A close-up photograph of water being poured into a clear glass. The water is captured in mid-pour, creating a dynamic splash with many bubbles and ripples. The background is a soft, out-of-focus green, suggesting a natural setting. The text is overlaid on the upper left portion of the image.

State of Delaware Public Drinking Water Annual Compliance Report and Summary for 2019

June 2020



*DELAWARE HEALTH
AND SOCIAL SERVICES*
Division of Public Health

Acknowledgements

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This report was prepared by the Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water.

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Executive Summary

The State of Delaware Public Drinking Water Annual Compliance Report and Summary for 2019 covers the period of January 1 to December 31, 2019. It is provided by the Delaware Department of Health and Social Services, Division of Public Health (DPH), Office of Drinking Water (ODW) to the U.S. Environmental Protection Agency (EPA) and the public. Submission of this annual report is a mandatory EPA requirement.

Water systems in Delaware must provide safe drinking water to the public in accordance with the Safe Drinking Water Act (SDWA). *The State of Delaware Public Drinking Water Annual Compliance Report and Summary for 2019* gives the EPA and the public a descriptive overview of all public water systems in Delaware and their compliance status. The public can use this document as a quick reference to determine if the water system serving their household or business is in compliance with, or in violation of, state and federal regulations.

Delaware residents get their drinking water from either groundwater or surface water sources, depending on where they live. About two-thirds of Delaware households are connected to public water systems that use groundwater sources; the remaining one-third obtains water from surface water sources. The major sources of groundwater are the Columbia Aquifer, the Cheswold Aquifer, and the Piney Point Aquifer. All surface water plants for Delaware reside in northern New Castle County. The major sources of surface water are the Brandywine River Basin, Christiana River Basin, Red Clay Creek, and White Clay Creek.

Definitions

Community Water System (CWS): a public water system that serves at least 15 service connections used by year-round residents, or regularly serves at least 25 year-round residents.

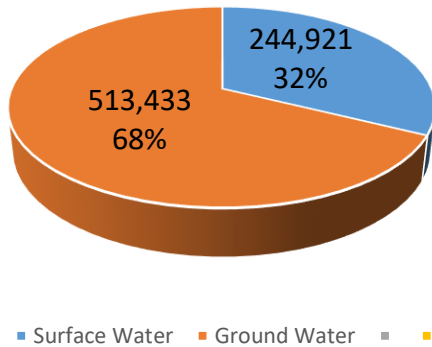
Non-Transient Non-Community Water System (NTNCWS): a public water system other than a community water system that regularly serves at least 25 of the same persons over six months per year.

Transient Non-Community Water System (TNCWS): a public water system with at least 15 service connections or that regularly serves an average of at least 25 individuals daily at least 60 days of the year.

Surface Water: all water that is open to the atmosphere and subject to surface runoff.

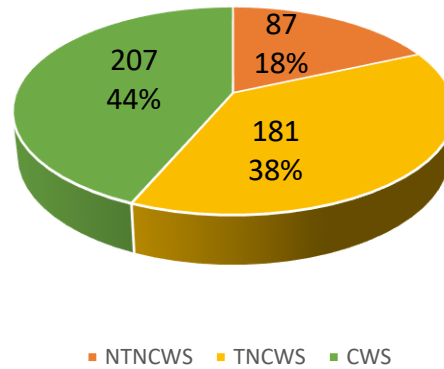
Groundwater: all water held underground in the soil or pores and crevices in rocks.

Figure 1. Population of Surface and Goundwater Systems, Delaware, 2019



Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

Figure 2. Types of Public Water Systems, Delaware, 2019



Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

Due to Delaware’s small size, DPH traditionally conducts most monitoring for public water systems. A few large water systems conduct their own monitoring and report the results to ODW. Since monitoring requirements increased in recent years, ODW requires community water systems serving more than 1,000 people to collect their own total coliform, nitrate, and monthly fluoride compliance samples. Such community water systems (municipalities and public water utilities districts) must submit those samples to the Delaware Public Health Laboratory (DPHL) or a certified private laboratory for analysis, and then submit results to ODW. Additionally, all community water systems and the non-transient, non-community water systems (e.g., schools, daycares, factories) are required to collect samples for compliance with Lead and Copper Rule standards. The samples are analyzed by a certified laboratory and the results are submitted to ODW. Transient, non-community water systems (e.g., restaurants, parks, rest stops) are not required to conduct lead and copper monitoring.

Related to bacteriological testing, ODW performs two types of assessments: Level 1 Assessments (a study of the water system after total coliform bacteria have been detected in the water system) and Level 2 Assessments (a detailed study of the water system after an *E. coli* Maximum Contaminant Level (MCL) violation, and/or multiple occasions when total coliform bacteria have been found in the water system). In 2019, ODW completed 26 Level 1 Assessments and 13 Level 2 Assessments, which is less than those completed in 2018. The lower number of completed assessments is due to consistent enforcement of the Revised Total Coliform Rule.

The total number of monitoring and reporting violations under the Lead and Copper Rule (LCR) decreased from 22 in 2018, to 16 in 2019. The decrease in violations is due to the proper enforcement of the regulations and active communication with systems reminding them of upcoming sampling deadlines and other LCR requirements.

There were three action level exceedances for lead and copper in 2019, compared to 10 in 2018. These water systems have installed treatment or flushed their system routinely to ensure lower levels of lead or copper.

The U.S. Congress passed the SDWA in 1974. The EPA established the Public Water System Supervision (PWSS) program under the authority of the SDWA to regulate drinking water provided by public water systems. Under the SDWA and its 1986 and 1996 amendments, the EPA set national limits on drinking water contaminant levels to ensure that water is safe for human consumption. These limits are known as Maximum Contaminant Levels. The State of Delaware adopted these limits for use in state regulations governing public drinking water systems.

