WATER QUALITY

Disease Information Packets – Slide Set

Public Health Services, Community Health Statistics

10/2023

COUNTY OF SAN DIEGO
HEALTH AND HUMAN SERVICES AGENCY

LIVE WELL
SAN DIEGO

What is Water Quality?

- The measure of the condition of water by examining the presence of certain contaminants (e.g., physical, chemical, biological, and radiological).
- Examining bodies of water will aid in determining where the water can be used:
  - Protection and Reproduction of fish, shellfish, and wildlife,
  - Recreational
  - Public Drinking Water
  - Agricultural
  - Industrial

Source: United States Environmental Protection Agency. (2023, March 27). *What are water quality standards?*. https://www.epa.gov/standards-water-body-health/what-are-water-quality-standards. Accessed 06/20/23.

Factors Affecting Water Quality

- Contaminated water can lead to various health issues, including gastrointestinal illnesses, reproductive problems, chronic diseases, and neurological disorders.
- Vulnerable populations (e.g., infants, young children, pregnant women, the elderly, and those with weakened immune systems) may have an increased risk of becoming sick after contact with contaminated water.

Source: Centers for Disease Control and Prevention. (2020, October 28). *Importance of water quality and testing*. https://www.cdc.gov/healthywater/drinking/public/water_quality.html. Accessed 06/21/23.

Factors Affecting Water Quality

- **Naturally Occurring Chemicals and Minerals**
  - Examples include arsenic, radon, and uranium
- **Agricultural Practices and Operations**
  - Agricultural runoff, caused by fertilizers, pesticides, livestock, and concentrated animal feeding operations.
- **Sewer System Overflow**
  - Untreated sewage from human and industrial waste and other stormwater pollutants into nearby water sources.

Source: Centers for Disease Control and Prevention. (2022, May 26). *Water contamination and diseases*. https://www.cdc.gov/healthywater/drinking/contamination.html. Accessed 06/21/23.

Factors Affecting Water Quality

- **Industrial Processes**
  - Toxic or corrosive industrial waste includes cleaning fluids, paints, and pesticides.
- **Storm Water**
  - Storm water pollution happens when materials and chemicals are collected into the storm drain and into waterways.
- **Wildlife**
- **Distribution System Issues**
  - Particles can accumulate in pipes and tanks, leading to the deterioration of water pipes over time.

Source: Centers for Disease Control and Prevention. (2022, May 26). *Water contamination and diseases*. https://www.cdc.gov/healthywater/drinking/contamination.html. Accessed 06/21/23.

Measuring Water Quality

- **A series of assessments are conducted to determine an area's water quality. Measurements include:**
  - Temperature
  - Acidity (pH)
  - Dissolved solids (specific conductance)
  - Turbidity (cloudiness of the water)
  - Dissolved oxygen (the level of oxygen that is dissolved in the water)
  - Hardness, and suspended sediments of the water.
  - Monitoring for contaminants (e.g., arsenic, nitrite, nitrate, uranium)
  - Physical characteristics of water (e.g., water absence/presence, water level, and discharge)

Sources: United States Environmental Protection Agency. (2022, November 23). *Assessing and reporting water quality (questions and answers).* https://www.epa.gov/waterdata/assessing-and-reporting-water-quality-questions-and-answers#:~:text=State%20water%20quality%20assessments%20are,types%20for%20an%20overall%20assessment. Accessed 06/20/23.
United States Environmental Protection Agency. (2023, April 3). *Water sensors toolbox*. https://www.epa.gov/water-research/water-sensors-toolbox. Accessed 06/20/23.

Measuring Water Quality

- Public water systems that fail to meet water quality standards must alert the public of potential health risks.
- Additional information about water quality can also be found through the annual *Consumer Confidence Report (CCR)*, also referred to as the *Water Quality Report*.

Sources: Centers for Disease Control and Prevention. (2023, February 23). *Drinking water frequently asked questions (FAQs)*. https://www.cdc.gov/healthywater/drinking/drinking-water-faq.html. Accessed 06/21/23.

National Statistics and Disparities

- **Millions of people in the United States rely on public community water systems for tap water yearly.**
  - In the United States, 9 out of 10 people receive their water supply from one of the 148,000 public water systems.
  - The U.S. Environmental Protection Agency (EPA) sets standards and regulations that are required to be followed by all public water systems in the United States.

Sources: Centers for Disease Control and Prevention. (2022, April 6). *Water sources*. https://www.cdc.gov/healthywater/drinking/public/water_sources.html. Accessed 06/21/23.
Centers for Disease Control and Prevention. (2023, February 23). *Drinking water frequently asked questions (FAQs).* https://www.cdc.gov/healthywater/drinking/drinking-water-faq.html. Accessed 06/21/23.

National Statistics and Disparities

- **In the United States, there are three sources of water supply for public water systems and private wells.**
  - Surface water (e.g., lakes, rivers, or reservoirs)
  - Ground water (e.g., aquifers)
  - Recycled water (e.g., reused water)

Source: Centers for Disease Control and Prevention. (2022, April 6). *Water sources*. https://www.cdc.gov/healthywater/drinking/public/water_sources.html. Accessed 06/21/23.

