

Water Use in Washington, 2015

Background

Water use in the State of Washington has evolved during the past century from small withdrawals used for domestic and stock needs to the diverse needs of current public supply systems, domestic water users, irrigation projects, industrial plants, and aquaculture industries. Increasing demand for water makes the accountability of water use an important issue.

A few State and local agencies in Washington collect water-use information for specific categories of water use; currently, only the U.S. Geological Survey (USGS) compiles cumulative water-use information across the State for a comprehensive range of uses.

Since 1950, on a 5-year cycle, the USGS has compiled and published estimates of water withdrawal and use for specific categories aggregated at the county, State, and national level. The information is shared publicly through the USGS Water Use in the United States website (<https://water.usgs.gov/watuse/>) and

national publications that detail water use definitions, categories, trends, and data for every state. The data are compiled individually by each state from available sources, and are augmented by estimates from national models for categories that have limited data. The USGS Washington Water Science Center is responsible for compiling their estimates and maintains the State water use webpage (<https://wa.water.usgs.gov/data/wuse/>) of State-level information and links to the national program.

Overview of 2015 Water Use

Total water withdrawals were estimated to be about 4,255 million gallons per day (Mgal/d) and can be divided into eight categories (fig. 1) across the State of Washington. Overall withdrawal estimates have decreased by 13 percent since 2010. Irrigation and public supply are the largest categories of water use, and mining and livestock are the smallest.

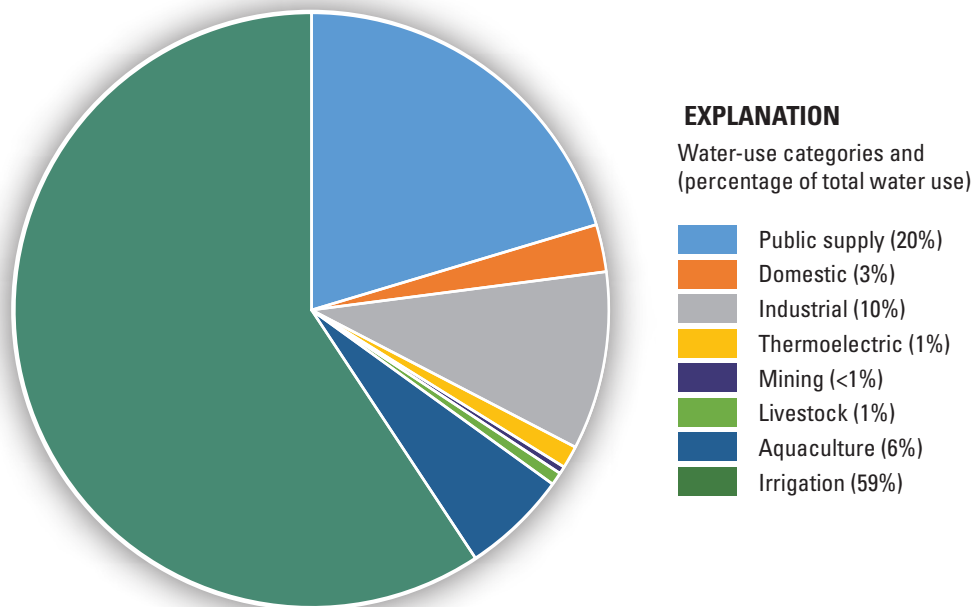


Figure 1. Compilation of water-use categories for 2015 decided by the U.S. Geological Survey National Water-Use Science Project.



Irrigation used on crops, like this vineyard near Quincy, Washington, is the highest water-use category across the State with 2,523 million gallons per day. Photograph by Ella Limoli, used with permission.



Average precipitation west of the Cascade Range was 80 inches per year from 2000–2015.



Average precipitation east of the Cascade Range was 16 inches per year.

