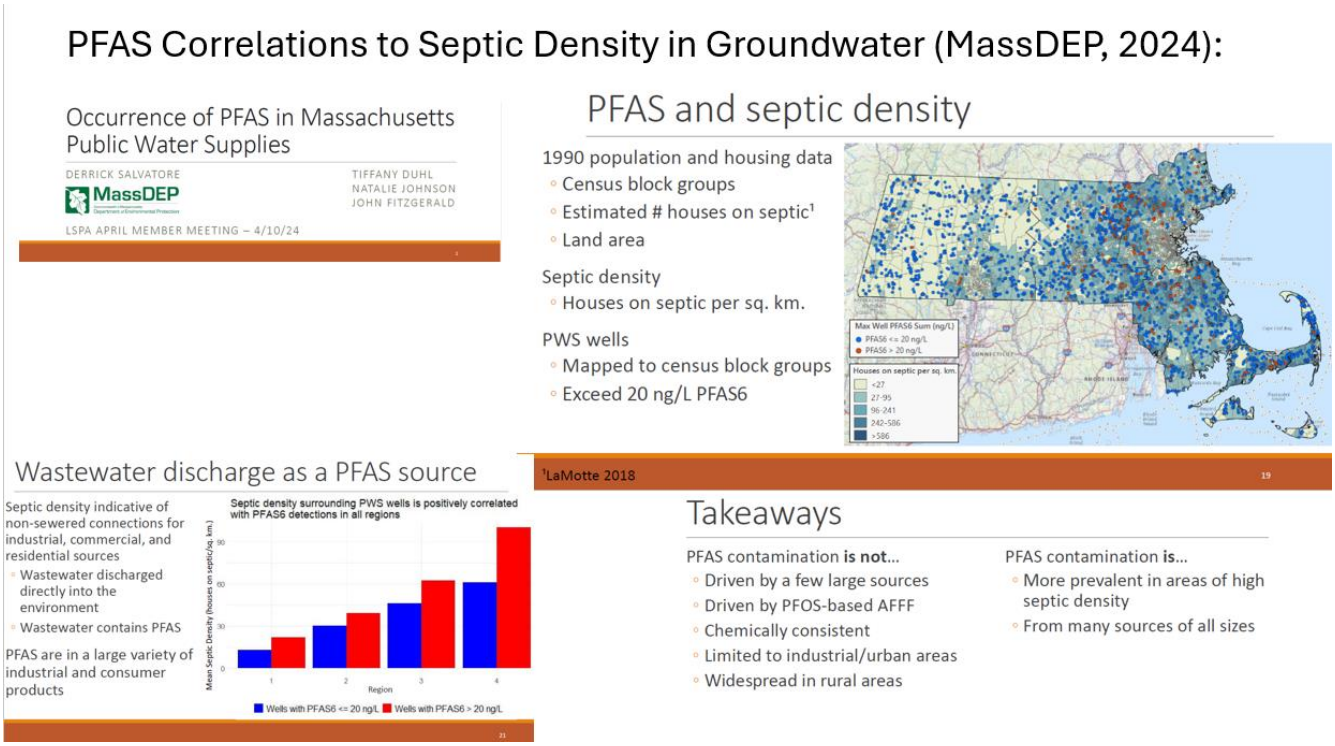
Septic/Cesspool Density versus Groundwater Quality

In examining all the testing results noted here, for both private and PWS wells in town, two trends are apparent:

- Nitrate at part per million levels, and PFAS at part per trillion levels, are compromising Sherborn groundwater quality.
- The source(s) of nitrate and PFAS showing up in Sherborn groundwater are a result of the nearby septic/cesspool systems effluent.

Examples of similar trends have been documented state-wide by MassDEP. See for instance a compilation of slides from a recent MassDEP public presentation, Figure 7, illustrating this trend:

Figure 7 – Salvatore et al, MA LSP Annual Meeting, 4-10-24:



Two additional groups from neighboring states (NY DEC, NH DES) have also presented talks on the influence of domestic wastewater on groundwater PFAS levels recently at conferences, see Figures 8 and 9:

