Analysis of PFAS Contamination in Water in Rhode Island

Massachusetts Sierra Club
January 13, 2022

Introduction and History

From August 16, 2017 to the present,[1] The Rhode Island Department of Health (RIDOH) has conducted 232 tests for PFAS in 87 Public Water Systems (PWS) with drinking water sites in 26 municipalities.[2] These systems were selected based on size and potential exposure to PFAS. Rhode Island has 39 cities and towns so 67% have had local water sources tested, but nearly all of the remainder will not be tested under this program since they obtain their water externally. Samples have been taken mostly from raw water sources such as wells and reservoirs but have also included finished drinking water (labeled "treatment plants"). Raw water gives a better measure of the underlying PFAS contamination.

The purpose of this analysis is to show *the amount and degree of environmental contamination from PFAS geographically* across the state in ground and surface water. This study aggregates all measurements for all systems within a municipality. This does *not* represent current finished drinking water quality, and so does not indicate the population that has been or may be exposed to any contaminated water and any associated health risks.[3]

While most communities utilize groundwater, the largest use surface water from ponds, lakes and reservoirs such as the cities of Providence, Pawtucket and Newport.

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[1] Most are from 2017-2019. Only one system has been reported for each year in 2020 and 2021.

[2] Prudence Island, which by itself is about the size of North Providence, was tested in 2019 and PFAS was not found. Its parent town, Portsmouth, is geographically distinct and so its results have been analyzed separately.

[3] Some contamination has already been mitigated in drinking water. Two PWS have since become inactive, one of which was highly contaminated (the Oakland Association in Burrillville). Some highly contaminated wells have since been taken offline such as Abbott Run Valley Well 3 in Cumberland.

The municipalities that will not be tested under this program because they are served by reservoirs outside the municipal limits and therefore have no local drinking water sources are: Barrington, Central Falls, Cranston, East Providence, Lincoln, Narragansett, Pawtucket, Providence, Warren, Warwick, and West Warwick. All of these except for Narragansett obtain their water from the City of Providence, which has its reservoir in Scituate.

PFAS Standards

To date, RIDOH has focused mainly on the EPA's 2016 Health Advisory of 70 ppt for PFOA and PFOS, the only national guideline for PFAS in drinking water. In 2019, RIDOH examined the five PFAS chemicals that are sometimes called "PFAS5":[4]

- Perfluorooctane sulfonic acid (PFOS)
- Perfluorooctanoic acid (PFOA)
- Perfluorohexane sulfonic acid (PFHxS)
- Perfluoroheptanoic acid (PFHpA)
- Perfluorononanoic acid (PFNA)

These chemicals were referenced in the Conservation Law Foundation and Community Action Works petition submitted to RIDOH in February, 2019 and is the same PFAS list used in the Vermont standard. More recently RIDOH has discussed including Perfluorodecanoic acid (PFDA), which would then match the same set of six ("PFAS6") as in Massachusetts and Maine.[5]

The Maximum Contaminant Level (MCL) in Massachusetts and Vermont is 20 ppt. Proposed legislation in Rhode Island would adopt the Massachusetts methodology. RIDOH has studied weighting the shorter-chain PFHxS and PFHpA at 15% due to reported lower toxicity. The MCL for Rhode Island has been proposed at values of 10 and 20 ppt. Like Massachusetts, Rhode Island is considering having the same levels for groundwater as for drinking water.

Other states have different standards with usually fewer chemicals so New England is generally in the lead nationally.

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[4] Draft Summary of PFAS Results. By Water System, Drinking Water Source and Test Date.