Irrigation and public supply accounted for 80 percent of the State’s 2015 water use per day with a total of 3,390 Mgal/d. Water use was not equally distributed across the State, which is expected because the climate, population, and land use in western and eastern Washington differ significantly (fig. 2). Most of the population live in western Washington in metropolitan areas along the I-5 corridor from the cities of Olympia to Bellingham where most of the water is used for public and domestic supply. The western side of the State had an average

precipitation of 80 inches per year (in/yr) during 2000–2015 (climatological data from PRISM Climate Group: www.prism.oregonstate.edu). The drier central and eastern parts of Washington are more sparsely populated and home to some of the highest producers of apples, hops, spearmint oil, potatoes, grapes, sweet cherries, pears, potatoes, grapes, and onions. This area has an average of 290 days of sunshine per year and an average precipitation of 16 in/yr, and relies heavily on extensive irrigation systems leading to highly productive agriculture lands.

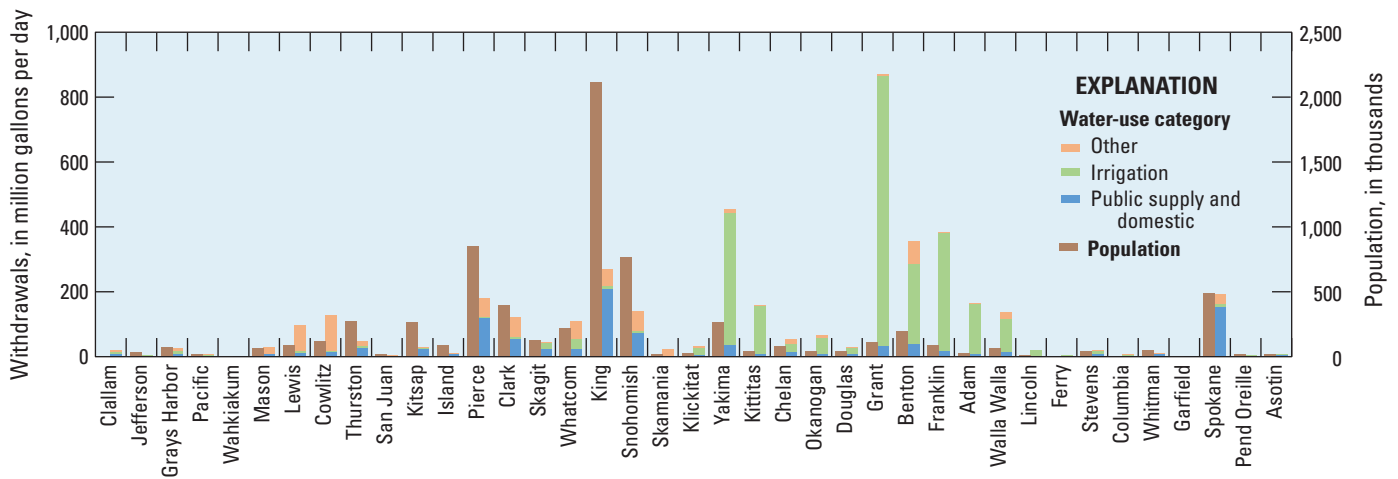


Figure 2. Comparison of county population and water withdrawal (primary use) by category between western and eastern Washington, 2015. Counties are listed from west to east with western most counties starting on the left.

Water Use Trends

The State of Washington population has increased steadily since 2000, whereas the total water use has generally decreased (figs. 3 and 4). The most noticeable decrease in water use has been in irrigation, likely because of several factors, including more efficient irrigation methods and less water available in

dry years. Despite the increasing population, total water use for public and domestic supply has also decreased steadily over the past 15 years. The steady decrease in the amount of water an average person uses a day (per capita water use) is primarily due to an increase in water conservation practices and education, as well as water-efficient facilities and appliances.