The SDWA allows a state to seek primacy, an EPA approval to administer its own PWSS program. The State of Delaware was granted primacy in April 1978. For Delaware to continue to receive primacy, it must meet certain SDWA requirements, including adopting drinking water regulations that are at least as stringent as the federal regulations. The State must also demonstrate that it can enforce the program requirements. DPH is the entity responsible for monitoring and enforcing drinking water regulations; it does so through ODW.

ODW staff generated the data in this report. Violation information was obtained from the Safe Drinking Water Information System/State version and the federal operational data system, and includes information reported quarterly to the EPA. This report is also available on ODW's website: <http://www.dhss.delaware.gov/dhss/dph/hsp/pubdw.html>.

State Public Drinking Water Summary, 2018

This document provides an overview of the state's public drinking water system for 2019. Its contents range from general information to violations by contaminant and by water system. For additional information or clarification, contact the ODW at 302-741-8630.

Population of Delaware	973,764
Percentage served by individual wells	22.1%
Percentage served by public water supplies	77.9%
Year primacy granted to state by EPA	1978

Source: Delaware Population Consortium, 2019.

Total land area of Delaware	1,533,500 acres	
Forest/Forested Wetlands	339,000 acres	23%
Agriculture	420,500 acres	28%
Developed	255,900 acres	17%
Wetland/Water/Waterways	291,365 acres	19%
Pastureland/other	172,400 acres	11%
Federal Land	30,670 acres	2%

Source: U.S. Department of Agriculture, 2007.

Residents served by public water systems ¹	758,354
Residents served by surface water systems	244,921
Residents served by ground water systems	513,433
Number of Public Water Systems	477
Community Water Systems	207
Non-transient, Non-Community Water Systems	89
Transient Non-Community Water Systems	181
Number using surface water	3
Number using ground water	473

¹ Safe Drinking Water Information System/State Version (SDWIS/State), Delaware Department of Health and Social Services, Division of Public Health, 2019.

Major Sources of Surface Water
Brandywine River Basin
Christina River Basin
Red Clay/White Clay Creeks
Major Sources of Ground Water
Columbia Aquifer
Cheswold Aquifer
Piney Point Aquifer
Number of gallons of public water used in Delaware each day: 101 mgd ¹

¹ Million Gallons per Day: Delaware Department of Natural Resources and Environmental Control, 2019.

Definitions

Filtered Systems: Surface water systems that have installed filtration treatment [[40 CFR 141, Subpart H](#)].

Inorganic Contaminant (IOC): A chemical compound identified in the National Primary Drinking Water Regulations (NPDWR), which may be naturally occurring or a result of human activities and does not contain both carbon and hydrogen. Examples include metals, nitrates, and asbestos. EPA has established MCLs for 15 inorganic contaminants [[40 CFR 141.62](#)].

Lead and Copper Rule: This rule established national limits on lead and copper in drinking water [[40 CFR 141.80-91](#)]. Lead and copper enter the drinking water from household pipes and plumbing fixtures. Lead can pose various health risks when ingested at any level, while copper ingestion can pose health risks at elevated levels. States report violations of the LCR in the following five categories:

1. *Initial lead and copper tap monitoring/reporting:* A violation in which a system did not meet initial lead and copper testing requirements or failed to report the results of those tests to the state.
2. *Follow-up or routine lead and copper tap monitoring/reporting:* A violation in which a system did not meet follow-up or routine lead and copper tap testing requirements or failed to report the results.
3. *Treatment installation:* Violations for a failure to install an optimal corrosion control treatment system or source water treatment system that would reduce lead and copper levels in water at the tap.
4. *Lead service line replacement:* A violation for a system's failure to replace lead service lines on the schedule required by the regulation.
5. *Public education:* A violation in which a system did not provide required public education about reducing or avoiding lead intake from water.

Maximum Contaminant Level (MCL): The legal threshold limit on the amount of a substance that is allowed in public water systems under the SDWA. MCLs ensure that drinking water does not pose either a short-term or long-term health risk. MCLs are defined in milligrams per liter (mg/L; 1 mg/L = 1 part per million) unless otherwise specified.

Monitoring: The EPA specifies which water testing methods public water systems and certified drinking water laboratories must use and sets schedules for the frequency of testing. A public water system that does not follow the EPA's schedule or methodology is in violation [[40 CFR 141](#)].

States must report monitoring violations that are significant as determined by the EPA Administrator in consultation with the states. For the purposes of this report, significant monitoring violations are major violations that occur when compliance sampling is not conducted or when results are not reported during a compliance period. A major monitoring violation for the Surface Water Treatment Rule occurs when at least 90 percent of the required

Definitions *(continued)*

compliance samples are not taken, or the results are not reported, during the compliance period. See Enforcement Actions for further enforcement actions, including administrative orders and penalties, may be taken for continued non-compliance.

Organic Contaminant: A chemical compound identified in the NPDWR, which contains both carbon and hydrogen and originate from human activities. EPA has established MCLs for 54 organic contaminants [[40 CFR 141.61](#)].

Public Notification: When a system issues a public notice and notifies the Division of Public Health that the notice was delivered.

Radionuclides: Radioactive particles that can occur naturally in water or result from human activity. EPA has set legal limits on five types of radionuclides: radium-226, radium-228, gross alpha, beta particle and proton emitters, and uranium [[40 CFR 141](#)]. Violations for these contaminants are reported using the following four categories:

1. *Gross alpha particles:* A violation for alpha radiation above the MCL of 15 picocuries/liter. Alpha particles include radium-226 but excludes radon and uranium.
2. *Combined radium-226 and radium-228:* A violation for combined radiation from these two isotopes above the MCL of 5 pCi/L.
3. *Beta particles and photon emitters:* A violation for beta particle and photon radiation from the decay of natural and man-made deposits of certain radioactive minerals above 4 millirem/year.
4. *Uranium:* A violation for uranium is above 30 micrograms/liter ($\mu\text{g/L}$; 1 $\mu\text{g/L}$ = 1 part per billion).

