

# Understanding Jersey WaterCheck Data



JERSEY

**WaterCheck**



## Understanding Jersey WaterCheck Data

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## Overview

This document explains the following related to Jersey WaterCheck:

- Terms used, their definitions, and clarification if they differ from typical industry usage
- Which “systems” were included/excluded and the basic information provided for each
- The breakdown of systems based on population served
- An overview of all data sources used
- Methodologies for system characteristics and metrics that required analysis beyond data gathering, such as the affordability metrics and population served

To see more details by metric, please refer to the “Understanding Jersey WaterCheck Metrics” spreadsheet within the [Documents Library](#).

This document has been reviewed by the Jersey Water Check Data Advisory Committee.

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## Terms

In this section, each term is provided with a general definition, according to typical industry usage. This includes clarifications, if any, for how the term is used in the context of Jersey WaterCheck.

### **Water vs. Wastewater**

“Water” refers to potable water (i.e., drinking water), meaning safe for consumption, and “wastewater” refers to contaminated water that cannot be consumed.

### **Wastewater vs. Sewage/Sewer**

“Wastewater” is used water from any combination of domestic, industrial, commercial or agricultural activities, surface runoff or stormwater, and any sewer inflow or sewer infiltration. As a term, “wastewater” includes both industrial and sanitary (i.e., municipal) categories– it refers to the flow, not the infrastructure. Thus, there are industrial wastewater treatment systems and sanitary/municipal wastewater collection and treatment systems.

“Sewage” is wastewater that is produced by a community of people (A.K.A. domestic/municipal wastewater) which mostly consists of greywater (from sinks, bathtubs, showers, dishwashers, and clothes washers), blackwater (the water used to flush toilets, combined with the human waste and

toilet paper that it flushes away), and soaps/detergents. Thus, this term is associated with municipal wastewater systems.

### ***Water vs. Wastewater Systems***

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“Water” systems refer to those that provide potable water (i.e., drinking water). These are also synonymous with “water supply” systems.

“Wastewater” systems are all municipal wastewater systems. Thus, for the purposes of the dashboard, “wastewater” is considered synonymous with “sewer/sewage.”

### ***System vs. Utility***

“System” is a regulatory unit. It does not imply size, as systems can be small, medium or large, and it does not imply ownership, as there can be one owner of many systems. For example, American Water has 15 million customers across the country (2 million in New Jersey), but they are not served by a single hydrologically connected system.

“Utility” is a type of organization that provides an essential service. The government oversees water and wastewater utility service in New Jersey either by delivering it directly through units of local, county, regional and state agencies or indirectly through corporations that own regulated utilities supervised in New Jersey under the Board of Public Utilities.

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The dashboard uses “system” rather than “utility”, because this better characterizes the individual profiles that data is reported for. For example, NJ American Water is a utility that owns 28 drinking water systems, which are independently operated from each other. Thus, “system” is the right word to refer to the infrastructure and “utility” is more appropriate for the ownership. Additionally, WaterCheck uses “system” as a word to encompass utilities, which feature most of the metrics, as well as municipalities, which feature metrics related to green infrastructure (GI) and combined sewer overflows (CSOs).

### ***Public vs. Private***

In general, entities in the public sector are under government ownership or control, whereas those in the private sector are run by individuals and companies for profit.

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“Public” refers to government owned (i.e., publicly owned) utilities, such as municipalities, municipal/county authorities, state agencies, etc.

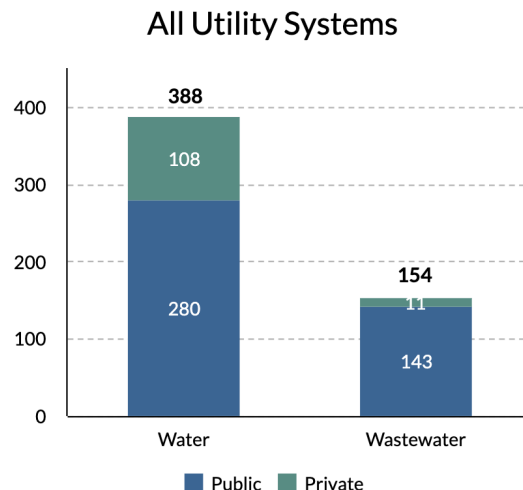
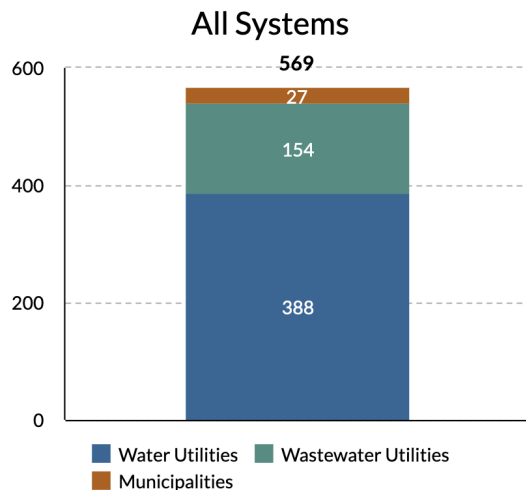
“Private” refers to corporate owned (i.e., investor owned) utilities only. Privately held utilities are not included in the dashboard.

