

# “Water Use Per Capita” – The Importance of Definition



Confined livestock facilities such as shown above continue to replace traditional smaller farm operations. The confined units often place unplanned water supply demands on rural water districts. Some rural water districts have been reluctant to provide new services for such facilities with the goal of reserving capacity for additional rural residences.

**W**ater use is important to Kansans. Water use provides an essential of life for drinking and cooking. An adequate supply of good quality water contributes to a high and comfortable standard of living. The amount of use varies among the population. As such, public water supplies (PWSs) keep detailed records on water use so as to operate the utility responsibly and to provide information for making financial decisions that ensure present and future operations.

State and federal agencies also gather and evaluate water use to determine trends and to determine compliance with laws. Agencies use various measurements to describe “water use per capita” (per person). The water use per capita is commonly expressed in gallons per capita per day (gpcd); that number is often used to make comparisons and to make judgments concerning habits, practices and in some cases, the “efficiency” of the use of water.

While the measurement in gpcd is commonly used, when discussing water use and water conservation it is important to understand how this value is explicitly defined and calculated. It needs to be correctly understood by those using or discussing the measurement. Otherwise, confusion and the wrong implications will result.

The State of Kansas, through the Kansas Water Office, recently issued two draft documents concerning water use in Kansas. The first draft was on July 1, 2014 entitled “Vision for the Future of Water in Kansas”. The second was published in November 2014 and was entitled

“A Long-Term Vision for the Future of Water Supply in Kansas”. A major issue in these documents is “water use” and “conservation”.

The draft documents from July and November 2014 use words and phrases such as “20 percent per capita reduction in water consumption”, “reduce statewide water consumption by 20 percent”, “20 percent reduction per capita in municipal water demand”, “Kansans will use 10 percent less water per person”, “importance of ... water conservation practices”, “development of locally driven

conservation and management plans”, “develop a conservation guide for communities”, “goals of reinforcing the value of water and reducing water consumption”, “more efficient water use”, “ensure water conservation is properly evaluated as an alternative for water supply when providing financial assistance”, and “effectiveness of rate structures and conservation”.

If implemented, these proposed items will have operational and financial effects on how public water systems manage their water supply systems. If enacted, these goals would likely need to be measured and evaluated by the State. It’s fair to speculate that “water

use per capita” would probably be used as a measurement -- and so the definition should be consistent.

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## Defining per capita use

The following are three examples of how gallons per capita per day have been used.

First, the “total consumptive use” is all the water measured and used in Kansas. This use from 1990 to 2008 averaged about 4.3 million acre-feet per year and gives a value of 1,360 gpcd. This value includes irrigation water use that is around 15 times more than all public water systems use.

Second, Kansas’ water agencies calculate the “PWS water use” that includes residential use, commercial use, public use, and unaccounted use (commonly called “water loss”). The PWS water use excludes sales to large industries and large water-use farmsteads (those using 200,000 gallons or more annually). The PWS water use from 2007 to 2011 averaged 122 gpcd.

Third, when the “citizens’ water use” or conservation of water is discussed, the first two methods of measuring water use do not accurately show the citizens’ water use or water conservation. That measurement would be the amount of residential sales; that value is significantly less than the PWS water use of 122 gpcd. While the actual “citizens’ water use” is unknown statewide, there are many, many citizens who use in the range of 40 to 80 gpcd.

Thus, when discussing water use and the gallons used per capita per day, the method of calculation and the definition must be understood.

As has been documented in various surveys and reports, the water usage for many Kansas citizens is already low compared to the use of other types of customers. Requiring mandatory water conservation on public water systems would be a strain on many citizens, because many are already conserving, while high usage by others may go unchanged.

An unintended consequence for public water systems in the reduction of water usage and water sales is that it can strain the finances of the utility – lower sales volume may result in lower revenue. That may result in the need to increase rates, which may lead to more conservation. This phenomenon is often called the “death spiral,” and for good reason.