Reporting Period: The reporting period for information to be included in this report is from January 1, 2019 through December 31, 2019.

Revised Total Coliform Rule (RTCR): Establishes an MCL for *E. coli* and uses the presence of *E. coli* and total coliform bacteria to initiate a “find and fix” approach to address fecal contamination that could enter the distribution system.

It requires public water systems to perform Assessments to identify sanitary defects and subsequently take action to correct them:

- *Level 1 Assessment:* A Level 1 Assessment is a study of the water system to identify potential problems and determine (if possible) why total coliform bacteria were detected in the water system. For systems collecting fewer than 40 samples per month, more than one positive sample for total coliform triggers an Assessment. For systems collecting 40 or more samples per month, more than 5 percent of the samples positive for total coliform triggers an Assessment.

Definitions *(continued)*

- **Level 2 Assessment:** A Level 2 Assessment is a detailed study of the water system to identify potential problems and determine (if possible) why an *E. coli* MCL violation has occurred and/or why total coliform bacteria were found in the water system on multiple occasions. Level 2 Assessments are conducted when a water system detects *E. coli* in its water, or if the system triggers two Level 1 Assessments in a rolling 12-month period.

Four classifications of violations are issued under the purview of the RTCR:

- ***E. coli* MCL Violation:** Issued when the presence of *E. coli* is confirmed.
- **Treatment Technique (TT) Violation:** Issued when a water system fails to conduct a required process intended to reduce the level of a contaminant in drinking water. Non-compliance is based on the failure to take any of the following actions:
 - Failure To conduct a Level 1 or Level 2 Assessment within 30 days of learning of the Assessment trigger
 - Failure to correct sanitary defects from a Level 1 or Level 2 Assessment within 30 days of learning of the Assessment trigger
 - Failure of a seasonal water system to complete the state-approved start-up procedure prior to serving water to the public
- **Monitoring Violations:** Issued to a system that fails to conduct routine or repeat monitoring, including:
 - Failure to take routine total coliform sample(s)
 - Failure to analyze for *E. coli* following a total coliform positive sample
- **Reporting Violations:** Issued to a system that fails to report routine or repeat monitoring results, including:
 - Failure to submit a monitoring report
 - Failure to submit a completed Level 1 or Level 2 Assessment form within 30 days of learning of the Assessment trigger
 - Failure to notify ODW by the end of the next business day following an *E. coli*-positive sample or *E. coli* MCL violation
 - Failure for a seasonal water system to submit a certification of completion for ODW-approved seasonal start-up procedure prior to serving water to the public

Definitions *(continued)*

Surface Water Treatment Rule: Establishes criteria under which water systems supplied by surface water sources or ground water sources under the direct influence of surface water must filter and disinfect their water [[40 CFR 141, Subpart H](#)]. Violations of the Surface Water Treatment Rule are to be reported for the following four categories:

1. *Monitoring, routine/repeat (for filtered systems):* A violation for a system's failure to carry out required tests, or to report the results of those tests.
2. *Treatment techniques (for filtered systems):* A violation for a system's failure to properly treat its water.
3. *Monitoring, routine/repeat (for unfiltered systems):* A violation for a system's failure to carry out required water tests, or to report the results of those tests.
4. *Failure to filter (for unfiltered systems):* A violation for a system's failure to properly treat its water. EPA will supply data for this violation code to the states.

Treatment Technique: A water disinfection process that EPA requires instead of setting an MCL for contaminants that laboratories cannot adequately measure. Failure to meet other operational and system requirements under the Surface Water Treatment Rule and the LCR have also been included in this category of violation for purposes of this report.

Unfiltered Systems: Surface water systems that do not need to filter their water before disinfecting it because the source is very clean [[40 CFR, Subpart H](#)]. There are no unfiltered surface water systems in Delaware.

Violation: A failure to meet any state or federal drinking water regulation.

Table 5. Summary of Violations for Regulated Analytes, Delaware, 2019

	MCL (mg/L) ¹	MCLs		Treatment Techniques		Significant Monitoring/ Reporting	
		Violations	Systems with Violations	Violations	Systems with Violations	Violations	Systems with Violations
Organic Contaminants							
1,1,1-Trichloroethane	0.2	0	0	N/A	N/A	0	0
1,1,2-Trichloroethane	0.005	0	0	N/A	N/A	0	0
1,1-Dichloroethylene	0.007	0	0	N/A	N/A	0	0
1,2,4-Trichlorobenzene	0.07	0	0	N/A	N/A	0	0
1,2-Dibromo-3-chloropropane (DBCP)	0.0002	0	0	N/A	N/A	0	0
1,2-Dichloroethane	0.005	0	0	N/A	N/A	0	0
1,2-Dichloropropane	0.005	0	0	N/A	N/A	0	0
2,3,7,8-TCDD (Dioxin)	3x10 ⁻⁸	0	0	N/A	N/A	0	0
2,4,5-TP	0.05	0	0	N/A	N/A	0	0
2,4-D	0.07	0	0	N/A	N/A	0	0
Acrylamide	N/A	N/A	N/A	0	0	N/A	N/A
Alachlor	0.002	0	0	N/A	N/A	0	0
Atrazine	0.003	0	0	N/A	N/A	0	0
Benzene	0.005	0	0	N/A	N/A	0	0
Benzo[a]pyrene	0.0002	0	0	N/A	N/A	0	0
Carbofuran	0.04	0	0	N/A	N/A	0	0
Carbon tetrachloride	0.005	0	0	N/A	N/A	0	0
Chlordane	0.002	0	0	N/A	N/A	0	0
cis-1,2-Dichloroethylene	0.07	0	0	N/A	N/A	0	0
Dalapon	0.2	0	0	N/A	N/A	0	0
Di(2-ethylhexyl) adipate	0.4	0	0	N/A	N/A	0	0
Di(2-ethylhexyl)phthalate	0.006	0	0	N/A	N/A	0	0

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

¹ Values are in milligrams per liter (mg/L), unless otherwise specified.