[5] *The Providence Journal*, Jan. 29, 2021, "Rules on 'forever chemicals' in drinking water in limbo" https://www.providencejournal.com/story/news/local/2021/01/29/state-rules-forever-pfas-chemicals-drinking-water-limbo/4302315001/

Analysis of Results

One or more PFAS were detected in 22 cities and towns or 81% of the municipalities tested. The PFAS5 were detected in 20 of these municipalities (77%). Of these, 15 (58%) were above the both Mass. MCL of 20 ppt for both PFAS5 and PFAS6.[6] If the weighted average of PFAS6 proposed by RIDOH is used, the number exceeding 20 ppt is only one less. If the limit was lowered to 10 ppt, then two more municipality would exceed under the RIDOH methodology (17 = 65%). There were 17 municipalities (65%) that were over a 20 ppt for the sum of all nineteen reported PFAS.[7] These figures demonstrate that where any PFAS is found in Rhode Island, it is generally found at high levels.

RIDOH has tested in their own lab using a modified version of EPA PFAS testing Method 537 (generally 9 selective chemicals) and later 537.1 (generally 14 selected chemicals). Twelve chemicals were detected statewide out of 19 reported in the data set. Where PFAS is detected, it has almost always been for multiple chemicals.[8] The maximum for any municipality was 9 (Westerly). But there are thousands of PFAS so the total burden is likely drastically underestimated.

Below is the frequency of chemicals by PWS. Note that there is often more than one PWS per municipality.

[6] PFDA was detected in only one town, Westerly, which would be over the limit for PFAS5 no matter which proposed MCL was used.
[7] The towns under the limit for PFAS6 but over the limit for all PFAS were Coventry, Little Compton and West Warwick.
[8] The exceptions were for two towns, Hopkinton and Richmond, where only one chemical was detected in PWS. Some towns apparently only tested for nine chemicals such Hopkinton, which missed one that is sometimes found, PFBA.

Chemical	PWS Detected	Max Concentration Detected (ppt)
PFBA	7	18.5
PFBS	17	14.5
PFDA	1	5.1
PFHpA	12	23.4
PFHxA	24	48.9
PFHxS	9	32.4
PFNA	5	16.3
PFOA	33	99.0
PFOS	26	104.0
PFPeA	25	38.6
PFUDA	1	2.4

Note: 9CI-PF3ONS was detected in one private well serving a daycare system (at a level of 64.1 ppt) so a total of 12 PFAS have been found across the state. [9]

PFOA and PFOS were the most frequently encountered in tests and had the highest maximum amount detected by far. None of the next most frequently found are in PFAS6:

- PFHxA
- PFPeA
- PFBS

PFHxA and PFBS are also frequently found in Massachusetts, while PFPeA is not tested there (since it is using an older testing method).