On the other end of the spectrum, there are many rural water districts where increasing expansion of livestock operations is placing unplanned and unparalleled demands on the public water system. In some cases, those systems are attempting to meet those demands

by spending significant sums of money to increase capacity that is required by only a small percentage of the customer base. If that capacity cost is borne by those that cause the need, that may be fine. But if it is borne by everyone, costs may grow too high for residential and “regular” customers to bear.

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## Fairly appropriating costs

Members of governing bodies need to carefully review what category of use is driving the need for expansion of water system facilities. Those that benefit from such expansions need to pay their fair share of those costs. A good way to determine who benefits from an expansion is to have the hydraulic model drop out the excess demand customers and then see if the expansion is still needed. Often, it is not.

While this problem is new to many rural water systems, large cities and metropolitan areas have faced it for many years. In that setting, large manufacturing plants occasionally move in or expand existing operations markedly, increasing utility demand disproportionately. The fair utility will make the plant pay for the upgrades required to serve the plant. In the same way, the fair rural water system needs to make extraordinary customers pay for the capacity needed to serve them. As Carl Brown, the rate analyst, has told me for years, rates need to match the nature of the customers. A simple user base only needs a simple rate structure. But a



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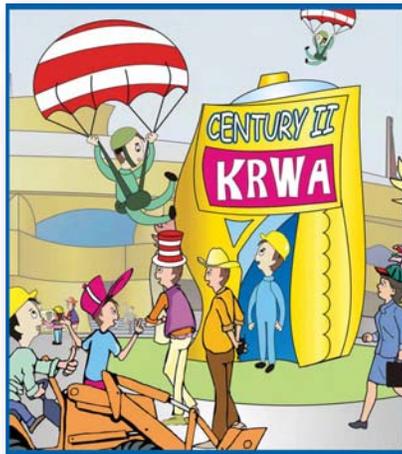
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complex user base needs a complex rate structure. How does that really apply to a rural water system?

In most cases, rural water system infrastructure and their rates were not designed for some farmers changing from having 100 head of steers or 500 head of hogs to now have 1,000 steers or 5,000 head of hogs. That's not to say that livestock use should not be allowed on a rural water system. It's just that when a system decides to meet those demands, then the costs need to be assessed to those who are the cause of the demand. It's certainly not the single household member who uses 2,000 gallons a month.

Rural water system governing bodies should assess costs fairly to those who are benefiting from the improvements and increased capacity. I recently was involved in a rate review discussion where the engineer pointed out that the high capacity needs of that water district were being driven by about 60 customers out of the total of 1,350 rural connections. You take out those high demand customers and the system functions just fine without capital improvements. When their demands are added in, the model says that significant expenditures are in order. Extraordinary customers need to pay for their extraordinary expenses.



As that engineer pointed out to the board, the other effect of trying to satisfy excessive use for livestock is that it prevents the addition of new residences that would only typically use 5,000 gallons or so per month. So it begs this question. What sort of community does the governing body have in mind? Is it one that has rural residences surrounded by confinement livestock facilities? Or, is it one that provides for human consumption as the primary beneficiary of the water system? That is not an abstract philosophical question. Confined livestock facilities often place unplanned demands on rural water districts. Some rural water districts have been reluctant to provide new services for such facilities, instead reserving capacity for rural residences.

How water use is calculated, judged, and regulated by law has an economic impact on the citizens purchasing water. Thus, reduction in water usage and water conservation can have adverse effects. Likewise, expansion of systems to meet excess demand also has adverse effects. Mandatory water conservation measures or laws should not be implemented except in those cases where needed and where conservation goals would be significant enough to make a difference. Also, in some cases, the governing bodies need to pull back and get smarter about the use habits and how costs are allocated through water rate schedules and make sure that those who are benefiting are paying for the capital costs they are creating.

