

WATER DEMAND

Municipal Water Demand

Introduction

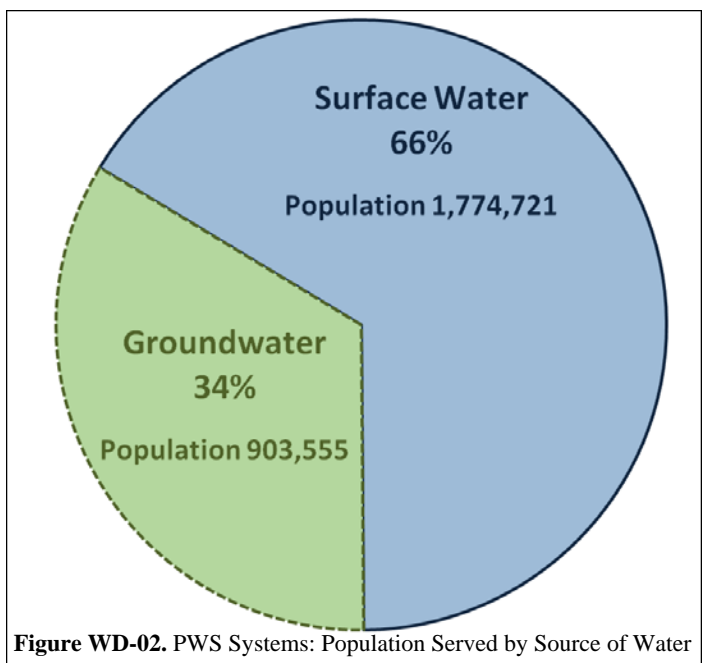
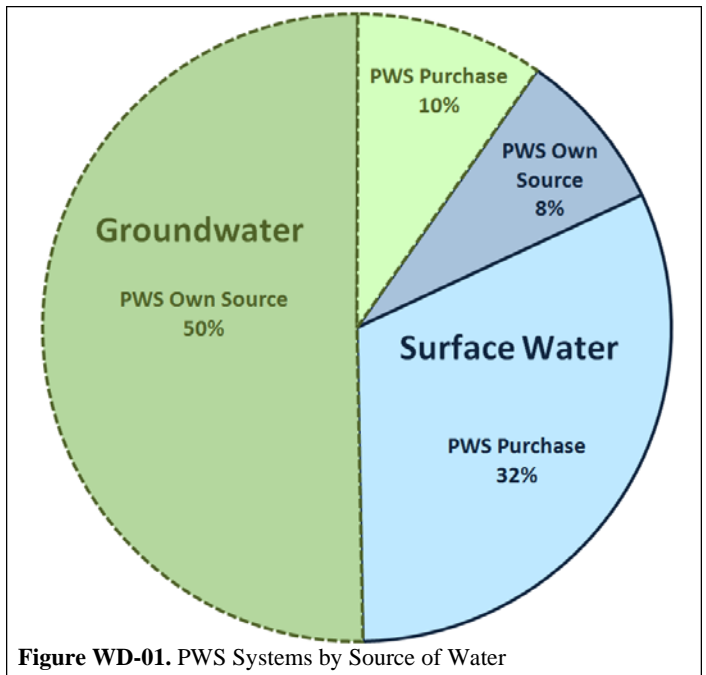
Defined by Kansas law, a Public Water Supply (PWS) is a system for the provision to the public of piped water for human consumption, if such system has at least 10 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year. At the close of 2011, there were 888 community systems, 89 non-community systems and 44 non-transient non-community systems for a total of 1,021 PWS systems in Kansas. The focus of this assessment is on the 888 community systems that serve 93% of the population of Kansas. The remaining seven percent of the population is either served by systems that have fewer than 10 service connections and 25 individuals served, or by private (domestic) water wells. Demands from these sources are not included in this assessment. The majority (53%) of Kansas PWS systems serve 500 or fewer people, while less than one percent of PWS systems serve over 100,000. PWS systems are typically managed by a public entity, such as a municipality or a rural water district, but may also be privately managed. The governing bodies of PWS systems bear primary responsibility for providing an adequate supply of potable water to the citizens served by their system.

Sources of and Access to Supply

Fifty-eight percent of Kansas PWS systems have their own source of raw water. Such sources include wells, streams, rivers, springs and lakes. Several PWS systems use water from lakes developed through the Kansas Multipurpose Small Lakes Program or supplement streamflow with water from federal reservoirs through the Kansas Water Assurance District Program. Some systems obtain raw water from federal reservoirs through participation in the Kansas Water Marketing Program. Many PWS systems buy treated water from another supplier; some supplement their own source by purchasing water. The Kansas Department of Health and Environment (KDHE) [Public Water Supply Section in the Bureau of Water](#) regulates the water quality of PWS systems. Suppliers must treat raw water to specified standards before distribution to the public. These standards are regulated by PWS Section in the KDHE - Bureau of Water to protect public health.

