



ISSUE PAPER

THREATS ON TAP: DRINKING WATER VIOLATIONS IN PUERTO RICO

Puerto Rico suffers the worst rate of drinking water violations of any state or territory in the nation.¹ In 2015, 99.5 percent of Puerto Rico’s population was served by community water systems in violation of the Safe Drinking Water Act, and 69.4 percent of people on the island were served by water sources that violated SDWA’s health standards. The data contained in this report reflect significant drinking water violations in Puerto Rico. These numbers are based on Safe Drinking Water Information System (SDWIS) data reported by the Puerto Rico Department of Health to the U.S. Environmental Protection Agency (EPA).

All Violations. In 2015, 99.5 percent of Puerto Rico’s population, or more than 3.4 million people, was served by community water systems in violation of the Safe Drinking Water Act.^{2,3} When ranked by percentage of the total population served by systems with drinking water violations, Puerto Rico was first among all states or territories in the nation. As noted below, most of these violations were for failure to test the water’s safety or failure to report issues to the public or health authorities as

required; a number of these were also violations of health-based standards (which set allowable levels of contaminants in the water, or specify treatment requirements to remove contaminants).

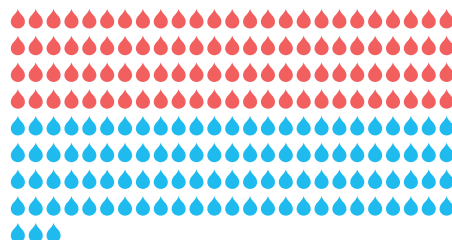
History of Violations. Many of these violations are longstanding. In fact, from 2005 to 2015, there were a total of 33,842 violations of the Safe Drinking Water Act in Puerto Rico, including violations of health-based standards, monitoring violations, and reporting violations.

Safe Drinking Water Act violations in Puerto Rico

99.5%

OF PEOPLE IN PUERTO RICO
 WERE SERVED BY WATER
 SYSTEMS WITH DRINKING
 WATER VIOLATIONS IN 2015

201 OUT OF 406 WATER SYSTEMS
 COMMITTED 545 HEALTH-BASED
 VIOLATIONS IN 2015 IN PUERTO RICO



2.4 MILLION

PEOPLE WERE SERVED BY
 WATER SYSTEMS WITH
 HEALTH-BASED VIOLATIONS
 IN PUERTO RICO IN 2015

Health Standard Violations. In 2015, 69.4 percent of the population in Puerto Rico, or 2,410,809 people, got their water from community water systems that violated the federal health-based standards. A total of 201 out of 406 water systems committed 545 health-based violations in 2015. These included having unlawfully high levels of contaminants such as volatile organic compounds, total coliform bacteria, and disinfection byproducts, as well as violations of the SDWA's Surface Water Treatment Rules. (See Table 1 for a summary of the potential health implications of these violations.) There were 4,092 total health-based violations between 2005 and 2015.

Lead Violations. In 2015, 97.2 percent of the population in Puerto Rico was served by water systems in violation of the Lead and Copper Rule. That year, there were 607 total violations of the Lead and Copper Rule by 158 systems that served 3,379,808 people. All but one of these violations were for failure to test for lead or to report problems to health authorities or the public. In one case, a system was also violating lead treatment rules. In some cases, water samples exceeded EPA's Lead Action Level, which is not an enforceable standard but indicates excessive lead in water.

Most-Violated Rules. The rules for which the most violations were reported from 2005 to 2015 in Puerto Rico were the Total Coliform Rule, the Synthetic Organic Contaminants Rule, the Volatile Organic Contaminants Rule, and the Surface Water Treatment Rule. (See Table 1 for details on these rules and contaminants.)

