

Metadata Definitions and Calculations

ACS: The American Community Survey

CWA: Clean Water Act

CWS: Community Water Systems

ECHO: EPA's Enforcement and Compliance History Online

EPA: United States Environmental Protection Agency

NPDES: National Pollution Discharge Elimination Permit

PWS: Public Water Systems

SDWA: Safe Drinking Water Act

Title	Dataset	Location	Definition	Calculation <small>(or original data column heading)</small>
Nation View or State View		Map	This toggle determines the behavior of the heatmap interface. In State View, the heatmap ranks data values across each state, and clicking into a state transforms the heatmap to rank data values across the counties of the selected state only. In Nation View, we remove the idea of state from the heatmap and directly rank data values for ALL counties nation-wide.	SDWA Geography Determination — To assign each water system to a county and state, we read SDWA_GEOGRAPHIC_AREAS.csv, then keep only rows where AREA_TYPE_CODE is CN (county level), and COUNTY_SERVED is non-empty. For each remaining row we take the PWSID's first two characters to get the full state name, then the COUNTY_SERVED value. We save the result so every PWSID has a clear "County, State" designation. NPDES Geography Determination — To assign each

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				water system to a county and state, we read ICIS_FACILITIES.csv, STATE_CODE and COUNTY_CODE and compare to a FIPS code table obtained from https://www2.census.gov/geo/docs/reference/codes2020/national_county2020.txt .
Legend		Map	The legend shows which colors represent better or worse values on the heatmap. Dark blue is a relatively worse value while white is a better one. Gray means that the data is unavailable for the state or county. The numbers on each side of the legend show the best (on the left) and worst (on the right) values in the current view.	
Public Drinking Water Systems	EPA Safe Drinking Water Act	Table	According to the US EPA, A public water system provides water for human consumption through pipes or other constructed conveyances to at least 15 service connections or serves an average of at least 25 people for at least 60 days a year.	The total number of active public water systems in the geography. Each system with PWS_ACTIVITY_CODE marked "A" for active in the SDWA_PUB_WATER_SYSTEMS.csv file is counted once to produce this figure.
Community Water Systems	EPA Safe Drinking Water Act	Table	A community water system is " A public water system that supplies water to the same population year-round. "	A subset of public water systems designated "CWS" (community) in SDWA_PUB_WATER_SYSTEMS.csv. Every active system whose

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				PWS_TYPE_CODE is CWS adds one to this count.
Systems with Violations	EPA Safe Drinking Water Act	Table	Number of public water systems with violations (regardless of severity)	The number of water systems that have at least one unresolved (unaddressed) Safe Drinking Water Act violation during the current reporting year. Any system appearing in SDWA_VIOLATIONS_ENFORCEMENT.csv with VIOLATION_STATUS = Unaddressed contributes to this total.
Systems with health based violations	EPA Safe Drinking Water Act	Both	Number of systems with Maximum Contaminant Level (or health based) violations	The count of systems with at least one Tier-1 public notification violation (“health violation”). Whenever a system has an unaddressed violation flagged PUBLIC_NOTIFICATION_TIER = 1 in SDWA_VIOLATIONS_ENFORCEMENT.csv, it is included here once regardless of how many such violations it has.
Systems listed as serious violators	EPA Safe Drinking Water Act	Table	Number of public water systems listed as serious violators – (repeat violators of SDWA regulations that may impact public health)	The number of systems whose individual violation score meets or exceeds 11 points. Each system’s score is the sum of its PUBLIC_NOTIFICATION_TIER

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				<p>points (Tier 1 → 10, Tier 2 → 5, Tier 3 → 1) plus up to a 5-point age bonus based on how many years have passed since its oldest unresolved violation.</p> <ul style="list-style-type: none"> • Violations and situations with significant potential to have serious adverse health effects on human health as a result of short-term exposure require Tier 1 public notification. • Violations and situations with potential to have serious adverse health effects on human health require Tier 2 public notification. • All other violations and identified situations not included in the list in Appendix A as requiring Tier 1 or Tier 2 public notification require Tier 3 public notification.
CWA Percent Non-Compliant	EPA CWA National Pollutant Discharge Elimination System (via	Table	Percentage of water systems that service the county that have at least one non-compliant violation	The share of NPDES-permitted facilities in the geography that have been flagged at least once as non-compliant. We calculate this by dividing the number of distinct

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	ECHO)			facilities with at least one serious violation (HLRNC codes S, E, X, T, D, or W) in NPDES_QNCR_HISTORY.csv by the total number of active facilities listed in ICIS_FACILITIES.csv, then multiplying by 100 to express it as a percentage.
Oldest Unresolved Violation	EPA Safe Drinking Water Act	Table	Date of oldest SWDA violation on record as unresolved.	The earliest “first reported” date among all unaddressed violations in the geography. This date is selected by comparing every system’s VIOL_FIRST_REPORTED_DATE (from SDWA_VIOLATIONS_ENFORCEMENT.csv) and carrying forward the minimum.
Percent of Systems with Violations		Map	Percent of systems with at least one unaddressed violation. Calculated by dividing Systems with Violations/Public Drinking Water Systems.	
Percent of Systems Listed as Serious Violators		Map	Percent of systems listed as serious violators – (repeat violators of SDWA regulations that may impact public health). Calculated by dividing Systems with a Violation Score of at Least 11/Public Drinking Water Systems.	