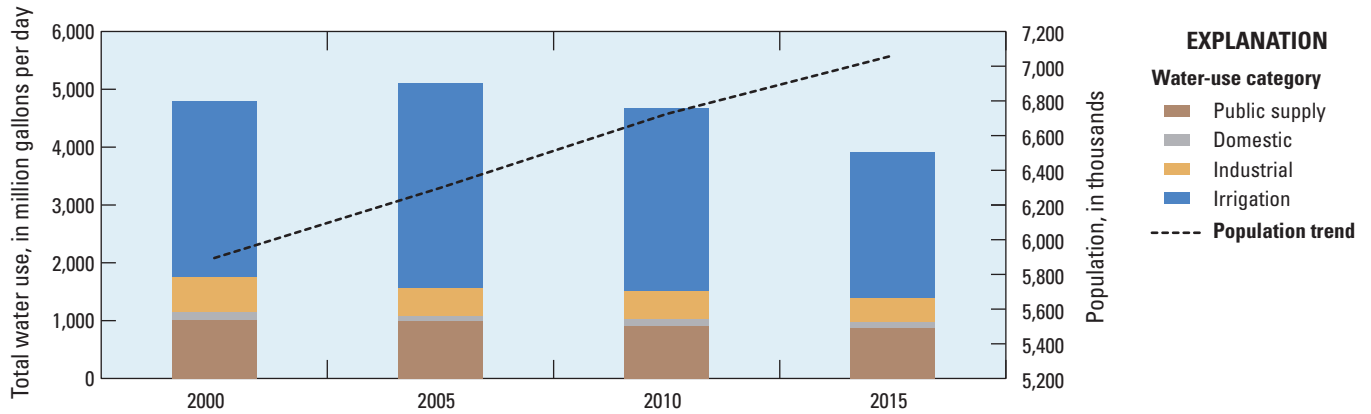


Figure 3. Water use and population trend in the state of Washington, 2000–2015. Population has steadily increased whereas the total water use has decreased. The largest decrease in water use has been in irrigation and industrial areas.