Table 5. Summary of Violations for Regulated Analytes, Delaware, 2019
(continued)

	MCL (mg/L) ¹	MCLs		Treatment Techniques		Significant Monitoring/ Reporting	
		Violations	Systems with Violations	Violations	Systems with Violations	Violations	Systems with Violations
Organic Contaminants							
Dichloromethane	0.005	0	0	N/A	N/A	0	0
Dinoseb	0.007	0	0	N/A	N/A	0	0
Diquat	0.02	0	0	N/A	N/A	0	0
Endothall	0.1	0	0	N/A	N/A	0	0
Endrin	0.002	0	0	N/A	N/A	0	0
Epichlorohydrin	N/A	N/A	N/A	0	0	N/A	N/A
Ethylbenzene	0.7	0	0	N/A	N/A	0	0
Ethylene dibromide	0.00005	0	0	N/A	N/A	0	0
Glyphosate	0.7	0	0	N/A	N/A	0	0
Heptachlor	0.0004	0	0	N/A	N/A	0	0
Heptachlor epoxide	0.0002	0	0	N/A	N/A	0	0
Hexachlorobenzene	0.001	0	0	N/A	N/A	0	0
Hexachlorocyclopent adiene	0.05	0	0	N/A	N/A	0	0
Lindane	0.0002	0	0	N/A	N/A	0	0
Methoxychlor	0.04	0	0	N/A	N/A	0	0
Methyl tert-Butyl Ether (MTBE)	0.01	0	0	N/A	N/A	0	0
Monochlorobenzene	0.1	0	0	N/A	N/A	0	0
o-Dichlorobenzene	0.6	0	0	N/A	N/A	0	0
Oxamyl (Vydate)	0.2	0	0	N/A	N/A	0	0
para- Dichlorobenzene	0.075	0	0	N/A	N/A	0	0
Pentachlorophenol	0.001	0	0	N/A	N/A	0	0
Picloram	0.5	0	0	N/A	N/A	0	0
Simazine	0.004	0	0	N/A	N/A	0	0
Styrene	0.1	0	0	N/A	N/A	0	0
Tetrachloroethylene	0.005	0	0	N/A	N/A	0	0
Toluene	1	0	0	N/A	N/A	0	0
Total polychlorinated biphenyls (PCBs)	0.0005	0	0	N/A	N/A	0	0

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

¹ Values are in milligrams per liter (mg/L), unless otherwise specified.

Table 5. Summary of Violations for Regulated Analytes, Delaware, 2019
(continued)

	MCL (mg/L) ¹	MCLs		Treatment Techniques		Significant Monitoring/ Reporting	
		Violations	Systems with Violations	Violations	Systems with Violations	Violations	Systems with Violations
Organic Contaminants							
Toxaphene	0.003	0	0	N/A	N/A	0	0
trans-1,2-Dichloroethylene	0.1	0	0	N/A	N/A	0	0
Trichloroethylene	0.005	0	0	N/A	N/A	0	0
Vinyl chloride	0.002	0	0	N/A	N/A	0	0
Xylenes (total)	10	0	0	N/A	N/A	0	0
Subtotal		0	0	N/A	N/A	0	0
Disinfection Byproducts							
Total trihalomethanes	0.08	1	1	N/A	N/A	0	0
Haloacetic Acid 5	0.06	0	0	N/A	N/A	0	0
Maximum Residual Disinfection Level	4.0	0	0	N/A	N/A	0	0
Subtotal		1	1	N/A	N/A	0	0
Inorganic Contaminants							
Antimony	0.006	0	0	N/A	N/A	0	0
Arsenic	0.05	0	0	N/A	N/A	0	0
Asbestos	7 million fibers/L, with fiber length >10 microns	0	0	N/A	N/A	0	0
Barium	2	0	0	N/A	N/A	0	0
Beryllium	0.004	0	0	N/A	N/A	0	0
Cadmium	0.005	0	0	N/A	N/A	0	0
Chromium	0.1	0	0	N/A	N/A	0	0
Cyanide (as free cyanide)	0.2	0	0	N/A	N/A	0	0

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

¹ Values are in milligrams per liter (mg/L), unless otherwise specified.

Table 5. Summary of Violations for Regulated Analytes, Delaware, 2019
(continued)

Inorganic MCLs							
	MCL (mg/L) ¹	MCLs		Treatment Techniques		Significant Monitoring/Reporting	
		Violations	Systems with Violations	Violations	Systems with Violations	Violations	Systems with Violations
Fluoride	2.0	0	0	N/A	N/A	0	0
Mercury	0.002	0	0	N/A	N/A	0	0
Nitrate	10 (as Nitrogen)	13	13	N/A	N/A	0	0
Nitrite	1 (as Nitrogen)	0	0	N/A	N/A	0	0
Selenium	0.05	0	0	N/A	N/A	0	0
Thallium	0.002	0	0	N/A	N/A	0	0
Total nitrate and nitrite	10 (as Nitrogen)	0	0	N/A	N/A	0	0
Subtotal		13	13	N/A	N/A	0	0
Radionuclide MCLs							
Gross alpha	15 pCi/l	0	0	N/A	N/A	0	0
Radium-226 and radium-228	5 pCi/l	0	0	N/A	N/A	0	0
Gross beta	4 mrem/yr	0	0	N/A	N/A	0	0
Subtotal		0	0	N/A	N/A	0	0
Revised Total Coliform Rule							
Acute MCL violation	Presence with <i>E. coli</i>	1	1	N/A	N/A	0	0
Level 1 Assessment	Presence	26	24	N/A	N/A	0	0
Level 2 Assessment	Presence w/ <i>E. coli</i>	13	12	N/A	N/A	0	0
Sanitary survey	N/A	N/A	N/A	N/A	N/A	0	0
Subtotal		40	37	N/A	N/A	0	0

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

¹ Values are in milligrams per liter (mg/L), unless otherwise specified.