Please refer to “Understanding How the Water Sector is Organized in New Jersey” for a more in-depth explanation of the types of water systems in New Jersey.

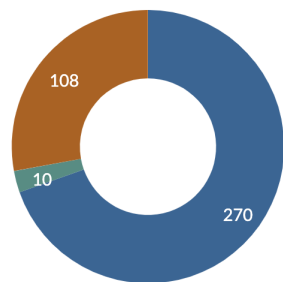
## Systems in Jersey WaterCheck

**All Systems, All Utility Systems (by Type), and Public Water/Wastewater Systems (by Subtype)**  
**Table of All Utility Systems in Jersey WaterCheck**

	Water	Wastewater
<b>Public</b>	280	143
<i>Government owned and operated</i>	270	143

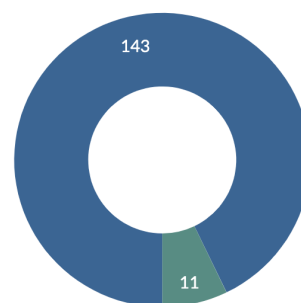


**Public Water Systems**



■ Gov't owned & operated (69.59%)  
■ Gov't owned & corp. operated (2.58%)  
■ Corp. owned & operated (27.84%)

**Public Wastewater Systems**



■ Gov't owned and operated (92.86%)  
■ Corp. owned and operated (7.14%)

<i>Government owned and corporate operated</i>	10	0
<b>Private</b> <i>(Corporate owned and operated)</i>	108	11
<b>Total</b>	388	154
	542	

### Systems Included vs. Excluded

Please refer to the Understanding How the Water Sector is Organized in New Jersey document for a more in-depth explanation of the types of water systems in New Jersey.

The comprehensive list of utility-type systems was obtained from NJDEP. The “Water” list includes systems by PWSID (Public Water System Identification Number). This list was obtained from [NJDEP’s Public Water System deficit/surplus database](#), which was provided via an Excel spreadsheet. Public community water supply (PCWS) systems were included, whereas public non-community water supply (PNCWS) were not. This is because Jersey Water Works goals focus on residents and communities.

The “Wastewater” list includes systems by NJPDES (New Jersey Pollutant Discharge Elimination System) permit number. This list was obtained via the NJPDES Active Permit List in [NJDEP DataMiner](#). NJPDES-permitted systems that are Domestic Treatment Works (DTW) were included, whereas industrial treatment works were not. Specifically, the list was filtered by the “Discharge Category” column to include all “Sanitary Wastewater” systems and certain “Discharge to Groundwater” systems. This is because Jersey Water Works goals focus on residents and communities. Currently, Jersey WaterCheck does not include wastewater systems that are collection systems only, and thus, do not have a NJPDES permit. This decision was made based on data gathering challenges, but future updates may include adding collection systems to the dashboard.

For both water and wastewater, systems that serve prisons, schools, healthcare facilities, nursing homes, mobile home parks, etc. were excluded. This is because most data is much more difficult to gather or otherwise assess for those types of systems compared to ones owned by state/local government or large investor-owned corporations.

All 565 municipalities in New Jersey have system pages in Jersey WaterCheck. Only a subset will have data, as not all municipalities have data to report on green infrastructure.

The municipalities that have data for the green infrastructure metrics were the ones that responded to a survey with questions pertaining to those metrics specifically. The survey was

directly sent to municipalities within the [New Jersey Highlands and Kirkwood Cohansey](#) clusters of the [William Penn Foundation's Delaware River Watershed Initiative](#). These municipalities were prioritized due to prior green infrastructure work that New Jersey Future (which supplies backbone staff for Jersey Water Works) has done in those towns in partnership with funders in the region, notably the William Penn Foundation. The municipality-focused survey was also distributed through other mediums, such as newsletters, to capture as many municipalities in New Jersey as possible.

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## System Characteristics

**Map:** The dots signifying the utility on the map in the “System Finder” page represent the centroids of the service area polygons, which are provided by NJDEP via the [New Jersey Geographical Information Network](#) (NJGIN) Open Data portal.

The following represent system characteristics that appear on each system's page to provide basic information about the system.

