This is a sample of what users of KETOS PRISM will receive when they create their own reports for their desired geographic areas.

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Water Quality Risk Assessment

Harris County, TX

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OVERVIEW

Harris County, TX

Geography

Harris County covers a total area of 1,778 square miles, out of which 1,729 square miles is land and 49 square miles is water[1]. Another source mentions the total area as 1,777 square miles with 1,703 square miles of land and 74 square miles of water[2]. The average elevation of the county is 92 feet[3].

Demographic

As of 2020, Harris County had a population of 4,731,145, making it the most populous county in Texas and the third most populous county in the United States[4]. Between 2010 and 2021, the population grew by 15.1% from 4,107,542 to 4,728,030[5]. The racial and ethnic makeup has evolved over time, with an increased percentage of Hispanics and Asians in 2021 as compared to 2010. As of the latest data, the racial composition was 26% White, 18% Black, 7% Asian, and 45% Hispanic, among others[6]. The median household income in 2021 was $63,498 and 33.5% of the population had a Bachelor's Degree or higher[7].

Key Water Sources (Surface Water or Groundwater)

Harris County has approximately 1,200 public drinking water systems, with the City of Houston having the largest system in Texas[8]. The water infrastructure includes elements like the Central Harris County Regional Water Authority and the City of Houston Area 2 Groundwater Infrastructure[9]. The county, situated in the West Gulf Coastal Plain, has one of the heaviest concentrations of groundwater withdrawal in the United States, where large quantities of water are pumped to cater to the growing population and industrial requirements[10]. For instance, the water supply for Harris County Fresh Water Supply District 61 primarily comes from deep wells, pumping water from aquifers to the water treatment plant[11].

References

[2] Infogalactic. "Harris County, Texas."
[3] Topographic-Map. "Harris County topographic map, elevation, terrain."
[4] USAFacts. "Harris County, TX population by year, race, & more."
[5] Wikipedia. "Harris County, Texas."
[6] Census Reporter. "Harris County, TX - Profile data."
[7] United States Census Bureau. "Harris County, Texas - Census Bureau Profile."
[8] Harris County Public Health. "Drinking Water."
[9] 2022 Texas State Water Plan. "Harris County."
[10] United States Geological Survey (USGS). "Salt water and its relation to fresh ground water in Harris County, Texas."
[11] Harris County Fresh Water Supply District #61. "Operations."

KEY COMPONENTS OVERVIEW

Water Quality Risk Report

The Water Quality Risk Report created by KETOS Inc is based on the aggregation of public and private water quality data from the United States.

Unlike water quantity, measuring water quality risk for specific geographic locations is an exceedingly difficult exercise. Not only does water quality depend on multiple dynamic environmental variables such as lithography, soil chemistry, precipitation but also complex factors that vary geospatially, such as industrial effluents, pollutant sources and demographic use KETOS PRISM takes a very pragmatic approach to estimating Water Quality Risk (WQR henceforth in this report). Risk is quantified through known incidents of violations where such violations are publicly recorded such as in EPA enforcement reports. In the absence of such knowledge, or in the event that a location has no known data regarding such violations, we estimate risk through other means – such as proximity to pollutant sources such as PFAS, toxic waste inventories, superfund sites and the like.

What emerges from this approach is a pragmatic, yet insightful measure of risk along several different dimensions, measured on a scale from 0 to 10 (with 10 being highest possible risk along that dimension and zero being the lowest) that can then be combined to create a composite Water Quality Riskscore that can be used to rank locations for their overall water quality risk.

In the following sections, we detail each dimension of Water Quality Risk and explain how we estimate each type of risk.

1. Drinking Water Quality Risk (DWR):

Drinking Water Quality Risk is the Water Quality Risk measure that impacts residents of a county most directly. We estimate this risk measure from several factors relating to Public Water Supply (PWS) systems in an area, such as the total number of serious violations, the frequency of violations in the last thirteen quarters, and the chemicals involved in a violation.

Water Quality Risk Report

2. Toxic Waste Related Water Quality Risk (TWR): Toxic chemical releases from federally regulated facilities pose an elevated risk to the safety of surface and ground waters. KETOS PRISM mines data from the EPA's Toxic Release Inventory program and creates a risk score on a scale of zero of ten for each county.

3. Industrial Effluent Related Water Quality Risk (IWR): The National Pollutant Discharge Elimination System (NPDES) permits industrial polluters to discharge into point sources of water in the US. KETOS PRISM takes an inventory of all NPDES permits in a county and mines this data for violations, discharges and computes a net risk score for industrial discharge risk.

4. PFAS Related Water Quality Risk (PWR): PFAS are widely used, long lasting chemicals, components of which break down very slowly over time. There are thousands of PFAS chemicals, and they are found in many different consumer, commercial, and industrial products. Information about Industrial activity and demographic distribution in a county are used to assess PFAS related risk in the county.

5. Public Waters (Surface/Ground water) Related Water Quality Risk (SGWR): Public Waters of the US are regularly measured for a wide range of contaminants and pollutants by the US Geological Survey. The possibility of these measurements for critical contaminants such as Copper and Lead being above critical levels identified by the EPA is captured in this risk measure.

When combined, the five risk measures identified above create a comprehensive view of Water Quality Risk in a particular county. KETOS PRISM then creates a composite Water Quality Risk metric by combining risk scores from each of the 5 metrics. Depending on the intended end application, the weight applied to each of the above risk measures can be changed to obtain an application-appropriate composite Water Quality Risk measure.

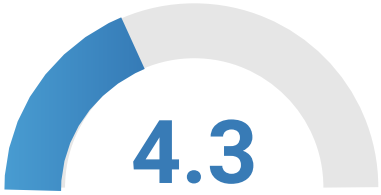
Contact info@KETOS.co to learn more about our approach to estimate Water Quality Risk.

KEY COMPONENTS OVERVIEW

Water Quality Risk Report

KETOS

Drinking Water Quality Risk (DWR) for Harris County, TX



Drinking Water Quality Risk

284
Active PWS Systems

3.14M
Total Population Served

145 Community Water Systems

60 Transient Non-Community Systems

79 Non-Transient Non-Community Systems

5
PWS Systems in Active Violation

5
PWS Systems in Serious Violation

PWS with Ground Water Source

69
3 Year Lead Copper Rule Violations

3
LCR Violation in Schools

23
LCR Violation in Residential Areas

The nominal Drinking Water Quality Risk score for Harris County, TX is **4.3/10**. The relative Drinking Water Quality Risk Score for Harris County, TX (measured versus all the counties in TX) is 10/10.

How to interpret the DWR?

A Risk score of 0.43 implies that about four out of ten water systems have had at least one violation of the SDWA in the last three years. Considering the population of Harris County, TX served by these PWS – greater than three million people – this is an alarmingly high number. PRISM analysis also indicates that greater than 50% of these PWS had multiple SDWA violations over the last three years, putting the populations served by these PWS at elevated risk from a number of regulated and unregulated contaminants in their water beyond permissible limits.

About KETOS

KETOS is a fully integrated platform that combines hardware, software, connectivity, automated reporting, predictive analytics, and maintenance to automate water monitoring and testing. KETOS enables water operators to identify and solve mission-critical water efficiency and quality challenges in real-time, or before they happen through predictive algorithms, to ensure that water meets specific quality and safety standards.

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