Table 5. Summary of Violations for Regulated Analytes, Delaware, 2019
(continued)

	MCL (mg/L) ¹	MCLs		Treatment Techniques		Significant Monitoring/Reporting	
		Violations	Systems with Violations	Violations	Systems with Violations	Violations	Systems with Violations
Surface Water Treatment Rule							
Filtered systems	N/A	N/A	N/A	0	0	N/A	N/A
Monitoring, routine/repeat	N/A	N/A	N/A	N/A	N/A	0	0
Treatment techniques	N/A	N/A	N/A	0	0	N/A	N/A
Turbidity	N/A	N/A	N/A	N/A	N/A	0	0
Monitoring, routine/repeat	N/A	N/A	N/A	N/A	N/A	0	0
Failure to filter	N/A	N/A	N/A	0	0	N/A	N/A
Subtotal	N/A	N/A	N/A	0	0	0	0
Lead and Copper Rule							
	Action Level (mg/L)	Exceedance	Systems with Exceedance	Violations	Systems with violations	Violations	Systems with Violations
Initial lead and copper tap M/R	N/A	0	0	N/A	N/A	0	0
Follow-up or routine lead and copper tap M/R	N/A	3	3	N/A	N/A	16	12
Treatment installation	N/A	0	0	0	0	N/A	N/A
Public education	N/A	N/A	N/A	0	0	N/A	N/A
Subtotal	N/A	3	3	0	0	16	12
Public Notification		Violations		N/A	Systems with Violations		
Consumer Confidence Reports Violations		15		N/A	15		
Public Notification		0		N/A	0		
Ground Water Rule		0		N/A	0		
Subtotal		15		N/A	15		

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

¹ Values are in milligrams per liter (mg/L), unless otherwise specified.

2019 Enforcement Actions

ODW takes enforcement actions when a public water system violates an MCL or treatment technique (TT), as specified in *State of Delaware Regulations Governing Public Drinking Water Systems*; or if a system fails to properly monitor and/or report a particular contaminant.

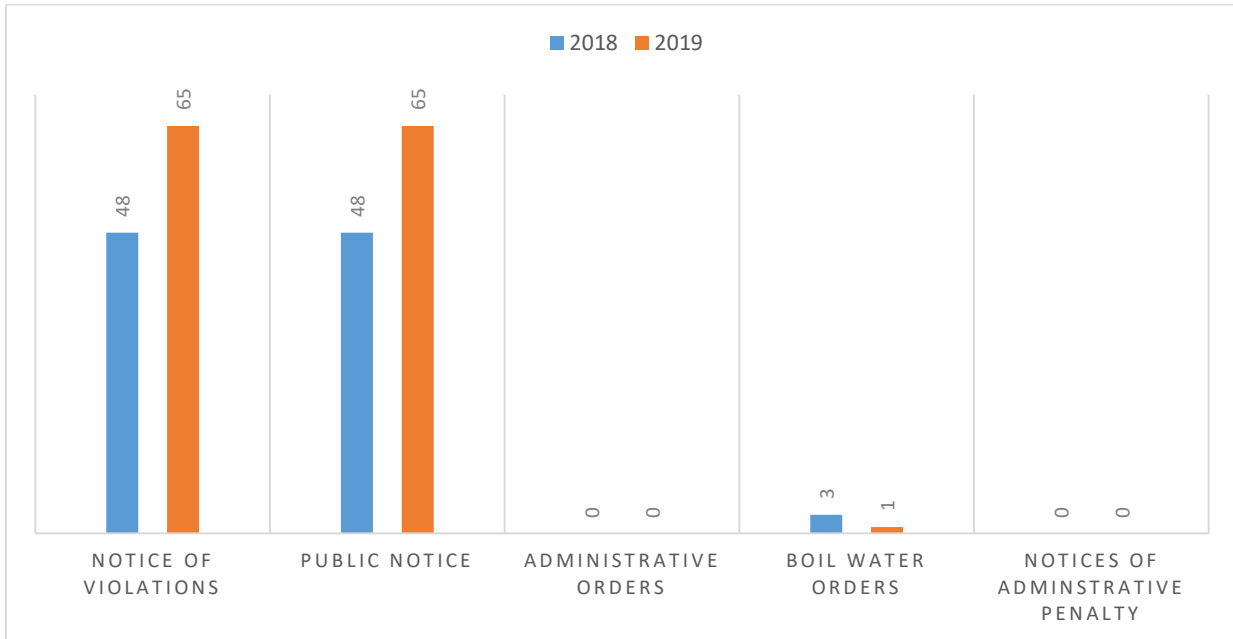
Issuing a Notice of Violation (NOV) is the first action taken. This notifies the owner/operator of a public water system that there was a violation. The next action is for the owner/operator to issue a public notice (PN). The owner/operator is required to mail, hand deliver, or post the PN in a conspicuous place. The PN informs consumers of the water that there was a violation, what the violation was, possible related health effects, and preventive measures the consumer can take until the violation is corrected. A water system issues a boil water notice when they violate the *E. coli* MCL. This requires immediate notice (within 24 hours of being notified of the violation) to all consumers and includes instructions for what actions to take to make their water safe for consumption, or if they should use an alternate source such as bottled water.

The Revised Total Coliform Rule requires Level 1 or Level 2 Assessments to be performed on public water systems with the presence of Total Coliform or *E. coli*. The purpose of a Level 1 Assessment is to determine a likely cause of contamination. A Level 2 Assessment is performed whenever *E. coli* is detected, or when the system has had two Level 1 Assessments in a rolling 12-month period. A Level 2 Assessment is an in-depth inspection of the water system to determine the likely source of contamination.