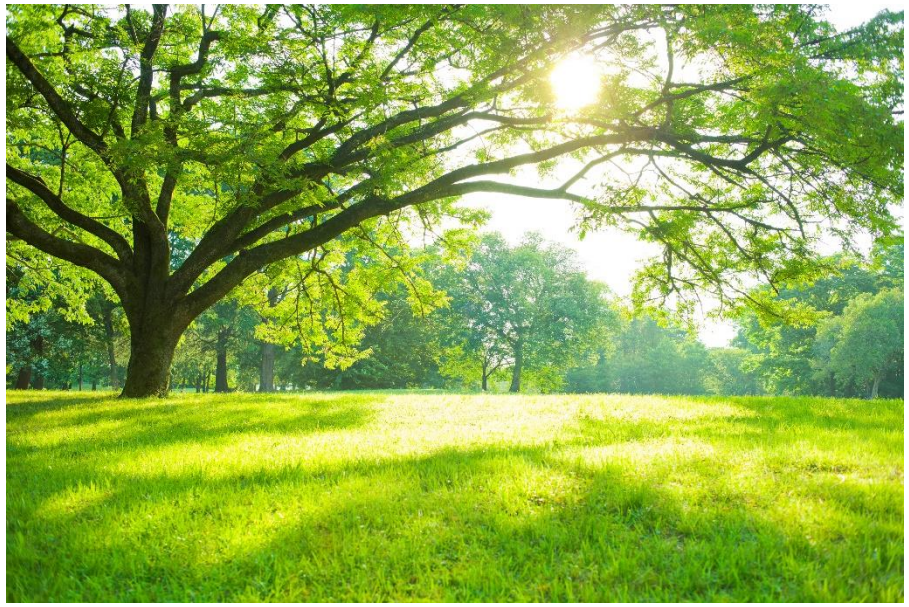
National Statistics and Disparities

- Although there have been many improvements in water quality practices in the United States over the years; further efforts are still needed to improve water quality systems to reduce the impact of waterborne illnesses.
- **Drinking Water**
  - In 2021, in the United States, there were 15 outbreaks (214 cases) of waterborne illnesses from public drinking water.
  - Between 1971 and 2021, **Legionella pneumophila**, a type of bacteria, has been found to be the leading cause of waterborne outbreaks resulting from contamination of drinking water.

Source: Centers for Disease Control and Prevention. (n.d.). National Outbreak Reporting System (NORS). https://wwwn.cdc.gov/norsdashboard/. Accessed 06/23/23.

National Statistics and Disparities

- **Treated and Untreated Recreational Water**
  - In 2021, in the United States, there were 23 outbreaks (223 cases) of waterborne illnesses from treated recreational water.
  - There were 10 outbreaks (65 cases) of waterborne illnesses from untreated recreational water in the United States in 2021.
  - Between 1971 and 2020, **Cryptosporidium**, a parasitic disease that causes diarrheal illness, has been the primary cause of waterborne outbreaks caused by recreational water contamination.



Source: Centers for Disease Control and Prevention. (n.d.). *National Outbreak Reporting System (NORS)*. https://wwwn.cdc.gov/norsdashboard/. Accessed 06/23/23.

National Statistics and Disparities

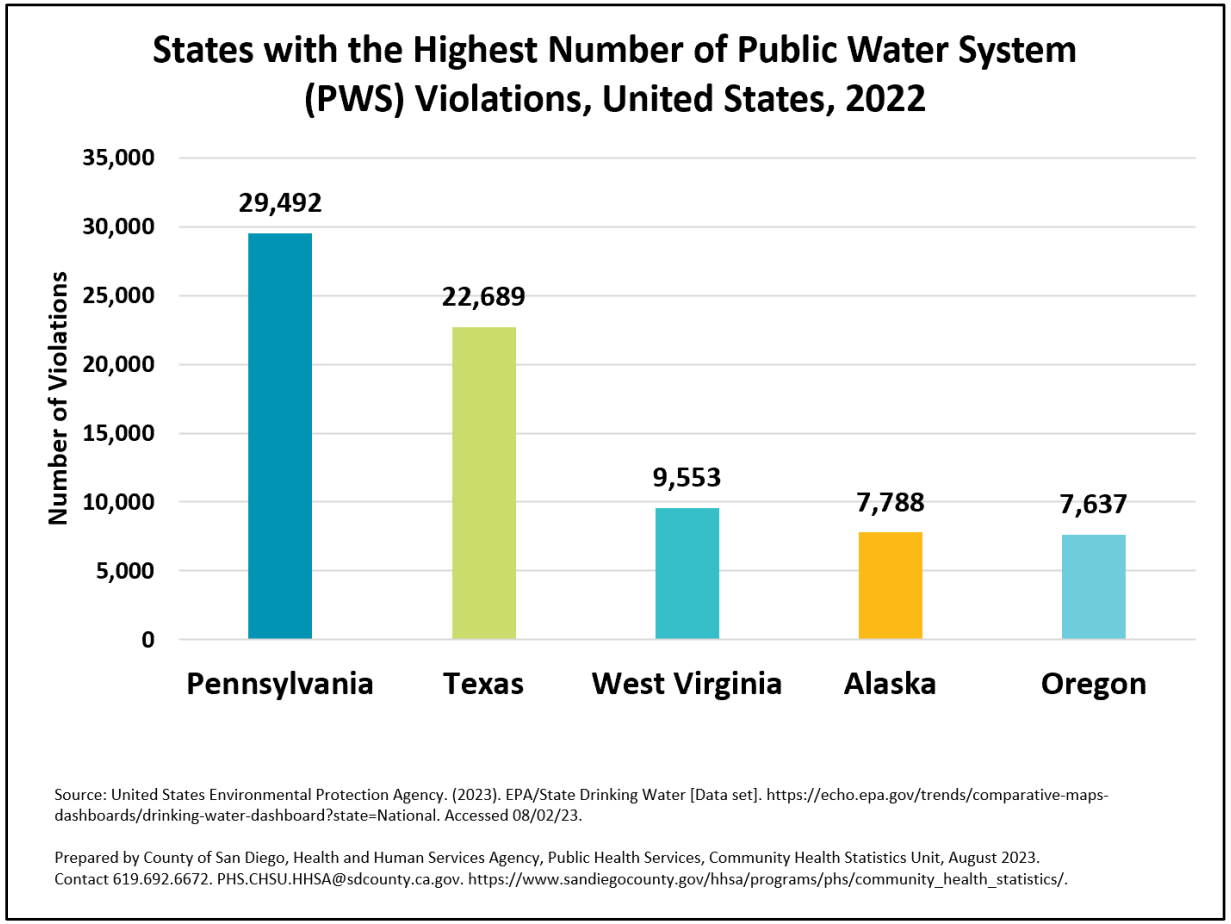


Figure 1: States with the highest number of public water system (PWS) violations, United States, 2022

- In the United States, Pennsylvania had the highest number of public water system violations (29,492), followed by Texas (22,689) in 2022.
- The most common violation for Pennsylvania, Texas, West Virginia, Alaska, and Oregon was the failure to regularly monitor and submit reports on drinking water quality, as required by the Safe Drinking Water Act.
- In 2022, the states with the fewest public water system violations were North Dakota (250), South Dakota (225), Nebraska (148), Delaware (133), and Hawaii (5).

