



## Industrial Water Use

This EnviroAtlas national map estimates the water used for industrial purposes in millions of gallons per day in each 12-digit hydrologic unit (HUC) in the contiguous United States. For this map, industrial water demand includes the amount of water used for manufacturing and production of commodities, including chemical, food, paper, wood, and metal production. Industrial water comes from self-supplied (e.g., private wells or reservoirs) surface and groundwater.

### Why is industrial water use important?

Industrial use is a major economic consumer of water resources. The United States Geological Survey (USGS) estimates that in 2010 industrial water use accounted for 4 percent of all water withdrawals within the U.S.<sup>1</sup> Based on USGS 2010 data, an average of 15,900 million (15.9 billion) gallons of water is used each day in the U.S. to support manufacturing and the production of commodities.

USGS estimates that industrial water withdrawals declined by 12% from 2005 to 2010. This decline may be a result of shifts in industrial practices and technology. Usage varies throughout the year and across the country depending on factors such as climate, population density, evolving technologies and practices, conservation efforts, cost, and cultural preferences. The EPA WaterSense Partnership states that moving products, maintaining temperature, and cleaning of equipment are some of the most common industrial uses of water.

The overuse of water resources within a watershed can lead to unintended consequences, such as water shortages, the need for additional treatment, and higher costs from storage and distribution. Overuse can also impact [ecosystems](#), such as forests and wetlands, and the ecosystem services, or natural benefits that they provide. Maintaining appropriate natural resource usage can help ensure the availability of a stable water supply. Natural ecosystems such as wetlands, trees and forests, and water bodies help protect the supply and quality of water resources. By storing and filtering rainwater, regulating the speed and volume of water flows, and preventing sediment and contaminants from entering the waterway, natural land cover ensures that clean and plentiful water is available for drinking, recreation, and aquatic habitat. Understanding the demand placed on these ecosystems will help ensure their continued ability to provide such services.



### How can I use this information?

The map, Industrial Water Use, can be used to help evaluate the demand for clean and plentiful water within a 12-digit HUC. Understanding water uses is a critical step to identifying potential imbalances and trends in supply and demand. Within EnviroAtlas, this map can be used with maps on agricultural water use, thermoelectric water use, and domestic water use to visualize which HUCs have relatively high demands on their water resources.

These data can also be used in conjunction with the maps that illustrate water availability, such as the “water supply in reservoirs” map and precipitation within the 12-digit HUCs, in order to demonstrate where demand may outpace availability at the watershed scale. It also highlights where the ecosystems that protect water resources may experience strain, require protection, or benefit from restoration. In areas with significant imbalances or detrimental trends, measures to further understand and alleviate pressure on the water supply could be implemented.

This map can be used to complement the maps showing stream length, density, and impairments for metals, nutrients, and temperature. By comparing thermoelectric use to stream impairments, users can better assess the extent of stresses to local watersheds.

## How were the data for this map created?

This map was created by combining water use estimation data from the United States Geological Survey (USGS) and the location of industrial facilities from Dun and Bradstreet. The 2010 USGS estimated water use tables summarize the daily water withdrawals for industrial use by county throughout the U.S. The total self-supplied withdrawals and 12 percent of the public supplied county level water use data were combined then evenly distributed among the industrial facilities within the county.

Where there was no county level water use data available for facilities, estimated water use was determined using state level data. For the purposes of EnviroAtlas, the estimated water use for each facility was summarized by 12-digit HUC.

## What are the limitations of these data?

The data that are reported for water usage in the United States are complex and have limitations. The calculations are based on the available data, which may not accurately represent water usage for individual industrial facilities. For example, available data on public supply for industrial use is not included and therefore using only 12 percent of the public supply may result in an underestimate of the total industrial water use. Additionally, there were a number of facilities without county self-supplied water use data. For these points, water demand had to be extrapolated from the state level data. As a result, these points are likely to be under- or overestimated.

## Selected Publications

1. Maupin, M.A., J.F. Kenny, S.S. Hutson, J.K. Lovelace, N.L. Barber, and K.S. Linsey. 2014. [Estimated use of water in the United States in 2010](#). United States Geological Survey Circular 1405, U.S. Geological Survey, Reston, Virginia. 52 p.
- Blackhurst, M., C. Hendrickson, and J.S. Vidal. 2010. [Direct and indirect water withdrawals for U.S. industry sectors](#). *Environmental Science and Technology* 44:2126–2130.
- Brekke, L.D., J.E. Kiang, J.R. Olsen, R.S. Pulwarty, D.A. Raff, D.P. Turnipseed, R.S. Webb, and K.D. White. 2009. [Climate change and water resources management: A federal perspective](#). U.S. Geological Survey, Circular 1331, U.S. Geological Survey, Reston, Virginia.
- Hanak, E. 2007. [Finding water for growth: New sources, new tools, new challenges](#). *Journal of the American Water Resources Association* 43(4):1024–1035.
- Hutson, S. (compiler). 2007. [Guidelines for preparation of state water-use estimates for 2005](#). U.S. Geological Survey Techniques and Methods Book 4, Chapter E1. Accessed March 2021.
- Mayer, A., and A. Muñoz-Hernandez. 2009. [Integrated water resources optimization models: An assessment of a multidisciplinary tool for sustainable water resources management strategies](#). *Geography Compass* 3(3):1176–1195.

Considerable efforts have been made by USGS to standardize, acquire, estimate, and report the most accurate available data. Despite the challenges, these data are the best available for national water use.

## How can I access these data?

EnviroAtlas data can be viewed in the interactive map, accessed through web services, or downloaded. The 2010 USGS [water use data](#) is available for download.

## Where can I get more information?

There are numerous resources on industrial water use and demand; a small selection of these resources is listed below. EPA and USGS have additional resources on their respective websites. For specific questions about the USGS Water Use data, see the USGS publications below. For additional information on how the data were created, access the [metadata](#) for the data layer from the drop down menu on the interactive map. To ask specific questions about this map contact the [EnviroAtlas Team](#).

## Acknowledgments

EnviroAtlas is a collaborative effort by EPA, its contractors, and project partners. Megan Mehaffey and Anne Neale, EPA, developed this map for EnviroAtlas. This fact sheet was created by Megan Mehaffey and Jessica Daniel, EPA.