- Water vs. Wastewater
  - Defined previously
- Ownership Type (Public vs. Private)
  - Defined previously
- Sub-types
  - Government owned\* and operated
    - \*For Jersey WaterCheck, this is synonymous with publicly owned
  - Government owned and corporate\* operated
    - \*Specifically, operated by a private entity under a contractual agreement
  - Corporate\* owned and operated
    - \*For Jersey WaterCheck, this is synonymous with investor owned
- Population Served
  - This was calculated via a spatial analysis. Please refer to the methodologies section for details.
- Associated Municipalities
  - This was determined via a spatial analysis. Please refer to the methodologies section for details.
- Water Bodies
  - For wastewater only: “Water Bodies Where Treated Wastewater is Released”
  - For drinking water only: “Drinking Water Sources”

- Data for both was obtained from the New Jersey Department of Environmental Protection website, specifically the webpage: [Community Water System Source Water Assessment Reports and Summaries](#).
- Badge: Jersey Water Works Collaborative Member (handshake icon)
  - Indicates that the system is a member of the [Jersey Water Works](#) collaborative
- Badge: EPA Water Needs Survey Participant (checklist icon)
  - Indicates that the system completed the EPA Drinking Water Infrastructure Needs Survey and Assessment and submitted it to the New Jersey Department of Environmental Protection

## System Size

Public water and wastewater systems in New Jersey have various categorizations based on characteristics like population served or amount of water serviced. Jersey WaterCheck uses an arbitrary classification system, based on the population served by each system, which was calculated via a spatial analysis (See the Data Sources and Methodologies document for details). For both water and wastewater systems, “large” systems were classified as serving the highest amount of people and collectively serve 90% of the population; “medium” systems were classified as serving the next highest numbers of people and collectively serve 8% of the population; and “small” systems were classified as serving the lowest number of people and collectively serve 2% of the population.

Large (Collectively serve 90% of population\*)

- Water: serve more than 11,000
- Wastewater: serve more than 25,000

Medium (Collectively serve 8% of population\*)

- Water: serve 3,000 - 11,000
- Wastewater: serve 8,000 - 25,000

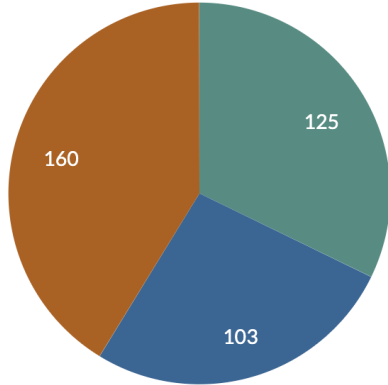
Small (Collectively serve 2% of population\*)

- Water: serve less than 3,000
- Wastewater: serve less than 8,000

\*Year-round population served determined by spatial analysis (see the Methodologies section for detail)

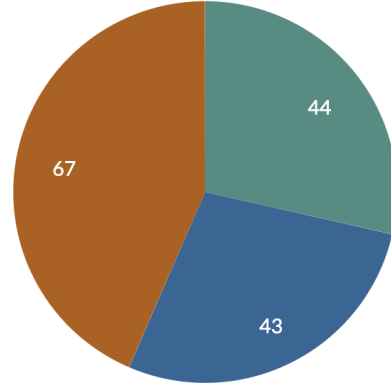


Water Systems by Size



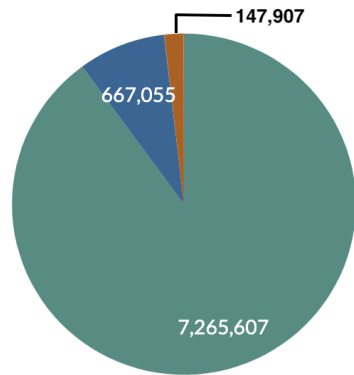
Large (32.22%) Medium (26.55%) Small (41.24%)

Wastewater Systems by Size



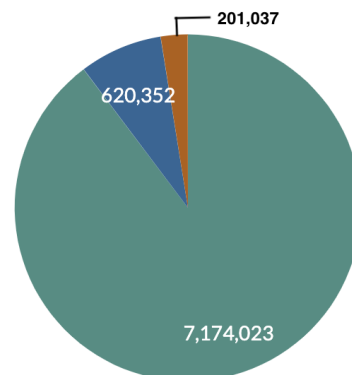
Large (28.57%) Medium (27.92%) Small (43.51%)

Water Systems by Population Served



Large (89.91%) Medium (8.26%) Small (1.83%)

Wastewater Systems by Population Served



Large (89.73%) Medium (7.76%) Small (2.51%)

## Data

### *Data Sources*

The data were collected from three main sources: third party, research, and survey. Third party sources include external organizations such as the New Jersey Department of Environmental Protection (NJDEP) and Sustainable Jersey. Research includes data collection, a review of the CSO Long Term Control Plans, and an affordability study conducted by Professor Dan Van Abs at Rutgers University. There were three surveys issued: one to utility leaders, one to municipal officials, and one to the public (i.e., public opinion survey).