Source: United States Environmental Protection Agency. (2023). *EPA/State drinking water dashboard [Data set].* https://echo.epa.gov/trends/comparative-maps-dashboards/drinking-water-dashboard. Accessed 08/02/23.

National Statistics and Disparities

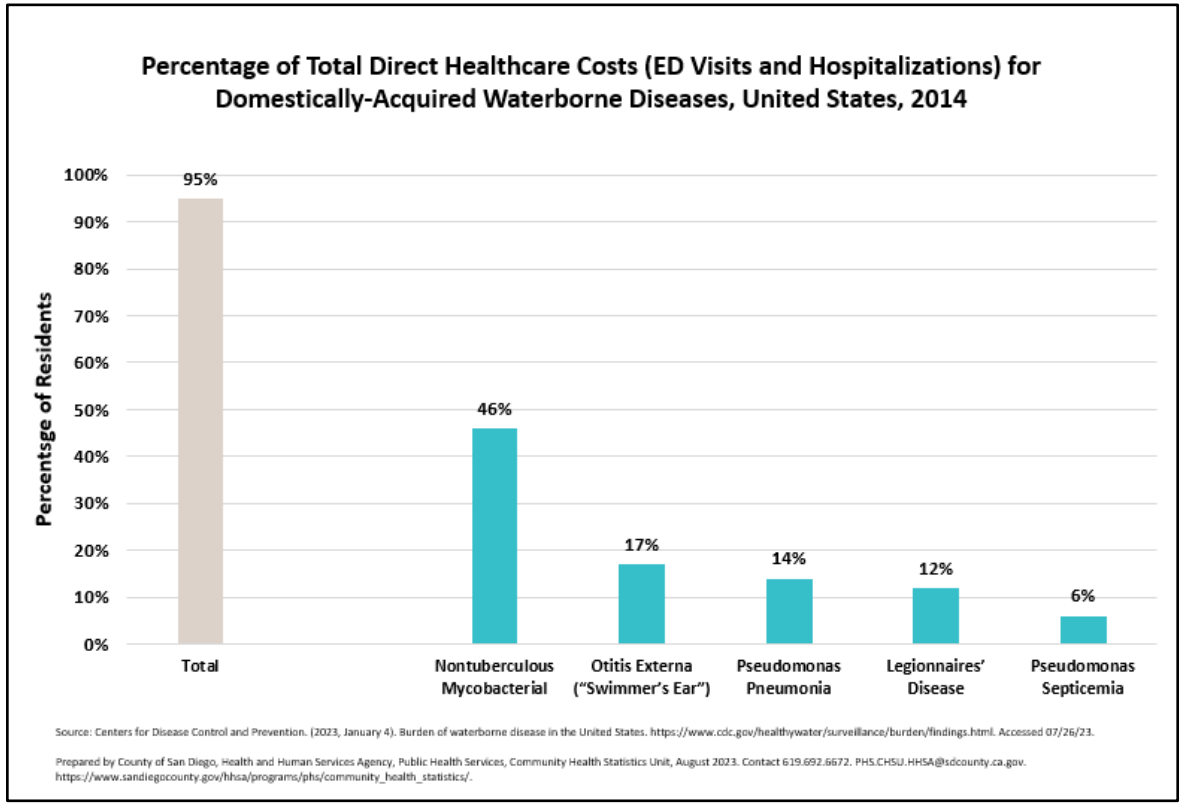


Figure 2: Percentage of total direct healthcare costs (ED visits and hospitalizations) for domestically-acquired waterborne diseases, United States, 2014

- Waterborne illnesses place a significant financial strain on the healthcare system.
  - The total estimated direct healthcare costs for hospitalizations and emergency department visits due to waterborne illnesses totaled $3.1 billion in 2014.
  - In 2014, nontuberculous mycobacterial (NTM) - a type of bacteria - was found to be the most costly waterborne illness of combined costs for emergency department visits and hospitalizations, amounting to $1.5 billion.

Source: Centers for Disease Control and Prevention. (2023, January 4). *Burden of waterborne disease in the United States*. https://www.cdc.gov/healthywater/surveillance/burden/findings.html. Accessed 07/26/23.

State Statistics and Disparities

- California has two primary sources of water: the **Colorado River** and the **State Water Project**.
- California has 2,933 public water systems, including 90 state small water systems, spread across its 58 counties.
  - In 2013, approximately 98% of Californians received water from public water system sources, while the remaining 2% obtained water from unregulated small water systems or privately operated groundwater wells with little or no treatment.

Sources: California Department of Water Resources. (n.d.). *The California water system*. https://water.ca.gov/water-basics/the-california-water-system. Accessed 06/21/23.
California Office of Environmental Health Hazard Assessment. (2021, October). *CalEnviroScreen 4.0 Report*. https://oehha.ca.gov/media/downloads/calenviroscreen/report/calenviroscreen40reportf2021.pdf. Accessed 07/05/23.
State of California Colorado River Board. (2023, January 31). *California water agencies submit Colorado river modeling framework to bureau of reclamation*. https://crb.ca.gov/2023/01/california-water-agencies-submit-colorado-river-modeling-framework-to-bureau-of-reclamation/. Accessed 06/27/23.

State Statistics and Disparities

- The EPA monitors violations related to drinking water according to the Safe Drinking Water Act; violations are classified into different categories.
  - The most common violation in California was related to monitoring and reporting, with approximately 1,200 violations annually.
  - The total number of violations in California's public water systems has decreased from 2,100 in 2020 to 2,069 in 2022.
  - Among the states in the US, California was ranked 28th for the most number of violations issued to public water systems in 2022.