Figure 8 - April 2024 NEWMOA PFAS conference, NY DEC

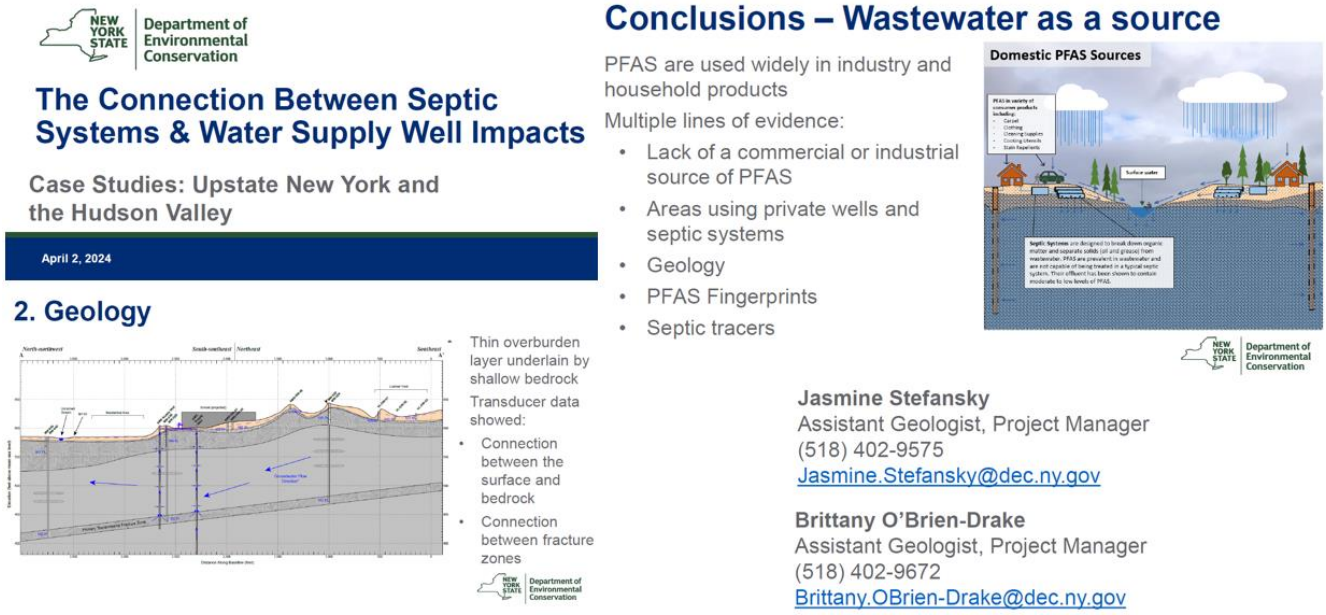
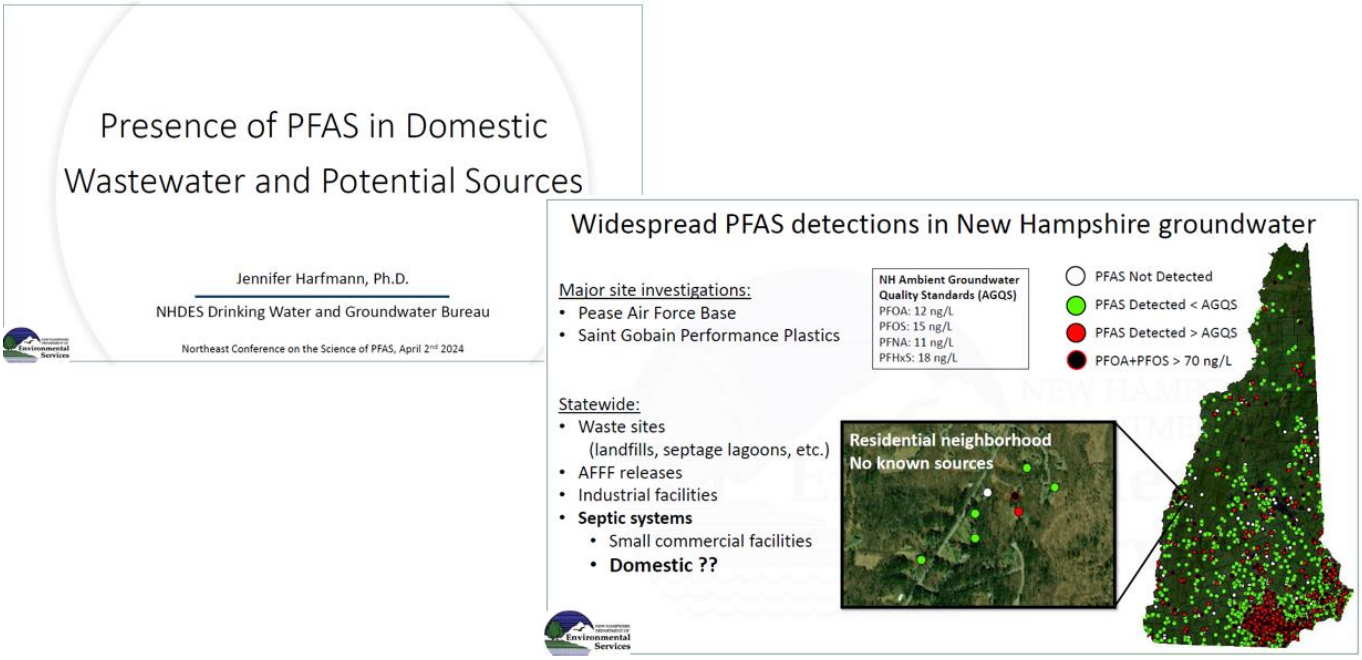