Additional enforcement actions can be used when a water system repeatedly violates an MCL or when a history of violations is present. The issuance of an Administrative Order (AO) can mandate the installation of treatment or the abandonment of a well for persistent violations. A bilateral compliance agreement (BCA) can also be issued. A BCA is a written contract between the system and ODW in which the violations, corrective steps, and the deadline for completing the work are established in writing and are enforceable.

If a public water system fails to correct a violation or continues to be unresponsive to DPH requirements, an AO with or without penalty may be issued. The penalty can range from \$100 per day to \$10,000 per day, per violation.

Figure 3. Office of Drinking Water Enforcement Actions, Delaware, 2018 and 2019



Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

Program Operation

ODW uses an Oracle®-based system to inventory water supplies, record sampling results, and track compliance with monitoring and MCL requirements. The Safe Drinking Water Information System/State (SDWIS/State) includes information about water supply facilities, water sources, treatment used, and sampling results. It includes information reported quarterly to the EPA.

ODW provides many services to consumers and public water systems. Funding comes from both state and federal monies allotted to Delaware's public drinking water program. ODW and the Delaware Public Health Laboratory (DPHL) use these funds to provide services for the drinking water program, including sample collection and analysis, technical assistance, and operator certification.

Total Budget	\$1,006,768.86
Federal Budget	\$542,000
State Budget	\$464,768.86
Number of Staff	10

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

To ensure that Delaware's drinking water meets or exceeds Safe Drinking Water Act (SDWA) requirements, ODW reviews and approves plans for new or existing water treatment systems and/or new or upgraded distribution systems. ODW staff also inspects water systems, provides technical assistance, responds to emergencies, makes compliance determinations based on monitoring results, and takes enforcement actions when necessary. The DPHL performs water analyses for water quality parameters as outlined in the SDWA. ODW also contracts with private laboratories to analyze some regulated parameters.

Inspections	178
Plan Reviews	153

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

ODW provides training to water system operators and owners regarding system operation and compliance with rules and regulations. Additionally, ODW contracts with the Environmental Training Center at Delaware Technical Community College (DTCC) and the Delaware Rural Water Association to provide training and additional technical assistance to water system operators.

Number of Certified Operators	470
Number of Approved Sampler/Testers	213

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

DPH requires individuals collecting compliance samples or conducting daily monitoring of a public water system to be a licensed operator or certified as an approved sampler/tester. This requirement helps to ensure the integrity of the sampling.

Table 9. Compliance Highlights, Public Water Systems, Delaware, 2018 and 2019

Compliance Area	Samples Collected	Systems In Compliance	Percentage of Population Served by Compliant Systems	Percentage of Water Systems Served by Compliant Systems	Systems not in Compliance	
					2018	2019
Bacteriological	9,957	475	100%	100%	0	0
Bacteriological, Acute (<i>E. coli</i>)	9,957	473	99.9%	99.6%	3	2
Surface Water Treatment Rule ¹	N/A	3	100%	100%	0	0
Nitrates	2,061	462	99.7%	97.2%	10	13
Fluoride	2,392	475	100%	100%	0	0
Inorganic (IOC) Excluding Nitrate and Fluoride	381	475	100%	100%	0	0
Volatile Organic Chemicals (VOC)	161	475	100%	100%	0	0
Synthetic Organic Chemicals (SOC)	990	475	100%	100%	0	0
Lead and Copper	1,176	472	99.7%	99.3%	10	3
Lead and Copper/M&R Violations	N/A	463	99.8%	97.5%	22	12
Consumer Confidence Rule – Failure to Report	N/A	460	99.9%	96.8%	13	15
Consumer Confidence Rule – Inadequate Report	N/A	475	100%	100%	3	0
Disinfection Byproducts (DBPs)	867	474	97.9%	99.6%	0	1
Radiological	374	475	100%	100%	1	0
Ground Water Rule	N/A	475	100%	100%	0	0

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.
¹ Systems with no action level exceedance.

Systems Out of Compliance

System Name	City	Population Served
Anyo Properties	Seaford	52
Ashland Nature Center System #1	Hockessin	200
Bethany Bay Pump District	Millville	6,000
Bethany Club Tennis	Ocean View	100
Burger King – Seaford	Seaford	525
Camden Wyoming Moose	Camden-Wyoming	70
Camden Wyoming Sewer and Water Authority	Camden-Wyoming	5,000
Country Rest Home	Greenwood	65
Flying Dutchman Mobile Home Park 2	Felton	30
Hearth Restaurant	Odessa	100
Hertrich – North Milford	Milford	100
Indian River Yacht Club	Millsboro	60
Milton Cheer Inc.	Milton	63
Peddlers Village Shopping Center	Rehoboth Beach	165
Pepper Ridge Park	Frankford	209
Royal Farms #117 – Pearson Corner	Dover	27
Serenity Manor Estates	Cantebury	110
Smith Landing System 2	Milton	114
Treasure Beach Campground System 4	Selbyville	699
Warren Station Restaurant	Fenwick Island	200
West Dover Pump District	Dover	1,158
White Clay Creek State Park (system 1)	Newark	100
Level 1 Assessment Totals		
Number of Assessments		22
Number of Systems Affected		22
Number of Repeat Violators		0
Total Population at Risk		15,147

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

Table 11. Level 2 Assessments, Non-Compliant Public Drinking Water Systems, Delaware, 2019

System Name	City	Population Served
Country Rest Home	Greenwood	65
Glasgow Deli	Dover	40
Green Stinger, The	Woodside	145
Lighthouse Point and Community Center	Millsboro	36
Little People Child Development Center	Bear	82
Milton Cheer Inc.	Milton	63
North Gate Shopping Center	Dover	50
Royal Farms – Cheswold	Cheswold	100
Shady Oak Trailer Court	Ellendale	108
Shining Time Day Care Center	Felton	30
Smith Landing System 2	Milton	114
Sports at the Beach System 3	Georgetown	25
Level 2 Assessment Totals		
Number of Assessments		12
Number of Systems Affected		12
Number of Repeat Violators		0
Total Population at Risk		858