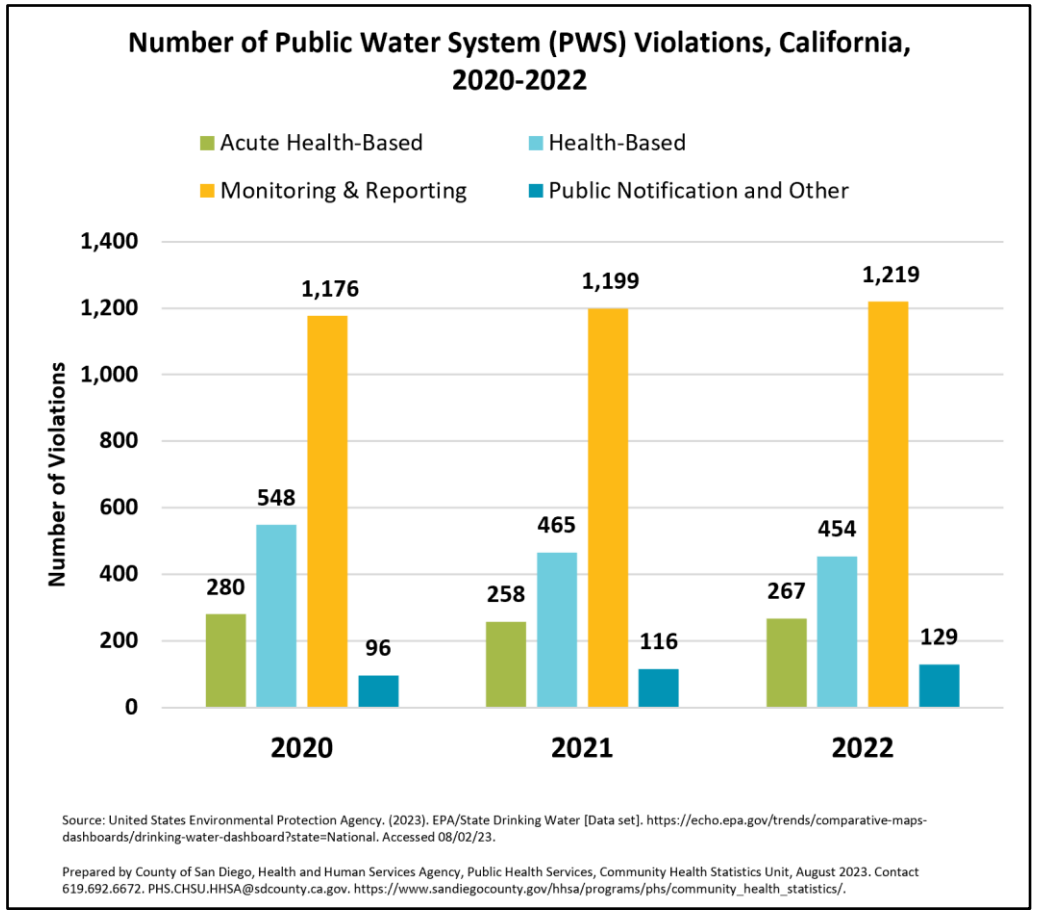


Figure 3: Number of public water system (PWS) violations, California, 2020-2022

Source: United States Environmental Protection Agency. (2023). *EPA/State drinking water dashboard [Data set].* https://echo.epa.gov/trends/comparative-maps-dashboards/drinking-water-dashboard Accessed 08/02/23.

Local Statistics and Disparities

- The San Diego County Water Authority (SDCWA) is a water wholesaler that sells untreated and treated water to various cities across San Diego County.
- The Metropolitan Water District of Southern California (MWD), sells a portion of water from the Colorado River and the State Water Project to SDCWA.
  - Treated water purchased through MWD is treated and processed at the Metropolitans Skinner Treatment Plant located in Temecula, CA.

Sources: San Diego County Water Authority. (2022, July 6). *Water quality*. https://www.sdcwa.org/your-water/water-quality/. Accessed 06/16/23.
San Diego County Water Authority. (2023, January 23). *Your water*. https://www.sdcwa.org/your-water/. Accessed 06/16/23.

Local Statistics and Disparities

- The **Twin Oaks Valley Treatment Plant in San Marcos** processes some of the raw water that belongs to SDCWA.
- SDCWA resells the remaining raw water to local water agencies.
  - Some local agencies, including the city of San Diego, have their own treatment plants to treat water.
- SDCWA also receives desalinated water from the **Claude "Bud" Lewis Carlsbad Desalination Plant in Carlsbad** to blend within the public drinking water supply.

Sources: San Diego County Water Authority. (2022, July 6). *Water quality*. https://www.sdcwa.org/your-water/water-quality/. Accessed 06/16/23.
San Diego County Water Authority. (2023, January 23). *Your water*. https://www.sdcwa.org/your-water/. Accessed 06/16/23.