Figure 9 - April 2024 NEWMOA PFAS conference, NH DES



Summary

Sherborn residents, with near complete reliance on groundwater wells for drinking water, and dependence on co-located septic systems/cesspools for wastes disposal, need to be aware of potential water quality degradation by at least two very common contaminants – nitrate and PFAS. Homeowners are encouraged to spend less than about $200 every few years to have their private wells tested for common water quality contaminants, including nitrate.

Nitrate levels above 1.0 mg/L are a potential indication of septic influence and may advise spending an additional $400 or so for a PFAS test by a MassDEP-certified lab. Assistance on finding a MassDEP-certified lab can be provided by contacting either the town's Board of Health (health@sherbornma.org) or the Groundwater Protection Committee (gpc@sherbornma.org). A variety of treatment options exist to deal with elevated levels of nitrate and/or PFAS in wells, with varying upfront installation and annual maintenance costs.

The Town needs to do more in the way of protecting groundwater in Sherborn, by preventing any increase in septic density (number of septic systems per acre) than what currently exists.

References

1. 1984, US EPA, 600/2-84-107, "Evaluation of Septic Tank System Effects on Ground Water Quality, 382 pages.
2. 2003, USGS, 02–4289, "Nutrients in Shallow Ground Waters Beneath Relatively Undeveloped Areas in the Conterminous United States", 21 pages.
3. 2022, "*Examining Relationships Between Groundwater Nitrate Concentrations in Drinking Water and Landscape Characteristics to Understand Health Risks"*, *GeoHealth*, Hamlin et al, https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2021GH000524
4. Cape Cod Commission, 1992, https://www.capecodcommission.org/resource-library/file/?url=/dept/commission/team/Website_Resources/regulatory/NitrogenLoadTechbulletin.pdf
5. 2023, MassDEP, PFAS state-wide PWS and private well testing results: https://www.mass.gov/doc/massdep-free-pfas-analysis-program-final-report/download, 79 pages.
6. 2024, MassDEP, April 2024 MA LSP conference, "Occurrence of PFAS in Massachusetts Water Supplies", pdf slide set.
7. 2024, NY DEC, April 2024 NEWMOA PFAS conference, "The Connection Between Septic Systems and Water Supply Impacts", pdf slide set.
8. 2024, NH DES, April 2024 NEWMOA PFAS conference, "Presence of PFAS in Domestic Wastewater and Potential Sources", pdf slide set.

Appendix I

Sherborn Groundwater Protection Committee - Press Release – For Immediate Distribution, Jan 3, 2023

"Sampling of Sherborn Residential Wells Finds High Frequency of Coliform Bacteria"

The Sherborn Groundwater Protection Committee (GPC) provided an opportunity this past summer for Sherborn residents to have their home well water sampled and tested for the most common contaminants of concern in our area. Homes were selected on a first come, first served basis following

an announcement of the free program on the Town website and a call to enroll. The water from 41 Sherborn residential wells was tested at no-cost to the residents. The testing included the following water quality parameters: the presence of coliform bacteria; and the concentrations of: Nitrate and Nitrite, Uranium, Radon, Arsenic, Chloride, Copper, Fluoride, Iron, Lead, Manganese, and Sodium; plus, water Hardness and pH levels.