In eastern Kansas, the primary source of water is surface water; in western Kansas, the primary source is groundwater (Figure WD-01). While 60% of the state's public water systems rely upon groundwater sources, these systems

serve only 34% of the population (Figure WD-02). This is consistent with major population centers occurring in the central and eastern part of the state where surface water is the most common source. See the groundwater and surface water supply sections for information on the available supply from these sources.



Determination of Municipal Water Demand

Municipal water demand is generally about 10% of total water demand in the state (Figure WD-03). Of the 12 major river basins (Figure WD-04) in the state, the Kansas-

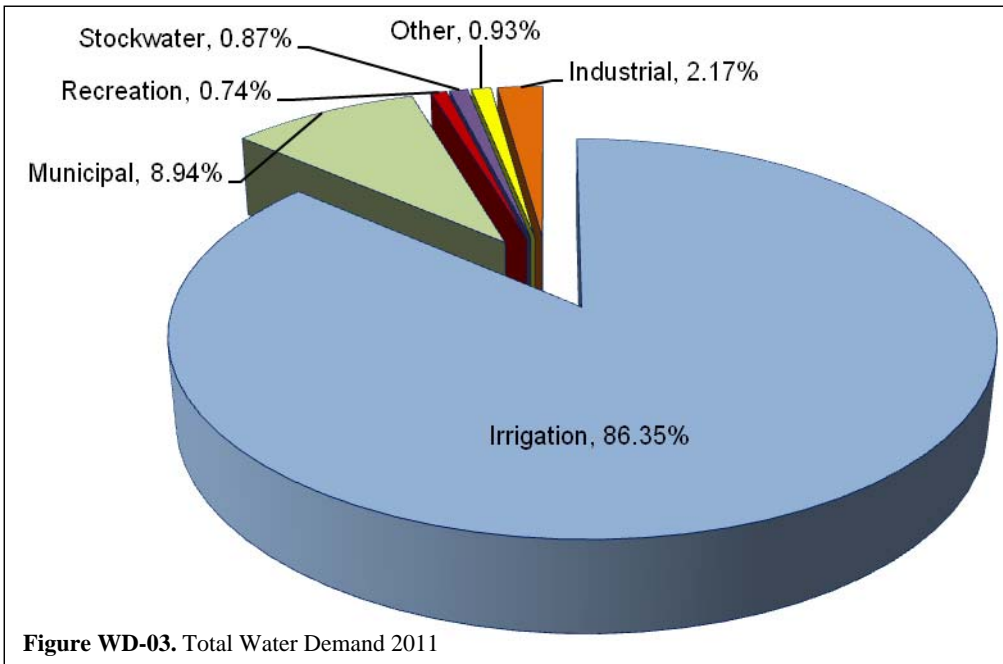


Figure WD-03. Total Water Demand 2011

systems. GPCD is based on water use by residential and commercial customers, metered water that is provided free and unaccounted for water (UFW). GPCD usage excludes water sold to other PWS systems as well as industries, bulk uses and farmsteads that use more than 200,000 gallons/year. Percent UFW is calculated as the amount of unsold, unmetered water divided by the total amount of water pumped or purchased.

Average GPCD is calculated for eight regions of the state which correspond to general patterns of precipitation and per capita use (Figure WD-05). Average GPCD is also determined for different

Lower Republican, Lower Arkansas, Missouri and Neosho basins have the greatest populations and the highest demand. Nearly 40% of the Kansas population lives in the Kansas–Lower Republican River basin, and nearly 25% live in the Lower Arkansas River basin.

sizes of public water suppliers in the three most populous regions (6, 7 and 8) so that individual systems can be compared to the average used by PWS systems of similar size and geography. In 2011, the average GPCD by region ranged from a high of 282 in western Kansas Region 1 to a low of 81 for small PWS systems in eastern Kansas Region 8.

One way to measure municipal water use by PWS systems is the amount of water used per person per day. This measurement, called gallons per capita per day (GPCD), is valuable for assessing the level of water efficiency of PWS