Local Statistics and Disparities

2022 SDCWA's Water Supply

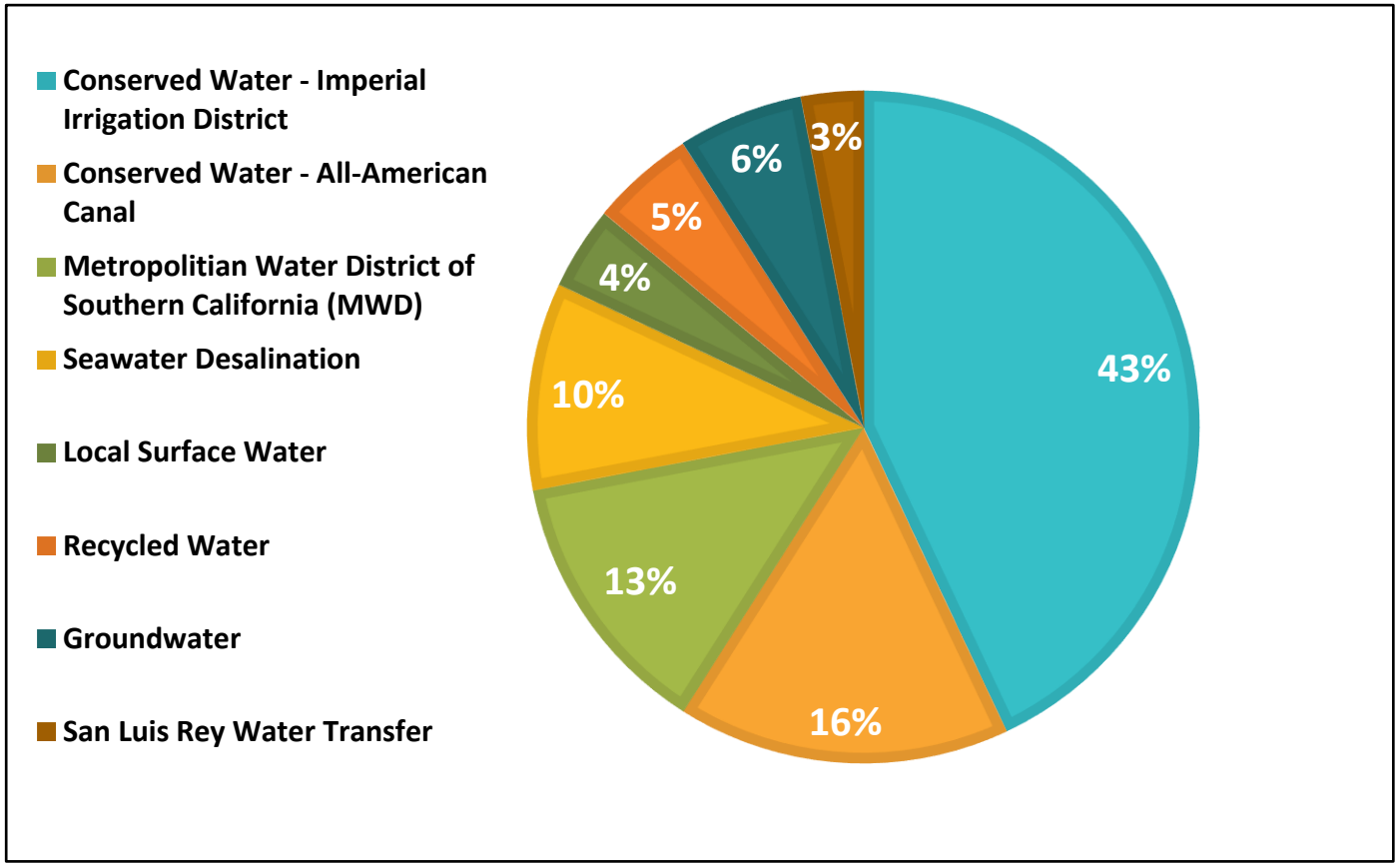


Figure 4: San Diego County Water Authority's Local Water Sources

- The Colorado River is over **50%** of the County of San Diego's water source.
- SDCWA has proposed to decrease water supply through the Colorado River and increase potable reuse water by **18%** by **2045.**

Source: San Diego County Water Authority. (2023, January 23). *Your water*. https://www.sdcwa.org/your-water/. Accessed 06/16/23.

Local Statistics and Disparities

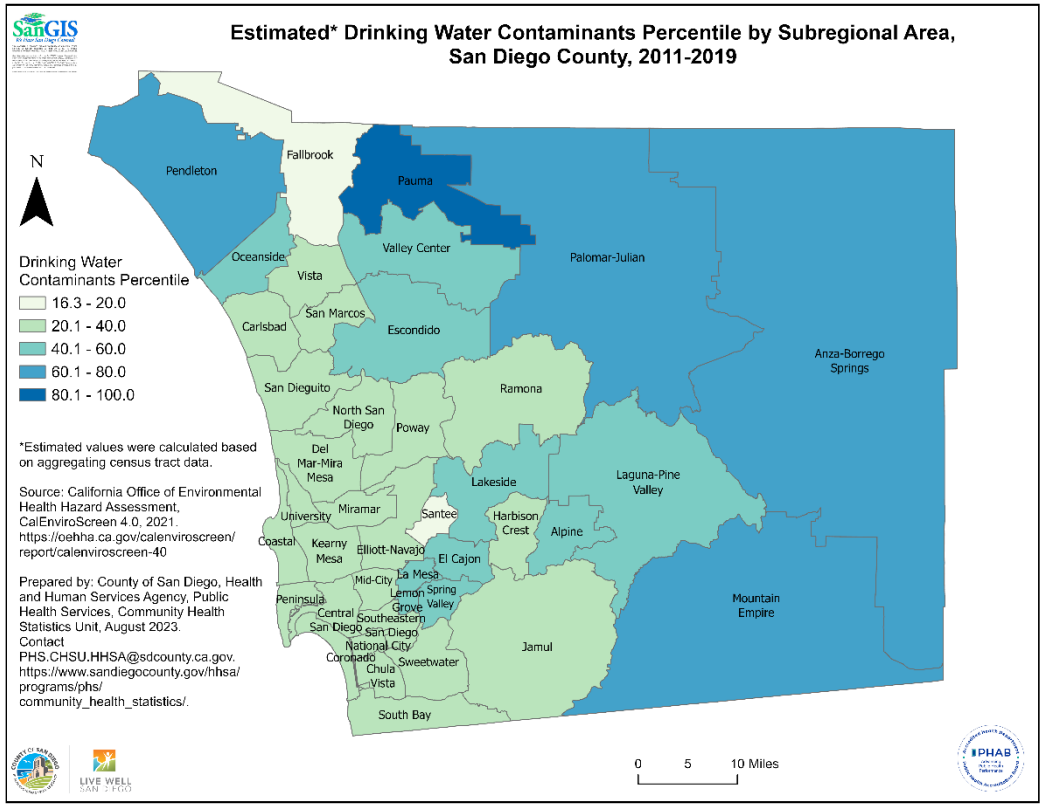


Figure 5: Estimated average drinking water contaminants percentile by subregional area, San Diego County, 2011—2019*

- A higher percentile indicates that there are more contaminants in the water.
- The average drinking water contaminants in **Pauma SRA** in North Inland Region was higher than **94.83%** of the census tracts in California between 2011 and 2019.