#### **NJDEP**

Data from NJDEP was provided by staff contacts within the Division of Water Supply and Geoscience (for drinking water system data) and the Division of Water Quality (for wastewater system data). Data from Sustainable Jersey was obtained from their website.

#### **CSO LTCPs**

On October 1, 2020 the 24 CSO permittees submitted draft Long Term Control Plans to the NJDEP (found [here](#)). The Jersey Water Works CSO Committee conducted a review of the plans and simultaneously compiled data to inform the relevant Jersey WaterCheck metrics.

#### **Research**

From June to December 2020, interns hired by New Jersey Future collected data to inform some of the Jersey WaterCheck metrics, such as the number of clicks to reach financial information and utility rates. This was conducted via internet searches, as well as emails and phone follow-ups. In August 2021, another intern assisted with the data collection process for the second round of data that was published in December 2021.

Professor Dan Van Abs at Rutgers University conducted a research study called “[A New Jersey Affordability Methodology and Assessment for Drinking Water and Sewer Utility Costs](#)”. This study analyzed the affordability of water and wastewater services in New Jersey, which has informed the relevant affordability metrics such as percent of households that may be stressed by water and sewer utility bills.

Two surveys, one to utility leaders and one to municipal officials, were administered, with the help of New Jersey Future interns, by Jersey Water Works backbone staff to collect data for certain metrics. In 2020, a third public opinion survey, which was distributed through Qualtrics, was conducted to ascertain public support for water infrastructure investment.

Before the launch of the Jersey WaterCheck dashboard, as well as prior to the 2021 data update, utility leaders (to the extent that contact information could be found) were sent copies of their data for review and were allowed to send comments and corrections.

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## Methodologies

### Population Served

NJDEP has data on the population served by each of their water supply systems (PWSID), but not on the wastewater systems (NJPDES). In order to calculate population served for both the water (PWSID) and wastewater (NJPDES) systems, a spatial analysis was conducted using GIS, using the service area, the population count by Census Tract, and residential areas via a land use layer. These population counts were also used to inform the percentage of households that are stressed by water bills for the affordability study.

Below are the general steps of the spatial analysis:

1. The water and sewer service area layers were overlaid with the Census tract layer, which were joined with population estimates (American Community Survey 2014-2018).
2. The land use/land cover 2015 layer was cut to only include residential areas and then that layer was overlaid with the resulting layer from step 1.
3. The percentage of the residential area within the polygons were used to calculate the population of the polygon, using the equation as follows:

$$\frac{\text{Residential area of polygon}}{\text{Total residential area of tract}} = \frac{\text{Population of the polygon}}{\text{Total population of host Census tract}}$$

4. The population of the polygons for a given system were summed to calculate the total population for that system.

### Municipalities Served

QGIS was also used to assign the municipalities served, which were cross-checked with the data that NJDEP provides via [DataMiner](#) (Report Category > Water Supply and Geoscience > Safe Drinking Water > “What Municipalities are Served by My Water System”). Some systems may include overestimates of the systems served due to very small areas of the extraneous municipalities falling under the system’s service area. The spatial analysis attempted to remove these slivers to the best extent possible to avoid this error.

### Cost of Drinking Water and Wastewater Service



Utility rates were obtained through intern data collection. This rate information was sourced from Board of Public Utilities tariff sheets, utility web pages, municipal codes, and often from direct communication with utilities by phone or email. These rates were then applied assuming 45,000 gallons of annual usage to obtain the annual cost, which was then divided by 12 to obtain the monthly cost.

For sewer utilities (usually regional authorities) that serve multiple municipalities, given that each municipality had different rates, a weighted average was calculated using population estimates from the American Community Survey (2014-2018 5 year estimates). The tables of these sewer utilities, with estimated annual rates for each municipality, are included in the last section of this document.

To see more details about this methodology, please refer to "[A New Jersey Affordability Methodology and Assessment for Water and Sewer Utility Costs](#)" (Van Abs, 2021).

### **Percentage of Stressed Households**

To see more details about this methodology, please refer to "[Assessing the Affordability of Water and Sewer Utility Costs in New Jersey. Phase 2 Report: Conceptual Issues for a New Jersey Affordability Assessment Methodology](#)" (Van Abs, 2021) and "[A New Jersey Affordability Methodology and Assessment for Water and Sewer Utility Costs](#)" (Van Abs, 2021).