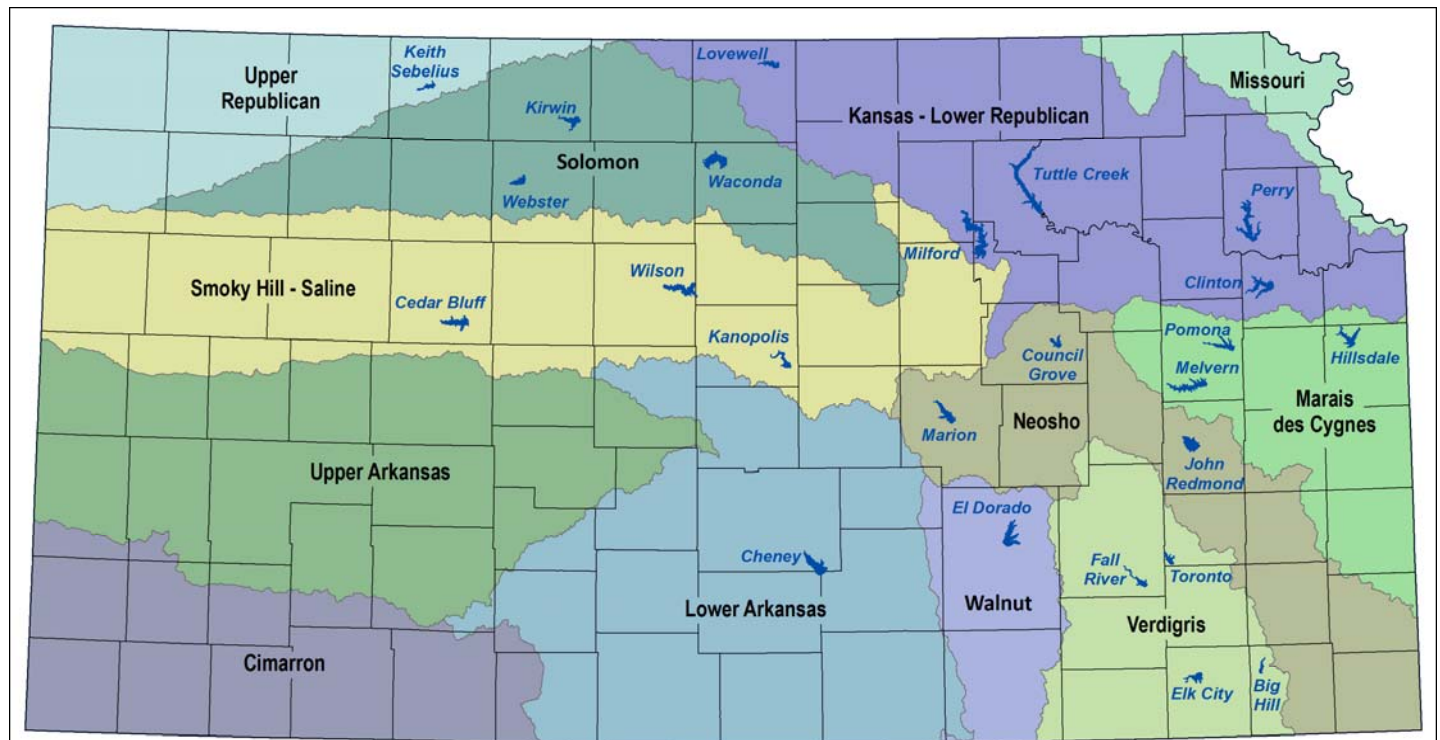


Figure WD-04. Major River Basins in Kansas

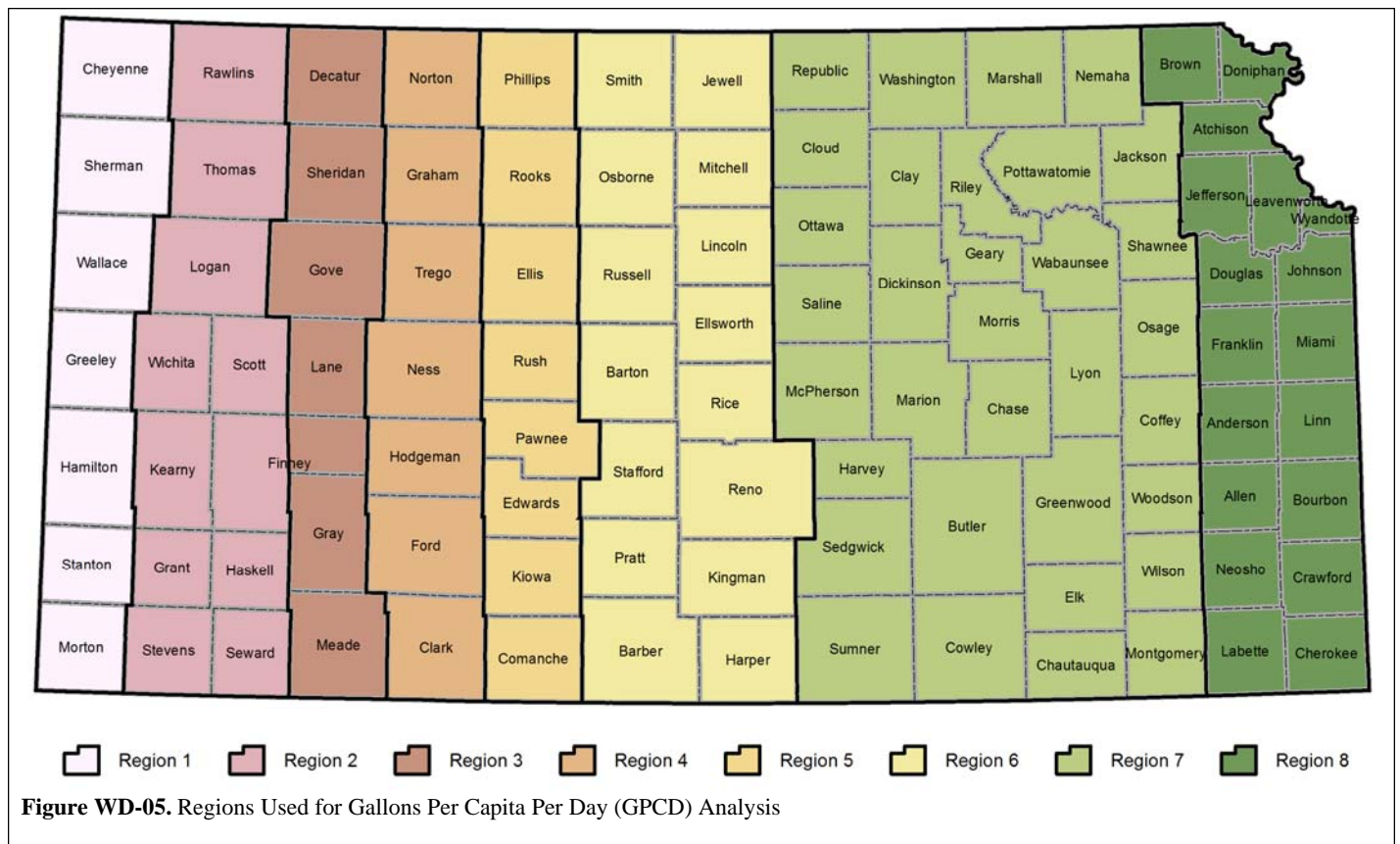


Figure WD-05. Regions Used for Gallons Per Capita Per Day (GPCD) Analysis

Demand Projections

Ability to meet demand depends on an adequate source of supply, capacity of the distribution system, treatment capacity and adequacy of storage of treated water.

The Kansas Water Office (KWO) developed demand projections to the year 2040 for all public water suppliers in 1998. These projections lend guidance for municipal planning purposes and are used by the KWO, the Kansas Department of Agriculture, Division of Water Resources (KDA-DWR) and consultants as a starting point in water supply studies. However, they should be used with caution, as they have not been updated with U.S. Census data collected in 2000 and 2010, and some assumptions are no longer reliable. There have been periodic regional updates due to special studies; including south central Kansas, the Upper Arkansas River corridor and central Kansas.

Demand from Reservoirs in Eastern Kansas

Nearly two-thirds of the Kansas population is served directly or indirectly by surface water from federal reservoirs. Given the significance of the federal reservoirs in meeting water supply needs in the state, in 2006 the KWO initiated a review of surface water supply and demand in basins supported by federal reservoirs in eastern Kansas. The intent of

the analysis was to identify future potential surface water supply vulnerabilities along mainstem river corridors. The projections are based on a severe drought condition scenario. The initial estimates indicated concerns with meeting demands during drought in the Neosho basin within the next decade. For other eastern basins the concerns with meeting demands during drought were within the next several decades; while for other basins, the next century. Findings from these studies are contained in the [Reservoir Roadmap](#).