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

Table 12. Nitrate Violations, Non-Compliant Public Drinking Water Systems, Delaware, 2019

System Name	City	Population Served	Return to Compliance Date
Avalon Woods Owners Assoc., Inc	Georgetown	306	03/29/2019
Carey Estates, LLC	Millsboro	312	05/07/2019
Child Craft Company	Seaford	88	05/06/2019
Country Club Village	Georgetown	72	05/14/2019
De-Lux Dairy Market - Seaford	Seaford	916	07/30/2019
Holly Lake Campsites System 1	Millsboro	405	07/08/2019
Lighthouse Point and Community Center	Millsboro	36	N/A
Mulligans Pointe, LLC	Georgetown	150	04/27/2020
Papen Farms Inc.	Camden-Wyoming	55	06/12/2019
Shawnee Country Store	Milford	60	07/08/2019
Shore Stop #237 Milford (Northside RT1)	Milford	100	02/18/2020
Shore Stop #270 Milton – March	Milton	25	05/13/2020
Shore Stop #270 Milton – December	Milton	25	05/13/2020
Nitrate Violation Totals			
Number of Violations		13	
Number of Systems Affected		12	
Number of Repeat Violators		1	
Total Population at Risk		2,550	

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

Table 13. Radiological Compounds Violations, Non-Compliant Public Drinking Water Systems, Delaware, 2019				
System Name	Population Served	Contaminant	MCL¹ in pCi/L²	Level Found in pCi/L
None	N/A	N/A	N/A	N/A
Radiological Compounds Violation Totals				
Number of Violations			0	
Number of Systems Affected			0	
Number of Repeat Violators			0	
Total Population at Risk			0	

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

¹ MCL means Maximum Contaminant Level

² pCi/L means picocuries per liter

Table 14. Inorganic/Volatile/Synthetic Organic Compound Rule (IOC/VOC/SOC) Violations, Non-Compliant Public Drinking Water Systems, Delaware, 2019				
System Name	Population Served	Contaminant	MCL¹ in mg/L²	Level Found in mg/L
None	N/A	N/A	N/A	N/A
IOC/VOC/SOC Rule Violation Totals				
Number of Violations			0	
Number of Systems Affected			0	
Number of Repeat Violators (Systems)			0	
Total Population at Risk			0	

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

¹ MCL means Maximum Contaminant Level

² mg/L means milligrams per liter

Table 15. Disinfection Byproducts Rule (DPB) Violations, Non-Compliant Public Drinking Water Systems, Delaware, 2019					
System Name	City	Population Served	Contaminant	MCL¹ in mg/L²	Level Found in mg/L
South Bethany	South Bethany	15,771	TTHM	0.80	92.25 mg/L
Disinfection Byproducts Rule Violation Totals					
Number of Violations				1	
Number of Systems Affected				1	
Number of Repeat Violators				0	
Total Population at Risk				15,771	

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

¹ MCL means Maximum Contaminant Level

²mg/L means milligrams per liter

Table 16. Maximum Residual Disinfection Level (MRDL) Violations, Non-Compliant Public Drinking Water Systems, Delaware, 2019				
System Name	Population Served	Contaminant	MRDL¹ in mg/L²	Level Found in mg/L
None	N/A	N/A	N/A	N/A
Maximum Residual Disinfection Level Violation Totals				
Number of Violations			0	
Number of Systems Affected			0	
Number of Repeat Violators			0	
Total Population at Risk			0	

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

¹MRDL means Maximum Residual Disinfectant Level

²mg/L means milligrams per liter

Table 17. Ground Water Rule Violations, Non-Compliant Public Drinking Water Systems, Delaware, 2019		
System Name	Population	Return to Compliance Date
None	N/A	N/A
Ground Water Rule Violation Totals		
Number of Violations		0
Number of Systems Affected		0
Number of Repeat Violators		0
Total Population Affected		0

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

Table 18. Surface Water Treatment Rule (Turbidity Violation), Non-Compliant Public Drinking Water Systems, Delaware, 2019	
System Name	Population Served
None	N/A
Surface Water Treatment Rule Violation Totals	
Number of Violations	0
Number of System Affected	0
Number of Repeat Violators	0
Total Population Affected	0

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

Table 19. Lead and Copper Rule (LCR) Monitoring Violations, Non-Compliant Public Drinking Water Systems, Delaware, 2019

Systems that failed to collect the required number of samples including tap samples and/or water quality parameters during any monitoring period in 2019

System Name	City	Population	Return to Compliance Date
Barkers Landing	Magnolia	498	On path to compliance
Blanton's Mobile Home Park	Cheswold	75	N/A
Crossroad Christian Church Academy	Dover	68	N/A
Hilltop Trailer Park – January 2019	Rising Sun	65	N/A
Hilltop Trailer Park – July 2019	Rising Sun	65	N/A
Holiday Estates – January - 2019	Dagsboro	37	N/A
Holiday Estates – July 2019	Dagsboro	37	N/A
Holiday Pines – January 2019	Millsboro	60	Consolidated with a water system that is in compliance
Holiday Pines – July 2019	Millsboro	60	Consolidated with a water system that is in compliance
Kent County Regional Sports Complex	Frederica	114	On the path to compliance
Little Einstein's Preschool & School Age	Georgetown	79	N/A
Northside Professional Center	Millsboro	35	On the path to compliance
Shell's Learning Center III	Harrington	83	On the path to compliance
Splash Bay Shore Day School	Gumboro	115	N/A
LCR Monitoring Violation Totals			
Number of Violations		14	
Number of Systems Affected		12	
Number of Repeat Violators		2	
Total Population at Risk		1,391	

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

Table 20. Lead and Cooper Rule (LCR) 90th Percentile Action Level (AL) Exceedances, Delaware, 2019

System Name	City	Population Served	Contaminant	AL in mg/L ¹	90 th percentile in mg/L
Bethany Crest	Millville	115	Lead	0.015 mg/L	0.16 mg/L
Central Christian School	Dover	100	Copper	1.3 mg/L	1.5 mg/L
Perdue Foods, LLC	Georgetown	1,500	Copper	1.3 mg/L	3.0 mg/L
LCR 90th Percentile Action Level Exceedance Totals					
Number of Exceedances				3	
Number of Systems Affected				3	
Number of Repeat Violators				0	
Total Population At Risk				1,715	

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2018.

