

Rockland County PFAS drinking water contamination

Analysis of 2019 testing data

January 2021



Prepared by Riverkeeper for the Rockland Water Coalition

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Table of Contents

[Sources, Terms and Acknowledgments](#) - Pg 2

[Observations](#) - Pg 3

[Drinking Water in Rockland County: Brief Overview](#) - Pg 5

[Where have PFAS been detected, and where have standards been exceeded?](#) - Pg 8

[Which regulated and unregulated PFAS were found?](#) - Pg 10

[How many different PFAS were detected in each sample?](#) - Pg 14

Sources

- 2019 testing data from [2019 Annual Water Quality Report](#) & [2019 Supplement](#)
- Well locations from USGS [Water Resources of Rockland County](#), 2005-7
- State drinking water standards from [Association of State Drinking Water Administrators](#)
- Information about PFAS chemicals from Environmental Working Group's [Human Toxome Project](#)
- Nyack Village Water [notice](#) and 2019 [annual water quality report](#)

Terms

PFAS - per- and poly- fluoroalkyl substances. This is a class of chemicals that includes thousands of individual chemicals.

PFOA - Perfluorooctanoic acid, one of the PFAS

PFOS - Perfluorooctanesulfonic acid, one of the PFAS

MCL - Maximum Contaminant Level, or drinking water standard, a threshold set by state or federal governments for the allowable amount of a contaminant in drinking water

ppt - Parts per trillion, the measure of concentration relevant for PFAS

Acknowledgments

Environmental Advocates of New York digitized the PFAS testing data from the 2019 Annual Water Quality report, making much of this analysis possible. In addition, a number of organizations working in coalition with Rockland Water Coalition have contributed to the emerging understanding of the contamination and advocacy recommendations. They include Food and Water Watch, NYPIRG and Sierra Club.

Observations

The analysis in this report is limited primarily to 2019 data from Suez, not the 2020 data that prompted it to notify customers of exceedances of New York State's Maximum Contaminant Level (MCL) for PFOA. It is also primarily limited to publicly available published information.

Suez's water system serving Rockland County is complex, and perhaps uniquely complex. Whereas many public water systems have more than one water source, as Rockland's Suez system does, those sources typically contribute to a single stream of water that is treated at a single point before distribution. Rockland's water system has at least 42 "on ramps" to the distribution system. Of these, 40 are groundwater sources - individual wells, pairs of wells or well fields that each contribute water to the distribution system directly. Two are treatment plants for reservoirs - Lake DeForest, and three reservoirs that provide water to the Letchworth treatment plant. Because of the nature of the Rockland distribution system, with its many "on ramps" from dozens of sources, PFAS treatment will likely have to be applied to multiple wells, rather than a single water treatment plant.

It's unclear what the source of contamination could be.

The widespread contamination, relatively low level compared to other high-profile PFAS contamination sites such as those affecting Newburgh and Hoosick Falls, suggests multiple

sources, or dispersed sources of some kind, rather than a single polluter. A thorough investigation of potential sources is needed to identify sources, including sources that may be held accountable for the costs of remediation and treatment. In addition, manufacturers of the chemicals may be held accountable for costs of remediation and treatment.

Contamination is widespread, with multiple PFAS detected in almost all water sources. PFOA, the contaminant that has been found at concentrations that violate New York State's MCL, is the most widespread, occurring in 44 of 45 tests, and all 31 water sources with detectable PFAS. Eight water sources exceeded New York State's PFOA MCL, and treatment should be required. PFOS, the other PFAS regulated in New York State, was the second-most prevalent, found in 33 of 45 tests, and 25 of 31 water sources with detectable PFAS. None violated New York State's PFOS MCL.

Each of the other six PFAS found in Rockland water sources is regulated in at least one other state. Scientists and advocates have called for drinking water standards to be set for the entire class of PFAS, given similarities in toxicity and persistence among them. While Massachusetts, Vermont and Connecticut have taken the first steps toward this goal, with standards based on the sum of multiple PFAS in drinking water. Applying other states' standards would not result in

additional violations, with the exception of Michigan's more protective PFOA standard. Applying Michigan's more protective PFOA standard would result in twice as many Suez water sources violating a drinking water standard (16 wells versus eight, based on 2019 testing results). Applying even Michigan's more protective standard would still leave 15 water sources with detectable PFAS untreated. There's no legal reason Suez would have to apply another state's standard, but New York State's regulations are also a floor, not a ceiling, so there is also no legal barrier to Suez applying a more protective standard.