***Table 1:** Subregional Areas with the Highest Estimated* Average Drinking Water Contaminants Percentile, San Diego County, 2011-2019*

Subregional Area (SRA)	Region	Percentile
Pauma	North Inland	94.83
Mountain Empire	East	78.58
Anza-Borrego Springs	North Inland	62.25
Palomar-Julian	North Inland	61.83
Pendleton	North Coastal	60.06
Lakeside	East	59.30
Oceanside	North Coastal	57.09
Laguna-Pine Valley	East	51.49
Lemon Grove	East	46.39
La Mesa	East	45.25

**Estimated values were calculated based on aggregating census tract data.*

Source: California Office of Environmental Health Hazard Assessment. (2021). *CalEnviroScreen 4.0 [Data set]*. https://experience.arcgis.com/experience/ed5953d89038431dbf4f22ab9abfe40d/. Accessed 06/28/23.

Local Statistics and Disparities

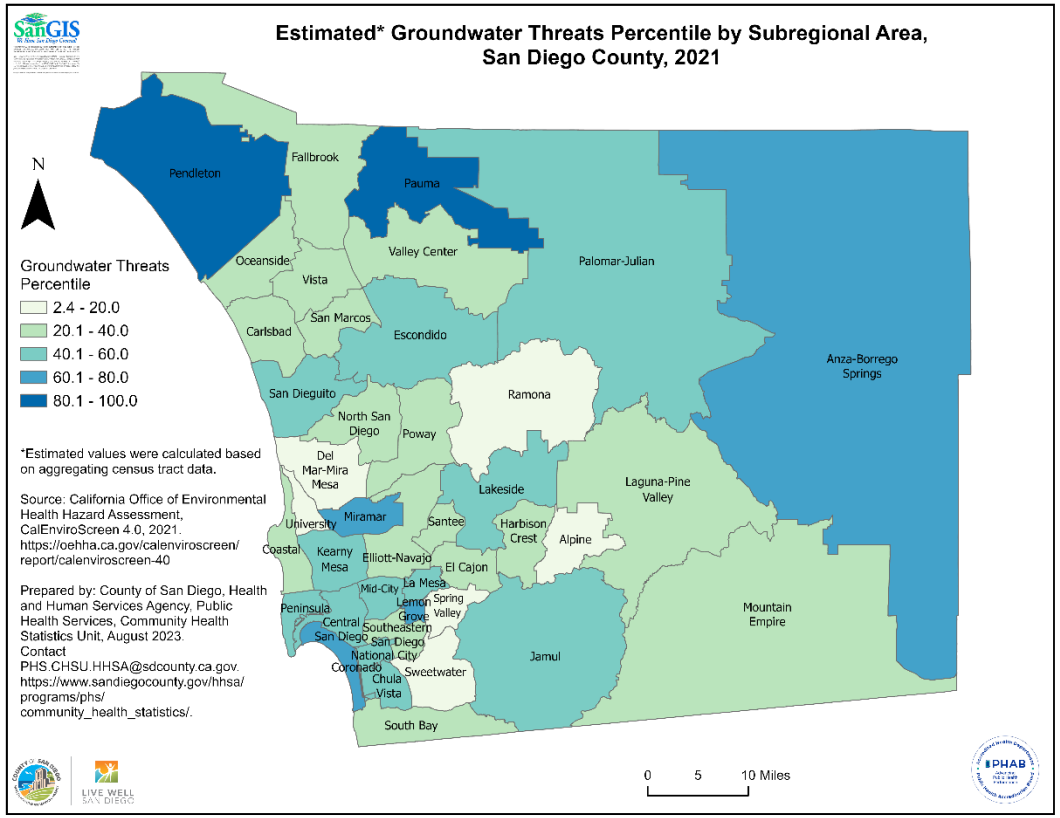


Figure 6: Estimated average groundwater threats percentile by subregional area, San Diego County, 2021*

- A higher percentile means there are a greater number of threats to sources of groundwater in a region.
- The average groundwater threats percentile in **Pendleton SRA** in North Coastal Region was higher than **98.67%** of the census tracts in California in 2021.

***Table 2:** Subregional Areas with the Highest Estimated* Average of Groundwater Threats Percentile, San Diego County, 2021*

Subregional Area (SRA)	Region	Percentile
Pendleton	North Coastal	98.67
Pauma	North Inland	83.21
Miramar	North Central	76.17
Anza-Borrego Springs	North Inland	72.49
Coronado	South	62.36
Lemon Grove	East	60.36
Central San Diego	Central	59.11
San Dieguito	North Coastal	54.20
Jamul	East	52.96
Peninsula	North Central	51.75

**Estimated values were calculated based on aggregating census tract data.*

Source: California Office of Environmental Health Hazard Assessment. (2021). *CalEnviroScreen 4.0 [Data set].* https://experience.arcgis.com/experience/ed5953d89038431dbf4f22ab9abfe40d/. Accessed 06/28/23.