¹mg/L means milligrams per liter

Table 21. Failure to have Licensed Operator Violations, Non-Compliant Public Drinking Water Systems, Delaware, 2019

System Name	City	Population Served
Barkers Landing	Magnolia	498
Holiday Estates	Dagsboro	75
Holiday Pines	Millsboro	60
Shell's Learning Center III	Harrington	83
Shoppes of Millville	Dagsboro	50
Splash Bay Shore Day School	Gumboro	115
Failure to have Licensed Operator Violation Totals		
Number of Violations		6
Number of Systems Affected		6
Number of Repeat Violators		0
Total Population Affected		881

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

Table 22. Monitoring Violations, Non-Compliant Public Drinking Water Systems, Delaware 2019¹

Systems that failed to collect the required number of samples during any monitoring period

System Name	Population	Rule
None	N/A	N/A
Monitoring Violation Totals		
Total Number of Violations		0
Number of Systems Affected		0
Number of Repeat Violators		0
Total Population Affected		0

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

¹ Excluding lead and copper

Table 23. Consumer Confidence Report (CCR) Rule Inadequate Reporting, Non-Compliant Public Drinking Water Systems, Delaware, 2019		
System Name	Population served	Return to Compliance Date
None	N/A	N/A
CCR Violation Inadequate Reporting Totals		
Number of Violations		0
Number of Systems Affected		0
Number of Repeat Violators		0
Total Population Affected		0

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019.

Table 24. Consumer Confidence Report (CCR) Rule, Failure to Report, Non-Compliant Public Drinking Water Systems, Delaware, 2019			
System Name	City	Population served	Return to Compliance Date
Countryside Estates	Viola	50	11/6/2019
Countryside Hamlet	Frankford	66	11/5/2019
County Seat Garden	Georgetown	297	7/11/2019
Enchanted Acres	Millsboro	225	8/6/2019
Flying Dutchman System 1	Felton	30	7/2/2019
Flying Dutchman System 2	Felton	30	7/2/2019
Flying Dutchman System 3	Felton	81	7/2/2019
Hedgerow Hollow Trailer Park	Smyrna	147	7/30/2019
Hilltop Trailer Park	Rising Sun	65	10/1/2019
Holiday Pines	Millsboro	60	7/15/2019
Kitts Hummock	Dover	252	7/8/2019
Long Neck Village	Millsboro	345	8/6/2019
Lynch Mobile Home Park	Milford	54	10/27/2019
Maranatha Court	Lebanon	54	11/6/2019
Milton Water Dept.	Milton	63	7/30/2019
Pinnacle Rehabilitation	Smyrna	256	10/23/2019
Stage Village	Delmar	93	8/8/2019
CCR Violation Failure to Report Violation Totals			
Number of Violations			17
Number of Systems Affected			17
Number of Repeat Violators			0
Total Population Affected			779

Source: Delaware Department of Health and Social Services, Division of Public Health, Office of Drinking Water, 2019

Conclusion

ODW, the EPA, other state agencies, and non-governmental organizations are working with Delaware's public drinking water systems to ensure compliance with all applicable state and federal drinking water regulations. Together, they ensure that violations are corrected in a timely manner and provide technical assistance as needed. This cooperative action ensures that all Delaware residents and visitors receive safe and potable sources of drinking water.

The majority of public water systems in Delaware supplied drinking water that met the requirements of the SDWA in calendar year 2019. Of the state's 973,764 residents, 20,175 (2.07 percent) were exposed to contaminants such as total coliforms (including *E. coli*) and nitrates. Of the 475 public water systems, 19 (4.0 percent) had a violation for health-based contaminants. Twelve additional water systems (2.5 percent) reported monitoring and reporting violations, and 12 different systems violated the LCR.

Additionally, 17 water systems received violations for failing to submit their Consumer Confidence Reports (CCR) and delivery certification to ODW by July 1, 2019, an increase of four compared to 2018. However, only four of the 17 were repeat violators. Seven water systems returned to compliance by July 31, 2019. The remaining 10 water systems returned to compliance by December 31, 2019 after receiving their notice of violation.

In 2019, only six of the 296 public water systems required to have an operator failed to do so, leading to 98 percent compliance rate. Three of the six systems without a licensed water operator are small community water systems. ODW provided them with a list of water operators they can hire. The remaining three water systems are non-transient non-community water systems. ODW is encouraging them to designate an employee to take the Limited License water operator course, offered by DTCC, so they can be certified to operate their specific water system. Since many of the non-transient non-community water systems are daycare businesses, ODW is working with the Office of Childcare Licensing, within the Department of Services for Children, Youth and Their Families, to enforce this state regulation.

For detailed information about Delaware's public water systems, visit EPA's Envirofacts webpage at www.epa.gov/enviro/html/sdwis/sdwis_query.html. Additional information can be found on ODW's website: www.dhss.delaware.gov/dhss/dph/hsp/odw.html. To view water system test results and other Delaware public water system data, visit the Drinking Water Watch website at <https://drinkingwater.dhss.delaware.gov/>. More information is available at this water quality website maintained by the Governor's Office: <http://www.delaware.gov/topics/waterquality/index.shtml>.