Small Water Systems. In 2016, an EPA inspector general's report found very serious violations in small water systems in Puerto Rico. Though small systems serve fewer people than do medium and large systems, they often tend to have special challenges with compliance. (Note that the data below cover community water systems of all sizes, not just small systems.) The inspector general found the following:

EPA and the Commonwealth of Puerto Rico's enforcement and compliance assistance efforts have not led to improved compliance for the [small drinking water] systems in our sample. The EPA designated 24 of Puerto Rico's 316 small community water systems as serious violators with Tier 1 violations [the most serious] in October 2011. Of the 24 systems, 23 had not returned to compliance as of April 2015. . . . Puerto Rico included the second-highest percentage of small community water systems designated as serious violators with Tier 1 violations of any U.S. state or territory in October 2011. The high percentage of serious violations reflects broader problems at small systems in Puerto Rico. For example, in 2013 . . . samples at 35 percent of small community systems violated total coliform standards.⁴

RECOMMENDATIONS

The Commonwealth of Puerto Rico's water authorities, such as the Puerto Rico Aqueduct and Sewer Authority, and its Financial Oversight and Management Board should prioritize investment in fixing Puerto Rico's water infrastructure, paying special attention to the needs of disproportionately affected communities. The Financial Oversight and Management Board, created by Congress to control and supervise the island's finances, should ensure that PRASA focuses its future efforts on revitalizing its infrastructure and complying with territorial and federal laws. PRASA should embark on this endeavor through processes that guarantee broad public participation. Such investment would protect public health and provide badly needed jobs. A safe and reliable water infrastructure would also help to revitalize the island's economy.

Through investment in drinking water infrastructure, the Commonwealth of Puerto Rico, water authorities such as the Puerto Rico Aqueduct and Sewer Authority, and the Financial Oversight and Management Board for Puerto Rico must work together to:

- **Implement a robust system for testing drinking water** for contaminants that complies with legal requirements.
- **Improve drinking water treatment** to meet standards that protect the health of Puerto Ricans and visitors from dangerous contaminants.
- **Ensure consumers' right to know about their tap water** by immediately disclosing violations, other water quality issues and test results, and releasing information about plans to upgrade the system and to fix problems.
- **Identify and immediately address sources of lead contamination.**
- **Fix, upgrade, and maintain drinking water distribution systems** to make sure the water is safe and in full compliance with health standards, and to reduce the major water losses that plague many water systems across Puerto Rico and cost consumers millions.
- **Invest in Puerto Rico's water infrastructure** to create jobs in construction, production and sale of materials, and system operation and maintenance. Investment in sustainable infrastructure projects should take into account the ecology of drinking water sources.
- **Strengthen enforcement** of all drinking water regulations.
- **Improve protection of source water** to address water contamination from known or potential pollution sources such as sewage, urban runoff, septic tanks, landfills, and coal ash.
- **Adopt zoning and permitting measures** targeted at ensuring groundwater and surface water are protected from significant pollution sources.

TIPS FOR CONSUMERS

- **Find out whether your water is safe.** This report contains information about Puerto Rico’s drinking water quality, but you can also contact your water provider and ask for its latest testing results.
- **Children, the elderly, pregnant mothers, and people with weakened immune systems** should be especially careful when drinking contaminated water.
- **If your water provider is among those with problems,** consider using an NSF International–certified home water filtration systems to address contaminants of concern. Filters must be carefully maintained in accordance with manufacturers’ instructions to ensure that they are working properly.
- **If your water system has a Lead and Copper Rule violation,** consider using a home water filtration system certified by NSF International to reduce lead.
- **Demand that your water utility come into compliance with the law.**