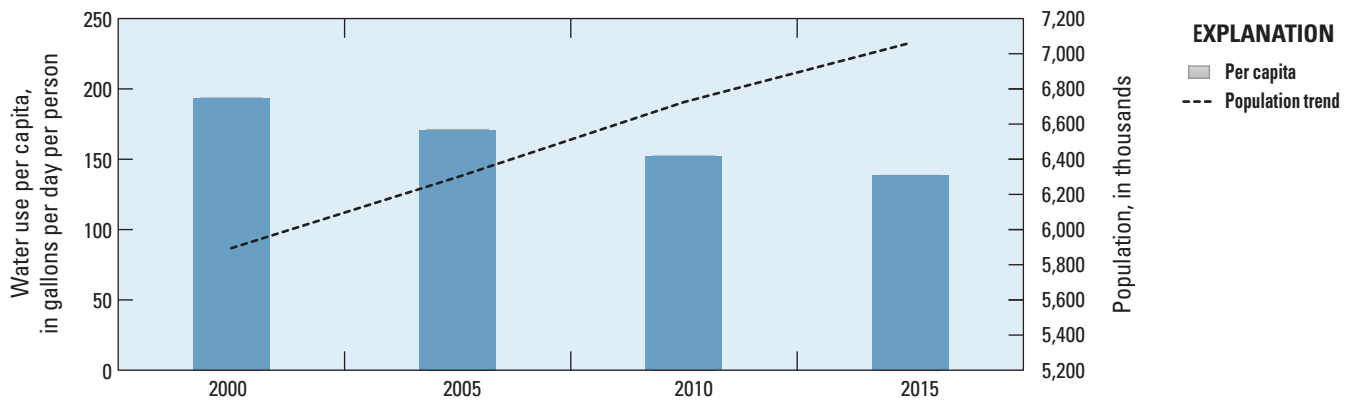
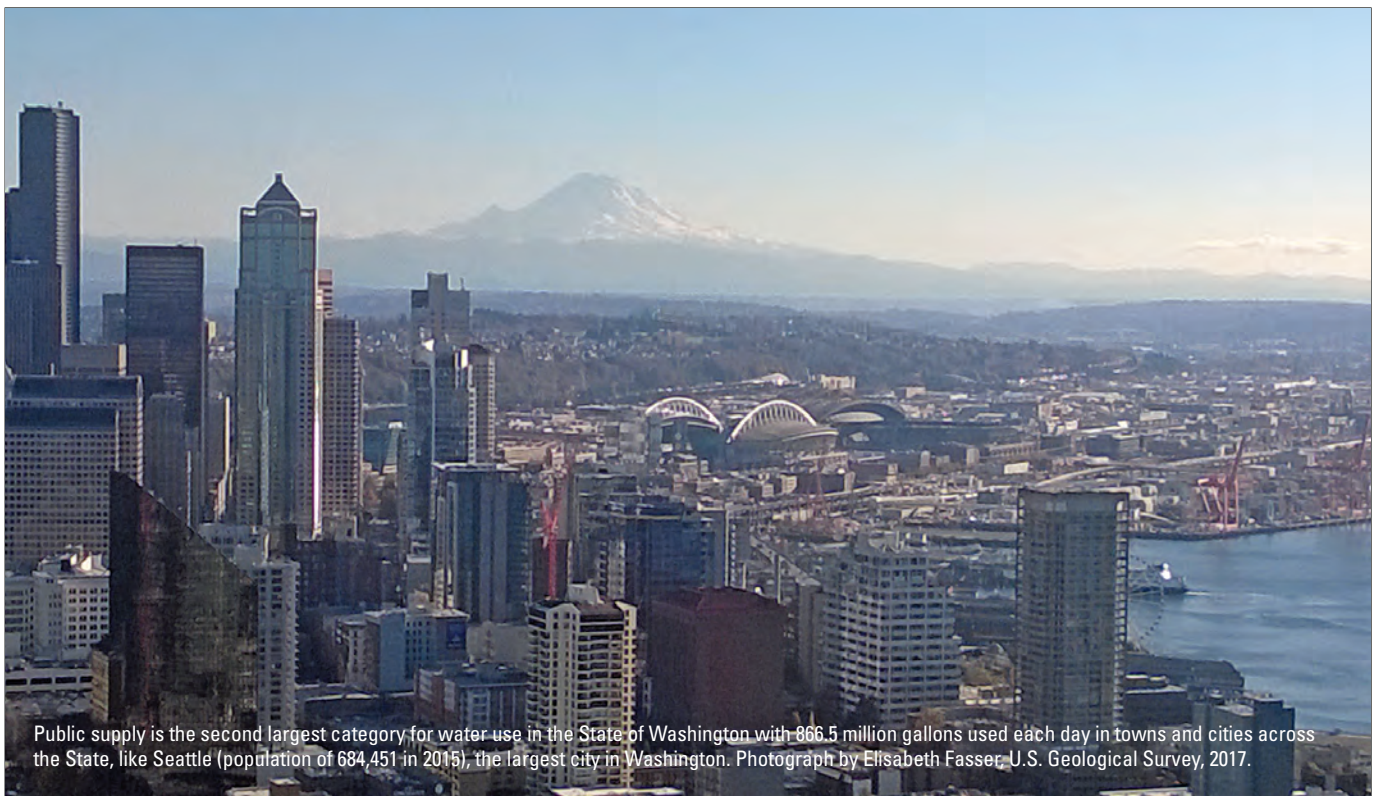
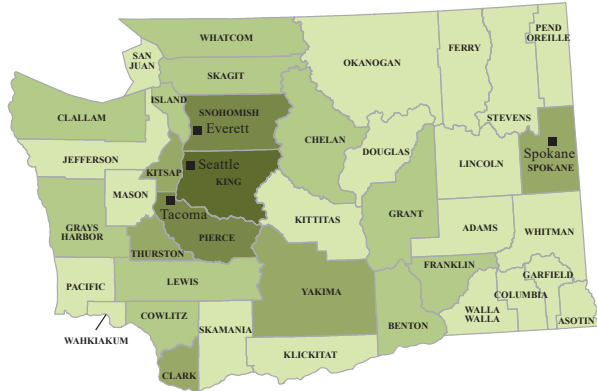


Figure 4. Water use per capita trend in the State of Washington, 2000–2015. Population has increased since 2000, the total amount of water used per capita has decreased during the same time.