Local Statistics and Disparities

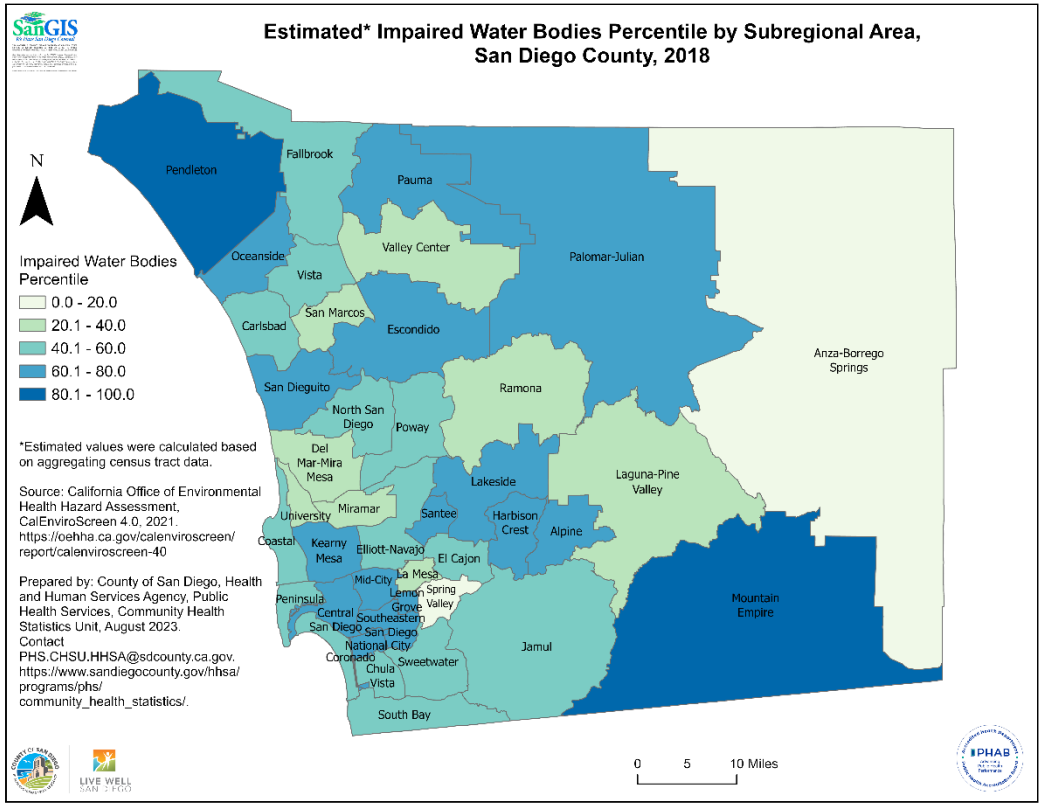


Figure 7: Estimated average impaired water bodies percentile by subregional area, San Diego County, 2018*

- A higher percentile indicates that more water bodies in a region, were impaired and were not meeting water quality standards set by the EPA.
- The average impaired waters percentile in **Pendleton SRA** in North Coastal Region was higher than **96.79%** of the census tracts in California in 2018.

***Table 3:** Subregional Areas with the Highest Estimated* Average Impaired Water Bodies Percentile, San Diego County, 2018*

Subregional Area (SRA)	Region	Percentile
Pendleton	North Coastal	96.79
Mountain Empire	East	86.96
Lemon Grove	East	77.25
Southeastern San Diego	Central	75.82
Kearny Mesa	North Central	73.86
Escondido	North Inland	73.11
Pauma	North Inland	72.15
Mid-City	Central	71.15
Santee	East	70.00
San Dieguito	North Coastal	69.65

**Estimated values were calculated based on aggregating census tract data.*

Source: California Office of Environmental Health Hazard Assessment. (2021). *CalEnviroScreen 4.0 [Data set].* https://experience.arcgis.com/experience/ed5953d89038431dbf4f22ab9abfe40d/. Accessed 06/28/23.

Local Statistics and Disparities

- In 2021, giardiasis had the highest total number of reported cases when compared to cryptosporidiosis and legionellosis.
- More cases of cryptosporidiosis, legionellosis, and giardiasis were reported among males compared to females in 2021.

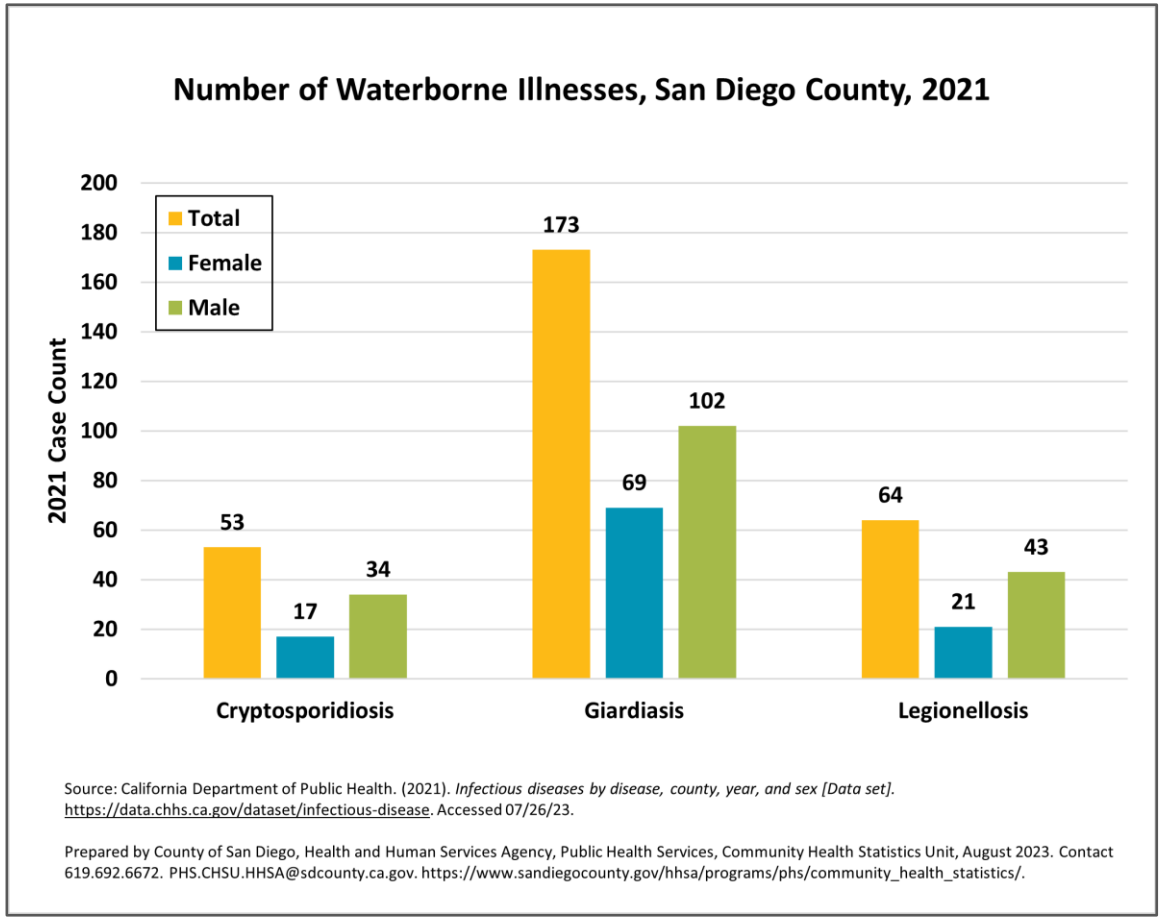


Figure 8: Number of waterborne illnesses, San Diego County, 2021

Source: California Department of Public Health. (2021). *Infectious diseases by disease, county, year, and sex [Data set].* https://data.chhs.ca.gov/dataset/infectious-disease. Accessed 07/26/23.