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Unresolved SDWA Violations	EPA Safe Drinking Water Act	Table	Number of SWDA violations on record as unresolved.	The total count of unaddressed violations for all systems combined. Each row in SDWA_VIOLATIONS_ENFORCEMENT.csv with VIOLATION_STATUS = Unaddressed adds one to this sum.
Population Served	EPA Safe Drinking Water Act	Table	Total population served by any public water system that serves this geography. (May double count people served by multiple water systems)	The aggregate number of people served by active water systems, as reported in SDWA_PUB_WATER_SYSTEMS.csv. Each system's POPULATION_SERVED_COUNT value is summed to reflect total community impact.
CWA Non-Compliant Systems	EPA CWA National Pollutant Discharge Elimination System (via ECHO)	Table	Number of facilities in violation of NPDES permit in the county	The number of NPDES-permitted facilities in the geography that have been flagged at least once as non-compliant during the current quarter. We calculate this by summing the number of distinct facilities with at least one serious violation (HLRNC codes S, E, X, T, D, or W) in NPDES_QNCR_HISTORY.csv
CWA Total Violations	EPA CWA National Pollutant Discharge	Table	Total number of violations of NPDES permits in the state or county	The sum of all non-compliance events recorded in the quarter, counting each individual row in

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	Elimination System (via ECHO)			NPDES_QNCR_HISTORY.csv. Unlike the “Non-Compliant Systems” metric, here every violation incident adds one to the total, giving a sense of overall enforcement activity volume.
Households Lacking Plumbing	The American Community Survey ¹	Table	Occupied housing units that do not have plumbing facilities which include hot and cold running water OR a bathtub or shower within the premises.	B25048_003E
Total number of occupied household units	The American Community Survey	Table	ACS estimates number of occupied households in the area	B25048_001E
Percent Households Lacking Plumbing	The American Community Survey	Table	Percentage of occupied households that do not have hot and cold running water OR do not have a shower/tub on premises	Computed as B25048_003E / B25048_001E * 100
Total Population	The American Community Survey	Table	ACS will estimate the total population of the spatial area	DP05_0001E
Median Household Income	The American Community Survey	Table	ACS estimates median household income in the area	S1903_C03_001E

¹ https://www2.census.gov/programs-surveys/acs/tech_docs/subject_definitions/2019_ACSSubjectDefinitions.pdf

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Percent Below Poverty Level	The American Community Survey	Table	ACS estimates population living below poverty line	S1702_C04_001E
Male	The American Community Survey	Table	Number of individuals who self identified as biological sex "male."	DP05_0002E
Female	The American Community Survey	Table	Number of individuals who self identified as biological sex "female."	DP05_0003E
Median Age	The American Community Survey	Table	The median age is the age that divides the population into two equal-size groups. Half of the population is older than the median age and half is younger. Median age is based on a standard distribution of the population by single years of age and is shown to the nearest tenth of a year.',	DP05_0018E
Multiracial	The American Community Survey	Table	People who report multiple races by selecting two or more race categories, also referred to as the "Two or More Races" population.	DP05_0078E
White	The American Community Survey	Table	A person having origins in any of the original peoples of Europe, the Middle East, or North Africa. It includes people who indicate their race as "White" or report entries such as Irish, German, Italian, Lebanese, Arab, Moroccan, or Caucasian.	DP05_0079E

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African American	The American Community Survey	Table	A person having origins in any of the Black racial groups of Africa. It includes people who indicate their race as “Black or African Am.” or report entries such as African American, Kenyan, Nigerian, or Haitian.	DP05_0080E
Latino	The American Community Survey	Table	OMB defines "Hispanic or Latino" as a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race.	DP05_0073E
Asian	The American Community Survey	Table	A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam. It includes people who indicate their race as “Asian Indian,” “Chinese,” “Filipino,” “Korean,” “Japanese,” “Vietnamese,” and “Other Asian” or provide other detailed Asian responses.	DP05_0044E
American Indian	The American Community Survey	Table	A person having origins in any of the original peoples of North and South America (including Central America) and who maintains tribal affiliation or community attachment. This category includes people who indicate their race as “American	DP05_0081E

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			Indian or Alaska Native” or report entries such as Navajo, Blackfeet, Inupiat, Yup’ik, or Central American Indian groups, or South American Indian groups.	
Native Pacific Islander	The American Community Survey	Table	A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands. It includes people who indicate their race as “Native Hawaiian,” “Guamanian or Chamorro,” “Samoan,” and “Other Pacific Islander” or provide other detailed Pacific Islander responses.	DP05_0083E