TABLE 1: SDWA RULES AND CONTAMINANTS’ HEALTH EFFECTS

RULE	DESCRIPTION	MAJOR HEALTH IMPACTS
Combined Disinfectants and Disinfection Byproducts Rules	Establish health standards for disinfection byproducts that apply to community water systems that add disinfectants to their water. While adding chlorine or other chemical disinfectants to water has benefits, these disinfectants can react with organic matter in the water to create byproducts that can adversely impact human health.	Exposure can lead to cancer and potentially to reproductive impacts such as miscarriages and birth defects.
Total Coliform Rule	Sets a maximum contaminant level goal (MCLG) and maximum contaminant level (MCL) for the presence of total coliforms in drinking water. Coliforms are a family of bacteria common in soils, plants, and the guts of animals. [Note: This rule was revised in 2013, but the changes didn’t go into effect until 2016. This report focuses on 2015 and therefore on the earlier rule before revision.]	The presence of coliform bacteria indicates that disinfection may not be working and that disease-causing organisms may be present. These can cause diarrhea, cramps, nausea, and headaches as well as potentially more serious health threats to children, the elderly, and immune-compromised people.
Combined Surface, Groundwater, and Filter Backwash Rules ⁵	Establish treatment requirements to protect people from potential pathogens from groundwater or surface water sources.	Some of the pathogens covered, such as Cryptosporidium and Giardia, can cause severe gastrointestinal distress, nausea, and diarrhea. In very young, elderly, and immune-compromised people, they can cause serious, life-threatening infections.
Nitrates & Nitrites ⁶	Sets an MCLG and MCL for nitrates and nitrites in drinking water. These contaminants commonly come from runoff from synthetic fertilizer or waste from large animal agriculture operations, or from human sewage or septic systems.	Exposure to nitrates and nitrites can lead to blue baby syndrome in infants, developmental defects, and in extreme cases infant death. Long-term exposure above the MCL can lead to impaired thyroid function and damaged cardiovascular health. Nitrates and nitrites may also cause cancer. ⁷
Lead and Copper Rule	Mandates a complex treatment technique to control lead levels in tap water. All water systems serving more than 50,000 people must either treat their water to “optimize corrosion control” or demonstrate that their water isn’t corrosive and that they have no lead problems. Additional requirements also apply.	Lead exposure is particularly toxic to children, potentially causing serious, irreversible damage to developing brains and other parts of the nervous system. Exposure can also cause miscarriages and stillbirths, as well as fertility issues, cardiovascular and kidney impacts, cognitive dysfunction, and elevated blood pressure in otherwise healthy adults.
Radionuclides Rule	Regulates combined radium-226/-228, (adjusted) gross alpha, beta particle, photon radioactivity, and uranium.	Exposure can lead to cancers and, in some cases, impaired kidney function.
Arsenic Rule	Sets an MCLG and MCL for arsenic in drinking water.	Arsenic is a known human carcinogen. Exposure can also lead to developmental defects and to pulmonary, skin, or cardiovascular disease.
Synthetic Organic Contaminants Rule	Sets an MCLG and MCL for 34 synthetic organic (man-made) chemicals that do not exist in nature.	Exposure can lead to cancers, developmental defects, central nervous system and reproductive difficulties, endocrine issues, and liver and kidney problems.
Inorganic Contaminants Rule	Sets an MCLG and MCL for 12 inorganic contaminants (excluding nitrate and nitrite). These are materials of mineral origin that may be present in water due to human activity, such as mining.	Exposure risks vary by chemical but can include increased cholesterol, kidney damage, hair loss, skin irritation, and cancer.
Volatile Organic Contaminants Rule	Sets an MCLG and MCL for 21 volatile organic compounds (VOCs), which are gases at room temperature.	Exposure can lead to cancers; developmental, skin, and reproductive issues; and cardiovascular problems. Exposure can also have adverse effects on the liver, kidneys, and immune and nervous systems.

TABLE 2: ALL VIOLATIONS OF THE SAFE DRINKING WATER ACT IN 2015, RANKED BY POPULATION SERVED (PUERTO RICO)

RULE	POPULATION SERVED	NUMBER OF VIOLATIONS	NUMBER OF SYSTEMS IN VIOLATION (OUT OF A TOTAL OF 406)
Lead and Copper Rule	3,379,808	607	158
Combined Disinfectants and Disinfection Byproducts Rules	2,573,277	252	64
Stage 2 Disinfectants and Disinfection Byproducts Rule	2,531,306	241	63
Combined Surface, Groundwater, and Filter Backwash Rules	1,713,320	304	117
Synthetic Organic Contaminants Rule	1,608,897	297	32
Long Term 2 Enhanced Surface Water Treatment Rule	1,607,059	41	10
Total Coliform Rule	1,363,753	1,739	222
Stage 1 Disinfectants and Disinfection Byproducts Rule	1,288,397	11	5
Long Term 1 Enhanced Surface Water Treatment Rule	1,173,290	15	5
Surface Water Treatment Rule	1,101,891	248	105
Inorganic Contaminants Rule	1,068,453	19	3
Arsenic Rule	1,064,755	2	2
Volatile Organic Contaminants Rule	196,248	273	10
Radionuclides Rule	3,710	5	2
Nitrates	25	4	1
TOTAL	3,456,835	3,502	374