Protection of Our Waterways

- **Limit Use of Fertilizers and Pesticides**
  - Avoid overusing pesticides, fertilizers, and other materials to prevent harmful runoff from seeping into groundwater and surface water sources.
  - Be cautious when using fertilizers and pesticides during expected rainfall. There is a higher risk of harmful runoff that can contaminate nearby water sources.

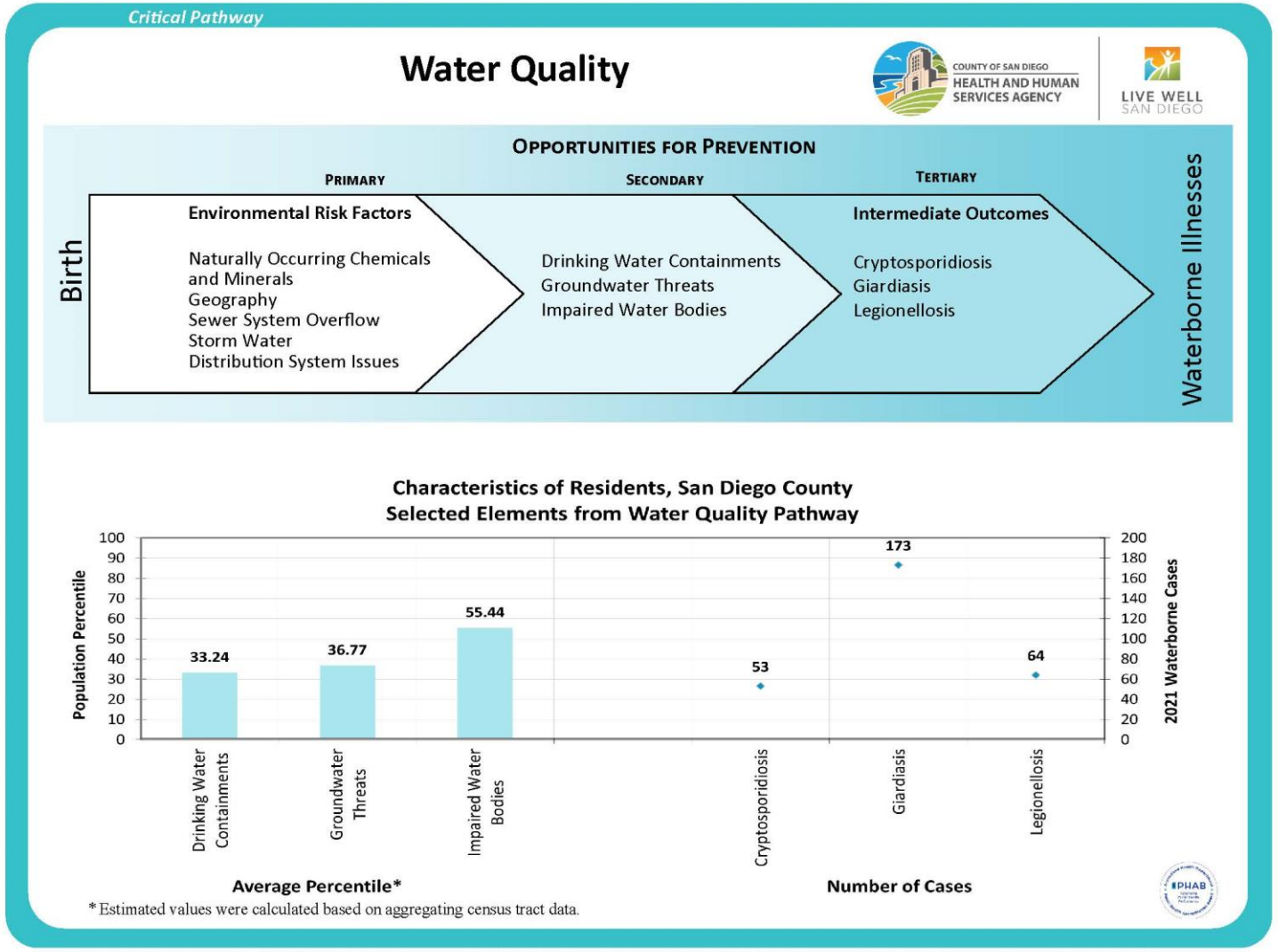
Source: United States Environmental Protection Agency. (2023, July 3). *What you can do about trash pollution*. https://www.epa.gov/trash-free-waters/what-you-can-do-about-trash-pollution. Accessed 07/11/23.

Protection of Our Waterways

- **Cleaning Up and Preventing Littering**
  - Dispose of waste properly. Litter can travel long distances in water and may cause harmful conditions for human health and aquatic life.
- **Conserving Water**
  - To reduce water shortages and the need to treat contaminated water, turn off the tap when running water is not actively being used.

Sources: United States Environmental Protection Agency. (2023, February 7). *Pollution prevention tips for water conservation*. https://www.epa.gov/p2/pollution-prevention-tips-water-conservation. Accessed 07/11/23.
United States Environmental Protection Agency. (2023, March 14). *How can you help protect source water?*. https://www.epa.gov/sourcewaterprotection/how-can-you-help-protect-source-water. Accessed 07/11/23.

Critical Pathway for Water Quality



Resources

United States Environmental Protection Agency:

Find your Local Confidence Consumer Reports (CCR)

https://ordspub.epa.gov/ords/safewater/f?p=136:102::::::

Contact Us

For more information, including data, resources and reports from the County of San Diego's Community Health Statistics Unit:

www.SDHealthStatistics.com

(619) 692-6667

The Public Health Services department, County of San Diego Health and Human Services Agency, has maintained national public health accreditation, since May 17, 2016, and was re-accredited by the Public Health Accreditation Board on August 21, 2023.