The wells that have the most different types of PFAS detected also have the highest total PFAS concentrations, and tend to have the highest PFOA concentrations. While applying New York's PFOA standard should result in treatment of wells with the highest total number of detected PFAS, and the highest total PFAS concentrations, applying Michigan's more protective PFOA standard would also result in treating more wells with multiple PFAS and relatively higher total PFAS concentrations.

Treatment should be able to remove all detected PFAS from these water sources, but treating for multiple PFAS in addition to PFOA and PFOS may require more frequent refreshing of

filter media, such as granular activated carbon. The operations and maintenance plan for the treatment should define whether treatment systems will remove all PFAS, and whether they will be removed to "non detect" levels.

Suez tested for 14 PFAS. EPA methods are approved to test for at least 29 PFAS chemicals. All PFAS that are currently regulated in New York or other states were included in the 2019 testing. It would be valuable to use the most expansive tests available to define total PFAS concentrations, though it may be difficult to interpret results that show detections of PFAS that have not yet been regulated. Test results should be made publicly available.

Test results suggest variable levels of PFAS. Not all wells were tested in 2019, there was variation in results from sources that were sampled multiple times, and the number of water sources that violated the PFOA MCL based on 2020 data differs from the number that would have violated the PFOA MCL based on 2019 data. Given this variability, ongoing testing of public water sources and private wells is important, particularly given that wells exceeded Michigan's but not NY's standards in 2019 testing. More frequent testing would identify if variability includes exceedances of NYS's MCL in additional wells over time.

Drinking water in Rockland County: Brief overview

After New York City’s water supply, Suez’s water system for Rockland County serves the largest population in the region - about 300,000 people. The Suez system serves most of Rockland County. The Village of Nyack water system supplies

an additional 14,700 people in the Villages of Nyack, South Nyack, as well as the Central Nyack and West Nyack areas of Clarkstown. Village of Suffern serves approximately 12,000 people. More than 6,000 private wells are also located in the county, and there may be other smaller public water systems.

Suez

Type	Water Source	Treatment
Surface water (30%)	Lake Deforest	Lake Deforest Water Treatment Plant (WTP) Treatments include Traveling screens, aeration, and dual-media filtration; potassium permanganate, anionic polymer, alum, sodium hypochlorite, polyphosphates. Note: Suez appears to be designing and planning to construct an upgrade to the Lake DeForest treatment plant, including a carbon filter to remove PFAS.
	3 reservoirs on Palisades Interstate Park property	Letchworth Water Treatment Plant Similar treatment, but without aeration by Dissolved Air Flotation
Ground-water (70%)	~59 wells	All wells are treated with sodium hypochlorite for disinfection and polyphosphates for corrosion control. Certain wells receive additional treatment through granular activated carbon filtration, aeration and/or ultraviolet disinfection. Treatment plants are in place at SW 13/14, SW 16, SW 28/106, SW 38, SW 42/54, Ramapo Valley Well Field and Spring Valley Well Field

We could identify 59 wells serving the Suez system, in Rockland County and Bergen County, NJ. (References identify as few as 53 wells and as many as 61, so there is a need to verify this data.) Each well has a number and a name that references its geographic location. These 59 wells include two larger well fields, accounting for 14 wells (10 in the Ramapo and 4 in the Spring Valley well fields). It also includes several wells that are blended and treated prior to entering the distribution system. These include SW 13/14 Nanuet, 18/24 New Hempstead, 28/106 Viola, 42/54 Catamount. There is also some unresolved information needed on paired wells (31/31A, 42/42A, 54/54A) which we are assuming are each a single point of connection to the distribution system. Bottom line: While there are 59 wells, we believe there are 40 points where well water enters the distribution system. Another two points of entry are the two reservoir systems, DeForest and

Letchworth, for a total of 42 entry points into the distribution system. That means there are as many as 42 points where source water may need to be treated.

Wells have high susceptibility to microbials, nitrates and industrial solvents and other industrial contaminants, according to an approximately 20-year-old source water assessment summarized in the annual water quality report. “These ratings are due primarily to the close proximity of permitted discharge facilities (industrial/commercial facilities that discharge wastewater into the environment and are regulated by the state and/or federal government) to the wells and the associated industrial activity in the assessment area. In addition, some of the wells draw from fractured bedrock and the overlying soils do not provide adequate protection from potential contamination.”