Public supply is the second largest category for water use in the State of Washington with 866.5 million gallons used each day in towns and cities across the State, like Seattle (population of 684,451 in 2015), the largest city in Washington. Photograph by Elisabeth Fasser, U.S. Geological Survey, 2017.

Water Use and Population



EXPLANATION

Total population by county, in thousands

2.2–61.0

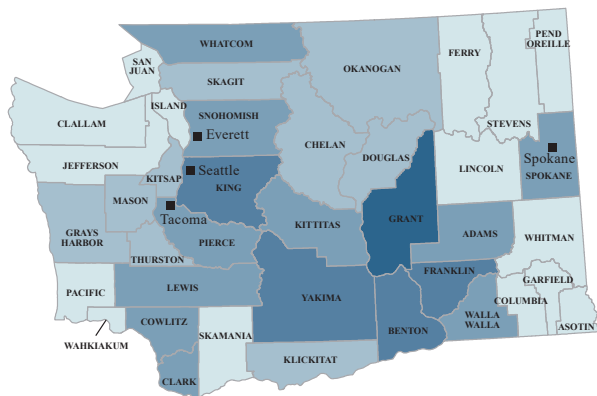
71.1–212.3

248.8–490.9

772.5–844.0

2,117.1

Figure 5. Distribution of population by county for Washington, 2015. Data ranges for each category reflect actual county values



EXPLANATION

Total withdrawals (fresh and saline), in million gallons per day

0.6–22.4

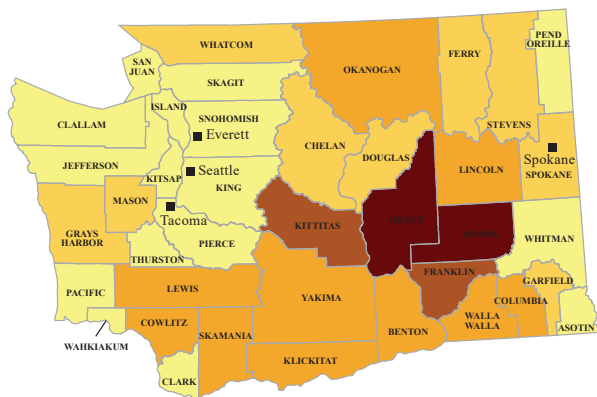
27.4–65.2

96.0–192.3

270.8–456.0

871.2

Figure 6. Total water withdrawals (fresh and saline), Washington, 2015. Data ranges for each category reflect actual county values.



EXPLANATION

Total per capita withdrawals, in million gallons per day

107.6–353.5

384.7–716.1

1,249.8–2,280.5

3,646.0–4,322.7

8,626.8–9,342.2

Figure 7. Total per capita water withdrawals, Washington, 2015. Data ranges for each category reflect actual county values.

Importance of Water-Use Data

Water-use information and trends help with understanding the effects of human activity on water resources and are paramount to the long-term effects and benefits of protecting this essential resource. Long-term water use at the state and national level provide invaluable information to water-resource planners to address and assess issues related to human effects on water use and availability.

Pierce, King, Snohomish, and Spokane Counties (fig. 5) are the most densely populated Counties in the State and are homes to the largest cities including Tacoma, Seattle, Everett, and Spokane.

The highest areas of water use are in central Washington (fig. 6) where the climate is dry, the soils are more fertile, and the land is highly irrigated. This area is one of the largest agriculture producers in the country.

Counties with high water use (primarily irrigation) and low population are those with the highest per capita water use in Washington (fig. 7).

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