All information in this table is based on Safe Drinking Water Information System (SDWIS) data reported by the Puerto Rico Department of Health to the U.S. Environmental Protection Agency (EPA) and has not been independently verified by NRDC.⁸

TABLE 3: HEALTH-BASED VIOLATIONS OF THE SAFE DRINKING WATER ACT IN 2015, RANKED BY POPULATION SERVED (PUERTO RICO)

RULE	POPULATION SERVED	NUMBER OF VIOLATIONS	NUMBER OF SYSTEMS IN VIOLATION (OUT OF A TOTAL OF 406)
Combined Disinfectants and Disinfection Byproducts Rules	2,179,838	127	39
Stage 2 Disinfectants and Disinfection Byproducts Rule	2,137,867	116	38
Total Coliform Rule	1,315,751	146	77
Stage 1 Disinfectants and Disinfection Byproducts Rule	1,288,397	11	5
Combined Surface, Groundwater, and Filter Backwash Rules	1,229,785	266	111
Long Term 1 Enhanced Surface Water Treatment Rule	1,173,290	15	5
Synthetic Organic Contaminants Rule	219,329	6	5
Surface Water Treatment Rule	37,161	246	104
Long Term 2 Enhanced Surface Water Treatment Rule	19,334	5	2
TOTAL	2,410,809	545	201

All information in this table is based on Safe Drinking Water Information System (SDWIS) data reported by the Puerto Rico Department of Health to the U.S. Environmental Protection Agency (EPA) and has not been independently verified by NRDC.⁹

TABLE 4: TOP TEN SYSTEMS WITH ANY VIOLATION IN 2015, RANKED BY POPULATION SERVED (PUERTO RICO)

WATER SYSTEM	SYSTEM ID	POPULATION SERVED	NUMBER OF VIOLATIONS	NUMBER OF RULES IN VIOLATION	RULES IN VIOLATION	NUMBER OF HEALTH-BASED VIOLATIONS	NUMBER OF HEALTH-BASED RULES IN VIOLATION	HEALTH-BASED RULES IN VIOLATION
METROPOLITANO	PR0002591	1,064,730	64	7	1. Combined SW, GW, FB Rules ¹¹ 2. Lead and Copper Rule 3. Synthetic Organic Chemicals Rule 4. Inorganic Chemicals Rule 5. Total Coliform Rule 6. Arsenic Rule 7. Combined DBP Rules ¹²	24	3	1. Total Coliform Rule 2. Combined DBP Rules 3. Combined SW, GW, FB Rules
MAYAGUEZ	PR0003283	181,972	10	3	1. Combined DBP Rules 2. Combined SW, GW, FB Rules 3. Lead and Copper Rule	5	1	1. Combined DBP Rules
PONCE URBANO	PR0003824	153,092	49	3	1. Volatile Organic Compounds Rule 2. Combined DBP Rules 3. Lead and Copper Rule	N/A	N/A	
AGUADILLA	PR0003293	132,716	16	4	1. Combined SW, GW, FB Rules 2. Combined DBP Rules 3. Lead and Copper Rule 4. Synthetic Organic Chemicals Rule	10	2	1. Synthetic Organic Chemicals 2. Combined DBP Rules
ARECIBO URBANO	PR0002652	92,942	12	2	1. Lead and Copper Rule 2. Combined DBP Rules	N/A	N/A	
RIO BLANCO, VIEQUES, CULEDRA	PR0005386	76,455	14	1	1. Lead and Copper Rule	N/A	N/A	
ISABELA	PR0002672	59,196	5	2	1. Combined DBP Rules 2. Lead and Copper Rule	1	1	1. Combined DBP Rules
EL YUNQUE	PR0005296	54,350	7	1	1. Lead and Copper Rule	N/A	N/A	
FAJARDO CEIBA	PR0005306	50,837	33	2	1. Synthetic Organic Chemicals Rule 2. Lead and Copper Rule	N/A	N/A	
VEGA BAJA URBANO	PR0002772	49,853	12	3	1. Lead and Copper Rule 2. Combined SW, GW, FB Rules 3. Combined DBP Rules	3	1	1. Combined DBP Rules