Village of Nyack

Type	Water Source	Treatment
Surface water	Hackensack River	Treatment includes potassium permanganate, powdered activated carbon, aeration, coagulation, flocculation, sedimentation, fine sand filtration, anthracite coal, sodium hypochlorite (liquid chlorine), and soda ash.
	Lake Deforest	When necessary, Nyack can draw water from Suez's system.

Nyack's source water assessment, summarized in its annual water quality report, includes this information: "The source water assessment found an elevated susceptibility to contamination for the Hackensack River. Due to the amount of residential land in the assessment area, there is an elevated potential for microbial, turbidity, Disinfection By-Products (DBP) precursors, and pesticides contamination. Non-sanitary wastewater discharges may also contribute to contamination. There is also noteworthy susceptibility to contamination from other sources including Chemical Bulk Storage (CBS) facilities, Inactive Hazardous Waste Sites (IHWS), Mines, Resources Conservation, CSX Railroad, New York State Thruway, Recovery Act (RCRA) facilities, and Toxic Release Inventory (TRI) sites."

Village of Suffern

Type	Water Source	Treatment
Groundwater	4 wells in the Ramapo Valley	Treatment includes greensand filters, sodium hydroxide, orthophosphate and sodium hypochlorite. Granulated activated carbon filtration is also available.

Where have PFAS been detected, and where have standards been exceeded?

This map shows the approximate location of Rockland water sources, color-coded based on 2019 Suez PFAS testing data, and Nyack's 2020 public notice. ([zoom in](#))

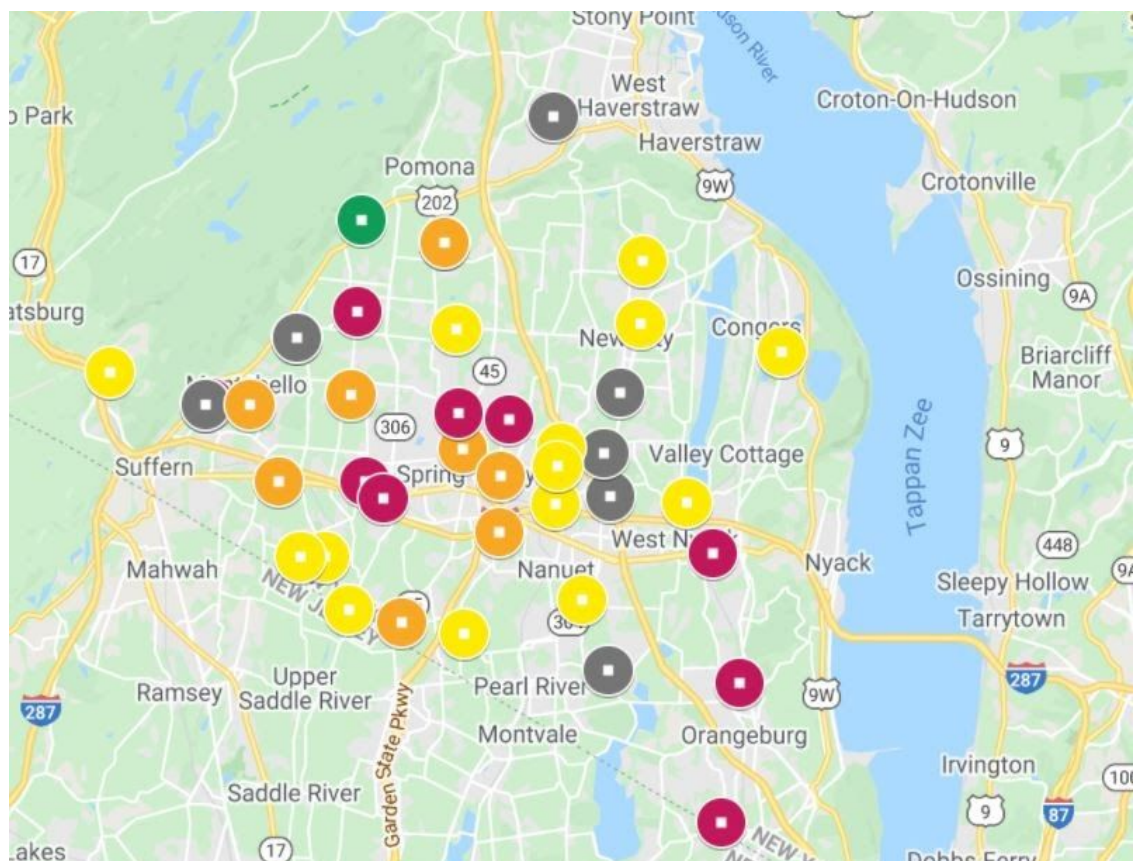
Red = PFAS detected, exceeding NYS PFOA MCL