Effects of Water Conservation on Demand

The KWO develops guidelines for development of municipal water conservation plans (WCP). The KWO also provides technical assistance to public water suppliers who are developing a WCP for their system. Each plan includes long-term, cost-efficient management practices for water supply, treatment and distribution designed to curtail the waste of water within the system. Education practices are implemented to inform customers of the value of water and promote conservation. Over time, public water suppliers have noted that the average residential water use has fallen even in situations where the number of connections has continued to grow. Water efficient plumbing fixtures and household appliances, as well as efficiency in landscape watering, are contributing factors.

The WCP contains a drought response component that uses system-specific measures that indicate the need to conserve water and actions to reduce demand. Drought presents challenges to PWS systems through depletion of the raw water supply availability, including low streamflow, depleting surface water reservoir volume and alluvial aquifer supplies not recharging. System challenges during drought are also due to increased customer water demand, especially for landscape irrigation. Even if the raw water supply remains adequate, increased demand may stress the ability of treatment, storage and distribution systems to keep up with that demand.

Many public water suppliers are required by statute to develop a state-approved water conservation plan; however, all public water suppliers are encouraged to do the same. Coordination of drought triggers and actions, to the extent possible, among systems using the same source, is also encouraged. A water conservation plan is a management tool that should be utilized and updated periodically to reflect changes in population, source water, water loss, treatment facilities, or distribution system.