All information in this table is based on Safe Drinking Water Information System (SDWIS) data reported by the Puerto Rico Department of Health to the U.S. Environmental Protection Agency (EPA) and has not been independently verified by NRDC.¹⁰

TABLE 5: TOP TEN SYSTEMS WITH HEALTH-BASED VIOLATIONS IN 2015, RANKED BY POPULATION SERVED (PUERTO RICO)

WATER SYSTEM	SYSTEM ID	POPULATION SERVED	NUMBER OF VIOLATIONS	NUMBER OF RULES IN VIOLATION	RULES IN VIOLATION	NUMBER OF HEALTH-BASED VIOLATIONS	NUMBER OF HEALTH-BASED RULES IN VIOLATION	HEALTH-BASED RULES IN VIOLATION
METROPOLITANO	PR0002591	1,064,730	64	7	1. Combined SW, GW, FB Rules 2. Lead and Copper Rule 3. Combined DBP Rules 4. Synthetic Organic Chemicals Rule 5. Inorganic Chemicals Rule 6. Total Coliform Rule 7. Arsenic Rule	24	3	1. Total Coliform Rule 2. Long Term I Enhanced Surface Water Treatment Rule 3. Combined DBP Rules
MAYAGUEZ	PR0003283	181,972	10	3	1. Combined DBP Rules 2. Combined SW, GW, FB Rules 3. Lead and Copper Rule	5	1	1. Stage 2 Disinfectants and Disinfection Byproducts Rule
AGUADILLA	PR0003293	132,716	16	4	1. Combined SW, GW, FB Rules 2. Combined DBP Rules 3. Lead and Copper Rule 4. Synthetic Organic Chemicals Rule	10	2	1. Synthetic Organic Chemicals Rule 2. Combined DBP Rules
ISABELA	PR0002672	59,196	5	2	1. Combined DBP Rules 2. Lead and Copper Rule	1	1	1. Stage 2 Disinfectants and Disinfection Byproducts Rule
VEGA BAJA URBANO	PR0002772	49,853	12	3	1. Lead and Copper Rule 2. Combined SW, GW, FB Rules 3. Combined DBP Rules	3	1	1. Stage 2 Disinfectants and Disinfection Byproducts Rule
MANATI EAST	PR0003262	47,519	75	3	1. Combined DBP Rules 2. Lead and Copper Rule 3. Synthetic Organic Chemicals Rule	5	1	1. Stage 2 Disinfectants and Disinfection Byproducts Rule
LAJAS	PR0003343	47,310	8	3	1. Combined SW, GW, FB Rules 2. Combined DBP Rules 3. Lead and Copper Rule	1	1	1. Stage 2 Disinfectants and Disinfection Byproducts Rule
GUAYAMA URBANO	PR0004745	45,959	21	3	1. Combined SW, GW, FB Rules 2. Lead and Copper Rule 3. Combined DBP Rules	8	1	1. Stage 2 Disinfectants and Disinfection Byproducts Rule
REGIONAL VILLALBA TOA VACA	PR0004664	45,080	10	2	1. Combined DBP Rules 2. Lead and Copper Rule	4	1	1. Stage 2 Disinfectants and Disinfection Byproducts Rule
CAGUAS NORTE	PR0005086	41,971	9	3	1. Combined SW, GW, FB Rules 2. Combined DBP Rules 3. Lead and Copper Rule	4	1	1. Long Term I Enhanced Surface Water Treatment Rule 2. Stage I Disinfectants and Disinfection Byproducts Rule

All information in this table is based on Safe Drinking Water Information System (SDWIS) data reported by the Puerto Rico Department of Health to the U.S. Environmental Protection Agency (EPA) and has not been independently verified by NRDC.¹³