Orange = PFAS detected, exceeding Michigan's PFOA standard, but not NYS PFOA MCL

Yellow = PFAS detected, but exceeding neither NYS nor any other state standards

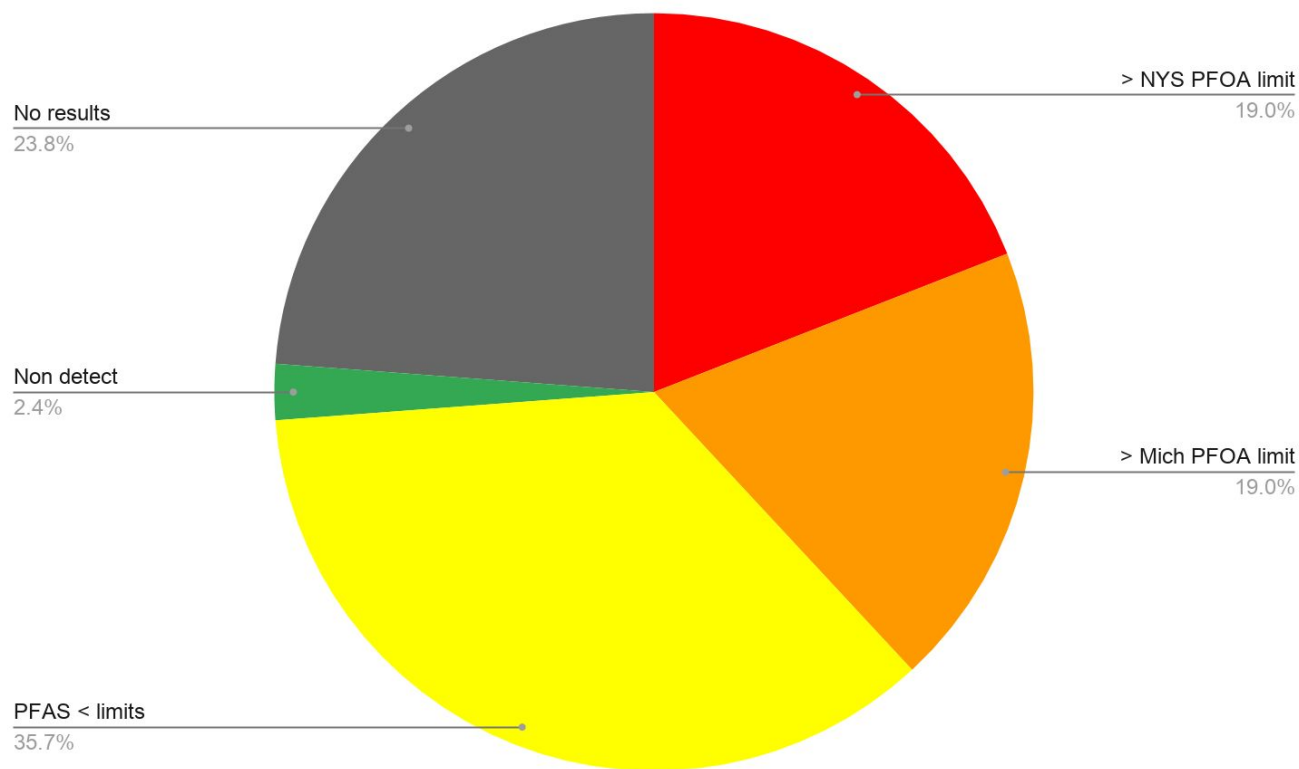
Green = Tested, no PFAS detected

Gray = No data (2019)



Of the 42 points where well water enters the Suez distribution system, 32 were tested in 2019. There are 45 complete test results, accounting for multiple tests of some sources.