### KRWA Conference discusses rates and financial planning

I hope readers will attend the 2015 KRWA Conference & Exhibition. As an example of the diversity of the presentations, Carl Brown of Carl Brown Consulting will present "Rate Fairness For The Big And The Small" on Wednesday, 3/25 at 1:30 p.m. I hope readers will attend to hear Carl explain what fixes need to be made when big customers start "hogging" the water and small customers get left out. Another session by Carl will review capital improvement and repair and replacement planning. These are only two of the 57 sessions offered at the 2015 conference. Hope to see you there.

*Elmer Ronnebaum is KRWA General Manager; he has been employed by KRWA since 1983. He served seven years on the KRWA board of directors prior to that. He also helped develop a large RWD and served for fourteen years on a water district board of directors.*



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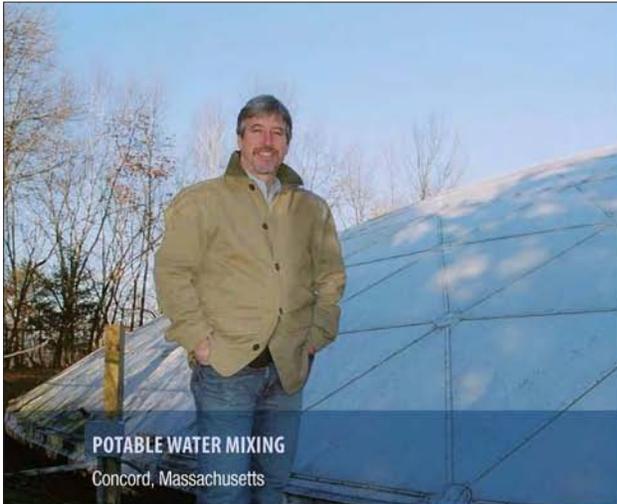
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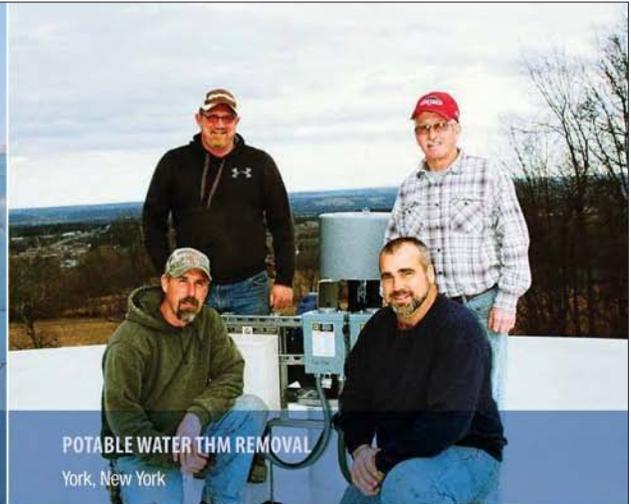
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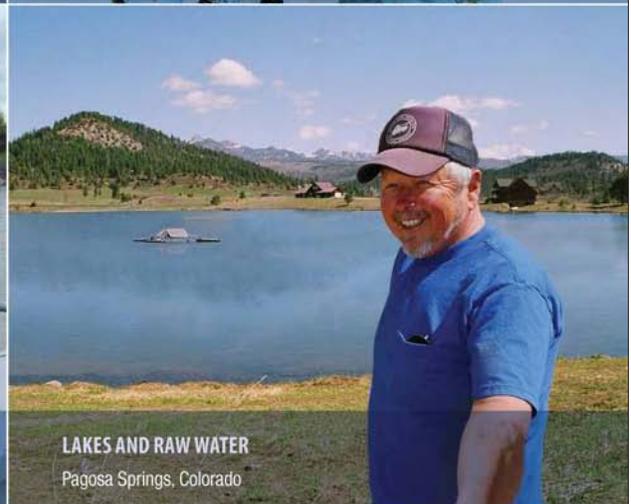
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