What was found in the water:

The GPC partnered with RCAP Solutions, a non-profit agency in Worcester that provides support services to rural communities, to sample the well water. RCAP assisted the residents in the sampling and delivered the samples to a MassDEP-certified laboratory for testing. RCAP also maintained all records associated with the project, keeping the addresses and homeowners' names unknown to the GPC and Town. The key finding of this small sampling set was that 42% of the well tests revealed one or more contaminants that exceeded MA Maximum Contaminant Levels (MCL), which MassDEP regularly enforces for public drinking water supplies. These included 15 instances of the presence of Coliform bacteria, 2 instances of Radon, and 1 instance of Uranium above recommended levels. Potential health problems may occur if drinking water contains these substances at levels higher than drinking water standards. Coliform bacteria exist naturally in the environment, but exposure from contaminated water may lead to gastrointestinal illness. ~~R~~adon inhalation and uranium ingestion may lead to elevated risks of some cancers.

How does this Sherborn study compare to other Massachusetts communities that depend on private wells?

During 2020-2022 RCAP Solutions, with funding from the US EPA, MassDEP, and Massachusetts Environmental Health Association, conducted 502 well assessments and water tests across 24 Massachusetts towns, which like Sherborn are primarily dependent on drinking water from private wells. About 32% of these wells had levels of contaminants exceeding MassDEP health standards. In comparison, data from MassDEP for community public water supply systems throughout the state showed that only about 4.5% had reported instances of contaminants exceeding MassDEP health standards over this same period.

A closer look at coliform bacteria and What to do if testing reveals coliform bacteria in your well water:

The 17 Sherborn wells that tested positive initially for total coliform bacteria were also analyzed at the same time for the more specific E. coli. E. coli is a sub-set of coliform bacteria that is associated with the potential presence of fecal contamination. All 17 wells were negative for E. coli.

Given the high number of wells showing the presence of coliform bacteria, Sherborn homeowners are reminded to have their well water tested on a regular basis. Our Sherborn Board of Health recommends that if you do find coliform bacteria in your homes' well water, that you immediately contract with a qualified well company to have the well and entire home water supply system disinfected, along with an effort to determine and eliminate the source of the bacteria contamination. The BOH does not advise residents to carry out the disinfection steps themselves. Common sources of coliform bacteria include water or air leaks anywhere in the plumbing lines, malfunctioning septic systems, and contaminated runoff on the property from animal wastes.

How you can get your well water tested:

The full battery of tests conducted in this study can be performed by MassDEP certified labs in this area for less than about $300, and less than about $75 for just the coliform/E. coli tests. The UMASS-Amherst Extension Service has a very informative website with homeowner resources on drinking water wells in Massachusetts (please see: https://ag.umass.edu/cafe/fact-sheets/well-water), and specific to the coliform bacteria screening test they state:

"Maximum Contaminant Level (MCL) for bacteria in drinking water is zero total coliform colonies per 100 milliliters of water as established by the EPA. The total coliform test is the basic yardstick for determining the biological quality in a water supply. The test is easy to perform, inexpensive, and errs on the side of caution. The organisms in the total coliform group are called indicator organisms. The presence of coliform bacteria in drinking water indicates that a pathway for disease producing (pathogenic) organisms exists. There may or may not be pathogenic organisms in the drinking water, but you should eliminate the potential pathway to prevent them from entering the well."

A note about PFAS in local drinking water wells:

There is a new and emerging set of groundwater contaminants of concern in Massachusetts and world-wide, known as Per- and Polyfluoroalkyl Substances (PFAS) (see: https://www.mass.gov/info-details/per-and-polyfluoroalkyl-substances-pfas-in-private-well-drinking-water-supplies-faq). The GPC is currently monitoring the progress of a recently completed state-wide PFAS study on residential wells and will share the results as soon as the final MassDEP project report is issued.

For further information and any questions that you may have on maintaining your homes well, please contact:

Sherborn Groundwater Protection Committee: Email to gpc@sherbornma.org, consult webpage: https://www.sherbornma.org/groundwater-protection-commmittee

Sherborn Board of Health: Phone: (508) 651-7852, Email to health@sherbornma.org. consult webpage: https://www.sherbornma.org/board-health