- 8 exceeded NYS's PFOA MCL of 10 ppt
- 8 others would have exceeded Michigan's PFOA standard of 8 ppt
- 15 had detectable levels of PFAS, but not at levels that would exceed any standard set in NYS or any other state. This includes 13 wells and both the reservoirs.
- 1 had no detectable PFAS
- 10 had yet to be tested (in 2019)



Which regulated and unregulated PFAS were found?

There were eight different PFAS chemicals detected in 2019, of 14 PFAS that were detectable and reported in the 2019 results. While New York State regulates two of these PFAS chemicals (PFOA and PFOS) the other six are regulated in at least one other state. Some states also have standards that are more protective than New York State's. Scientists and advocates have suggested the need to regulate PFAS as a class of chemicals, given that there are thousands of them, and many have similar properties of persistence and toxicity, and it is largely unknown how health may be affected by

exposure to mixtures of these similar chemicals. Regulating only one or two at a time will take many lifetimes, at our current pace, and results in frequent cases of “regrettable substitution,” whereby a new unregulated PFAS chemical with slightly different chemistry is introduced to replace a regulated PFAS chemical. There are cases of this evident in Rockland’s drinking water, with PFBS detected 23 times. PFBS is one of the chemicals that replaced PFOA, according to Environmental Working Group.

PFAS	# of detects	Max detect	A little about the chemical	Drinking water limits in NYS or other states (if potentially more protective)	Rockland well test results relative to standards.
PFOA	44 of 45 tests	18 ppt	3M/ Dupont/ Chemours product in stain-resistant, grease-proof, wrinkle-resistant products, etc. Phased out in 2000 due to health concerns.	<p>NYS: 10 ppt</p> <p>Michigan: 8 ppt</p> <p>Mass: Sum of PFOA, PFOS, PFDA, PFNA, PFHxS, PFHpA: 20 ppt</p> <p>VT: Sum of PFOA, PFOS, PFNA, PFHxS, PFHpA: 20 ppt</p> <p>CT: Sum of PFOA, PFOS, PFNA, PFHxS, PFHpA: 70 ppt</p>	<p>8 wells exceed NYS standard of 10 ppt</p> <p>These same 8 would exceed Massachusetts’ sum standard.</p> <p>8 <u>additional</u> wells would exceed Michigan’s PFOA standard of 8 ppt</p>

PFAS	# of detects	Max detect	A little about the chemical	Drinking water limits in NYS or other states (if potentially more protective)	Rockland well test results relative to standards.
PFOS	33 of 45 tests	8.4 ppt	One of many ingredients in certain firefighting foams. Phased out in 2000 due to health concerns.	NYS: 10 ppt Mass: Sum of PFOA, PFOS, PFDA, PFNA, PFHxS, PFHpA: 20 ppt VT: Sum of PFOA, PFOS, PFNA, PFHxS, PFHpA: 20 ppt CT: Sum of PFOA, PFOS, PFNA, PFHxS, PFHpA: 70 ppt	No standards exceeded for PFOS alone. Present in all wells that violate NYS PFOA MCL. Would contribute to violation of Mass standard in six of them.
PFHxA	31 of 45	10 ppt	Breakdown products of other PFAS chemicals	Michigan: 400,000 ppt	No standard exceeded for PFHxA alone
PFHpA	23 of 45	6.4 ppt	Breakdown products of other PFAS chemicals	Mass: Sum of PFOA, PFOS, PFDA, PFNA, PFHxS, PFHpA: 20 ppt VT: Sum of PFOA, PFOS, PFNA, PFHxS, PFHpA: 20 ppt CT: Sum of PFOA, PFOS, PFNA, PFHxS, PFHpA: 70 ppt	Present in 8 wells that violate NYS PFOA MCL. Would contribute to violation of Mass standard in six of them
PFBS	23 of 45	6.6 ppt	Replaced phased-out PFAS	Michigan: 420 ppt	No standard exceeded for PFBS alone.