TABLE 6: TOP TEN SYSTEMS IN VIOLATION IN 2015 RANKED BY TOTAL VIOLATIONS (PUERTO RICO)

WATER SYSTEM	SYSTEM ID	POPULATION SERVED	NUMBER OF VIOLATIONS
JEA QUALITY	PR0724167	25	127
MANATI EAST	PR0003262	47,519	75
METROPOLI-TANO	PR0002591	1,064,730	64
MOROVIS	PR0005486	614	53
PONCE URBANO	PR0003824	153,092	49
FAJARDO CEIBA	PR0005306	50,837	33
ARUZ	PR0003834	7,225	31
YAUCO	PR0004314	41,473	31
BARRANCAS NUEVO	PR0004625	4,336	31
SALINAS URBANO	PR0004885	12,081	27

All information in this table is based on Safe Drinking Water Information System (SDWIS) data reported by the Puerto Rico Department of Health to the U.S. Environmental Protection Agency (EPA) and has not been independently verified by NRDC.¹⁴

TABLE 7: TOP TEN SYSTEMS IN VIOLATION IN 2015 RANKED BY TOTAL HEALTH-BASED VIOLATIONS (PUERTO RICO)

WATER SYSTEM	SYSTEM ID	POPULATION SERVED	NUMBER OF VIOLATIONS
METROPOLITANO	PR0002591	1,064,730	24
ZAMAS	PR0238012	1,400	13
ANON CARMELITA	PR0458194	800	12
AGUADILLA	PR0003293	132,716	10
SAN SEBASTIAN	PR0003303	34,615	9
COMERIO URBANO	PR0004705	10,101	8
GUAYAMA URBANO	PR0004745	45,959	8
APEADERO	PR0556085	320	8
COTTO LAUREL	PR0004524	14,365	7
CAGUAS NORTE	PR0005086	41,971	6

All information in this table is based on Safe Drinking Water Information System (SDWIS) data reported by the Puerto Rico Department of Health to the U.S. Environmental Protection Agency (EPA) and has not been independently verified by NRDC.¹⁵

ENDNOTES

1 The data in this report are derived from an NRDC analysis of the U.S. Environmental Protection Agency’s Safe Drinking Water Information System. The landing page for that EPA database is found at <https://ofmpub.epa.gov/apex/sfdw/f?p=108:200:::>

2 Based on U.S. Census Bureau population data for July 1, 2015. U.S. Census Bureau, “Quick Facts: Puerto Rico,” undated, <https://www.census.gov/quickfacts/table/PST045216/72>.

3 Safe Drinking Water Act, codified at 42 U.S.C. §300f et seq.

4 U.S. Environmental Protection Agency (hereinafter EPA), Office of the Inspector General, Drinking Water: EPA Needs to Take Additional Steps to Ensure Small Community Water Systems Designated as Serious Violators Achieve Compliance, Report No. 16-P-0108, March 22, 2016, <https://www.epa.gov/sites/production/files/2016-03/documents/20160322-16-p-0108.pdf>.

5 Includes the Groundwater, Surface Water, Filter Backwash, Long Term 1 Enhanced Surface Water Treatment, and Long Term 2 Enhanced Surface Water Treatment Rules.

6 Regulated under Phase II of the Inorganic Contaminants Rule. The EPA classifies these contaminants independently in the Safe Drinking Water Information System (hereinafter SDWIS).

7 Agency for Toxic Substances and Disease Registry, “Nitrate/Nitrite Toxicity: What Are the Health Effects from Exposure to Nitrates and Nitrites?” last updated August 2016, <https://www.atsdr.cdc.gov/csem/csem.asp?csem=28&po=10>.

8 Ibid.

9 Ibid.

10 Ibid.

11 “SW” stands for Surface Water Rules; “GW” for Groundwater Rules, and “FB” for Filter Backwash Rules.

12 “DBP” stands for Disinfection Byproduct Rules.

13 SDWIS, <https://ofmpub.epa.gov/apex/sfdw/f?p=108:200:::>

14 Ibid.

15 Ibid.