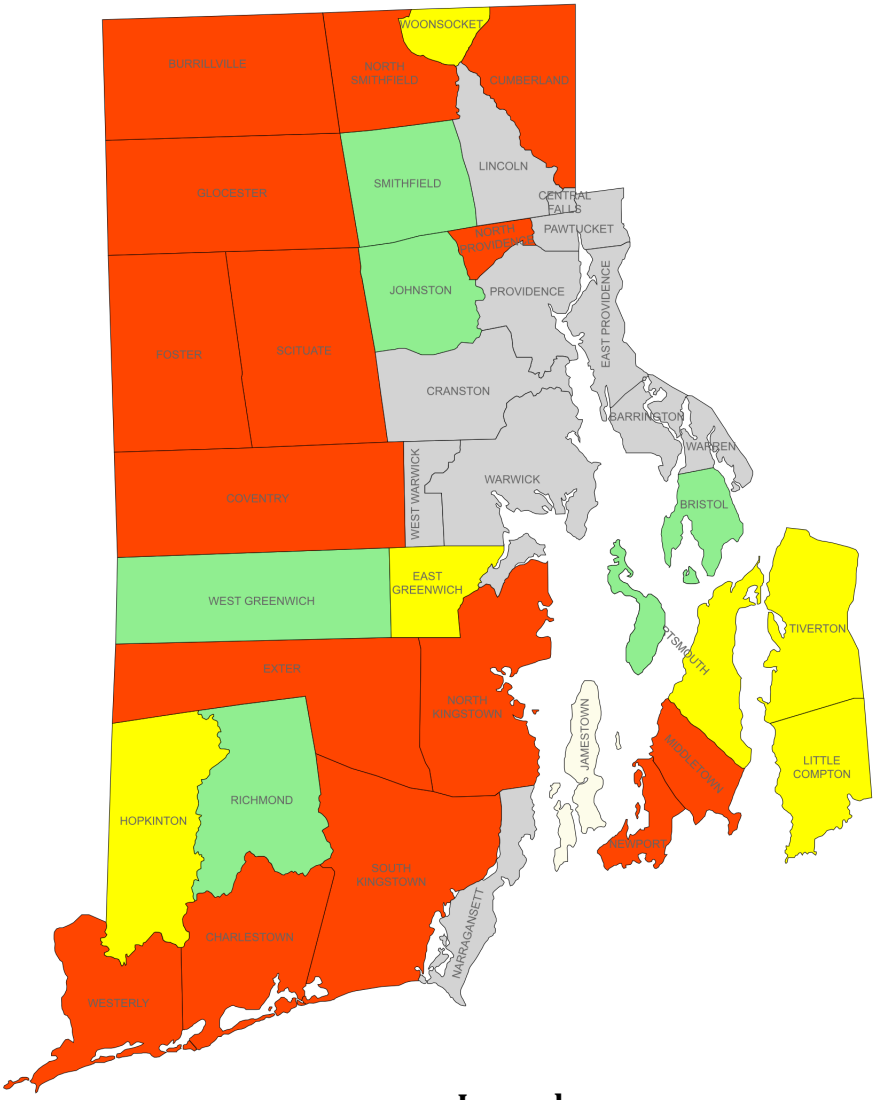
[9] This was in Richmond where the only PWS that has been tested is the Chariho Regional Middle School.

Appendix 1:
Summary of Testing by Municipality

Municipality	# of Public Water Systems Tested	# of Chemicals detected	# of Chemicals tested	Sum of PFAS5 (ppt)	Sum of All PFAS (ppt)[10]
Bristol	1	0	13	0.00	0.00
Burrillville	12	9	14	166.10	228.11
Charlestown	9	7	16	108.99	125.83
Coventry	3	6	14	30.17	41.00
Cumberland	2	8	14	63.56	94.05
East Greenwich	1	4	14	9.70	38.69
Exeter	6	6	14	30.53	53.98
Foster	4	5	14	31.08	42.35
Glocester	7	6	14	52.89	158.89
Hopkinton	4	1	9	4.04	4.04
Johnston	1	0	9	0.00	0.00
Little Compton	2	4	14	5.35	28.86
Middletown	3	8	17	45.53	56.87
Newport	1	5	14	21.15	35.61
North Kingstown	2	7	14	25.39	77.58
North Providence	1	6	9	71.96	93.52
North Smithfield	2	4	14	30.35	48.22
Portsmouth	1	1	14	11.60	15.74
Prudence Island	1	0	14	0.00	0.00
Richmond	3	1	14	0.00	5.26
Scituate	9	6	14	27.96	62.68
Smithfield	2	0	9	0.00	0.00
South Kingstown	4	7	14	32.27	54.37
Tiverton	2	4	17	7.00	12.00
West Greenwich	6	0	14	0.00	0.00
Westerly	2	9	19	32.21	49.61
Woonsocket	1	3	14	12.90	17.45
Maximum		9	19	166.10	228.11

[10] Zero technically can mean non-detection or detection below the reporting limit.

Figure 1:
Map of Sum of PFAS5 by Municipality



Legend:
Cream – no PWS testing yet
Grey – untested because the water sources are outside of the municipality
Green – no PFAS detected above the reporting limited
Yellow – Total PFAS detected below 20 ppt
Red – Total PFAS detected ≥ 20 ppt

Figure 2:
Map of Sum of all PFAS by Municipality