PFAS	# of detects	Max detect	A little about the chemical	Drinking water limits in NYS or other states (if potentially more protective)	Rockland well test results relative to standards.
PFHxS	9 of 45 tests	8.2 ppt	Phase out in 2000 due to health concerns	NH: 18 ppt Minn: 47 ppt Mich: 51 ppt Mass: Sum of PFOA, PFOS, PFDA, PFNA, PFHxS, PFHpA: 20 ppt VT: Sum of PFOA, PFOS, PFNA, PFHxS, PFHpA: 20 ppt CT: Sum of PFOA, PFOS, PFNA, PFHxS, PFHpA: 70 ppt	Present in 6 of 8 wells that violate NYS PFOA MCL. Would contribute to violation of Mass standard in four of them.
PFNA	7 of 45 tests	6 ppt	Breakdown products of other PFAS chemicals	Mich: 6 ppt NH: 11 ppt NJ: 13 ppt Mass: Sum of PFOA, PFOS, PFDA, PFNA, PFHxS, PFHpA: 20 ppt VT: Sum of PFOA, PFOS, PFNA, PFHxS, PFHpA: 20 ppt CT: Sum of PFOA, PFOS, PFNA, PFHxS, PFHpA: 70 ppt	Present in 3 of wells that violate NYS PFOA MCL, and would contribute to violation of Mass standard in each of them.

PFAS	# of detects	Max detect	A little about the chemical	Drinking water limits in NYS or other states (if potentially more protective)	Rockland well test results relative to standards.
PFDA	1 of 45 tests	2.2 ppt	Breakdown products of other PFAS chemicals	Mass: Sum of PFOA, PFOS, PFDA, PFNA, PFHxS, PFHpA: 20 ppt	Would not contribute to an exceedance of sum standard

Six additional PFAS were tested for, but not detected: NEtFOSAA, NMeFOSAA, PFDoA, PFTA, PFTTrDA, PFUnA. No other states have regulations for these PFAS.

How many different PFAS were detected in each sample?

Of the 32 water sources tested in 2019, 31 had detectable PFAS, based on 45 test results. Of the 45 test results, all 44 that detected any PFAS detected PFOA. Many of the samples showed multiple PFAS per sample. Some water sources

tested multiple times showed different levels. For sources tested more than once, the data below reflect the greatest number of PFAS detected per water source, if test results showed different results on different occasions. Averages and ranges are based on all 45 test results.

# PFAS detected per test	# of water sources with that many PFAS detected	Exceeds NYS PFOA standard	Would exceed Mich. PFOA limit, but not NYS	Would exceed no NYS or other state standard
7 PFAS 46.8 ppt avg total PFAS 42.3-51.9 ppt range	4	SW 15 Blauvelt SW 16/20 Tappan SW 27 Ramapo SW 31A Monsey	N/A	
6 PFAS 30.1 ppt avg total PFAS 22.7-50.8 ppt range	4	SW 71 Eckerson SW 82 Eckerson	Spring Valley Well Field SW 28/106 Viola	
5 PFAS 22.3 ppt avg total PFAS 18.4-29.5 ppt range	6	SW 30 Monsey SW 56 Willow Tree	SW 69 Pinebrook SW 26 Tallman SW 65 Pascack	Lake DeForest

# PFAS detected per test	# of water sources with that many PFAS detected	Exceeds NYS PFOA standard	Would exceed Mich. PFOA limit, but not NYS	Would exceed no NYS or other state standard
4 PFAS 16.7 avg total PFAS 12-21 ppt range	3		SW 55 Nottingham	SW 66 Elmwood Ramapo Well Field
3 PFAS 11.7 avg total PFAS 8.1-15.3 ppt range	4		SW 70 Birchwood SW 38 Pomona	SW 29 Ramapo SW 32 Wesel
2 PFAS 8.9 avg total PFAS 7.7-9.5 ppt range	5			SW 13/14 Nanuet SW 18/24 New Hempstead SW 53 Saddle River SW 72 Rustic Drive SW 73 Lake Shore Drive
1 PFAS 1.3 avg total PFAS 2.4-7.8 ppt range	5			SW 64 Norge SW 68 Cherry Lane SW 79 West Gate SW 83 Grotke Letchworth WTP
0 PFAS	1			SW 42/54 Catamount

# PFAS detected per test	# of water sources with that many PFAS detected	Exceeds NYS PFOA standard	Would exceed Mich. PFOA limit, but not NYS	Would exceed no NYS or other state standard
No data reported	10	Unknown: SW 19 Bardonia SW 21 Germonds SW 22 Pearl River SW 23 New City SW 29A Lake Road (may be same as SW 29, which was sampled and did not exceed any standards) SW 37 Pomona SW 50 Thiell (SW 50 and 51 may be combined) SW 51 Thiell SW 67 Grandview SW 78 Grandview		