City of Santa Fe, New Mexico

memo

DATE: April 25, 2013

TO: Public Utilities Committee

VIA: Rick Carpenter, Water Resources and Conservation Section Manager RC
Nick Schiavo, Acting Public Utilities & Water Division Director

FROM: Alan G. Hook, Water Resources Analyst AGH
Laurie Trevizo, Water Conservation Program Manager

RE: The 2013 gallons per capita per day of 101 utilizing the NM Office of the State Engineer methodology.

Introduction: Since 2011, Santa Fe and other parts of New Mexico have experienced persistent drought conditions, despite exceptional precipitation in the fall of 2013, resulting in higher customer peak daily demands. Despite these challenges, the 2013 City of Santa Fe Water Division's (City) water production for the service area customers remained under 10,000[1] acre-feet (af), due to water conservation efforts practiced by the community. Another measurement of water conservation success is the use of the gallons per capita per day (gpcd) calculation. Staff has completed the annual gpcd report of 2013 data, using the New Mexico Office of the State Engineer (OSE) methodology referenced below. The new gpcd calculation for 2013 data resulted in 101 gallons per capita per day. As part of the City's Permit SP 4842 Condition No. 10 for the Buckman Direct Diversion Project, the City must annually submit an annual gpcd calculation to the NM Office of the State Engineer. Though this region of New Mexico has experienced climatic and seasonal challenges, the calculated gpcd of 101 is a result of progressive on-going water conservation efforts by the City's water customers.

New Mexico Office of the State Engineer GPCD Calculator Methodology:
To better regulate municipal water use, the NM Office of the State Engineer (OSE) began to condition municipal water-rights permits with the gpcd measurement and began a program to standardize the gpcd methodology (Vogel, et al. 2009, Southwest Hydrology, see attachment 1). On March 16, 2009, the OSE released the standardized gpcd methodology using the OSE gpcd calculator, 2.04 Beta Version. 2010 was the first year the OSE tool was required.

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[1] The City of Santa Fe's production for water utility customers was 9,414 af with an additional 240 af of potable water exported to Santa Fe County, per the 2005 Water Resources Agreement, for a total production of 9,654 af in 2013.

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Results of the 2012 NM OSE GPCD Calculator:

The NM OSE gpcd for 2013 is 101 gallons per capita per day for the City of Santa Fe. The previous year, the NM OSE gpcd for 2012 was 106 gallons per capita per day. In comparison to other western cities, the City's gpcd is one of the lowest and continues to remain low.

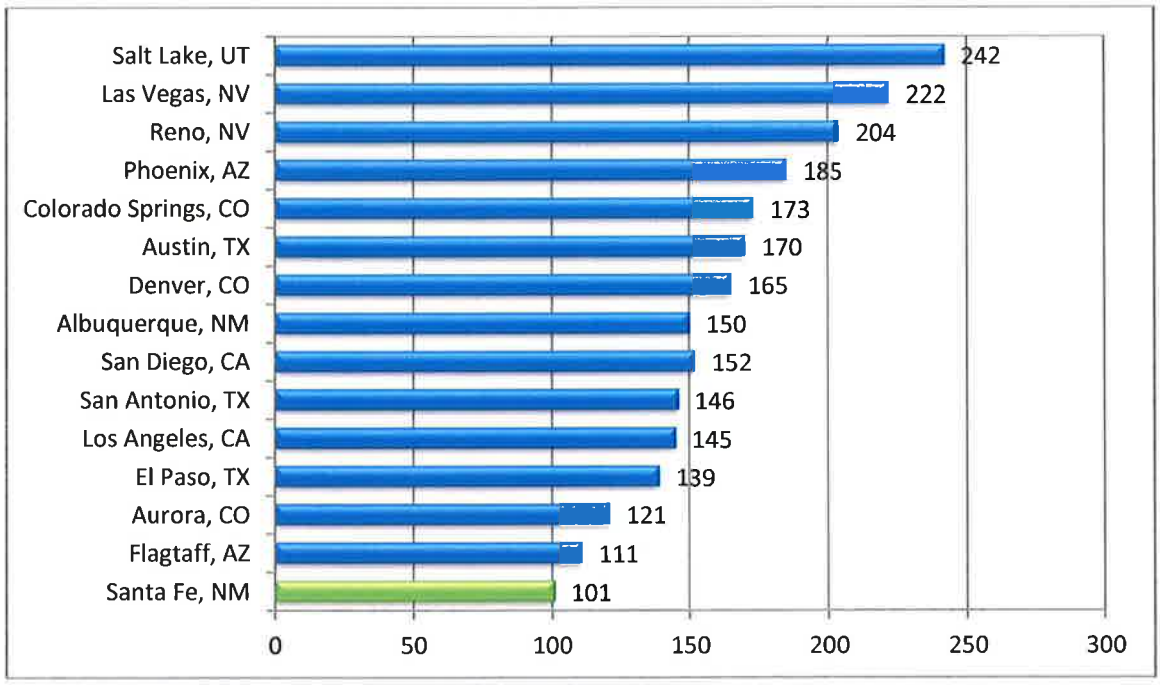


Figure 1. Comparison of the gallons per capita per day of 15 western cities from 2008 to 2013 data

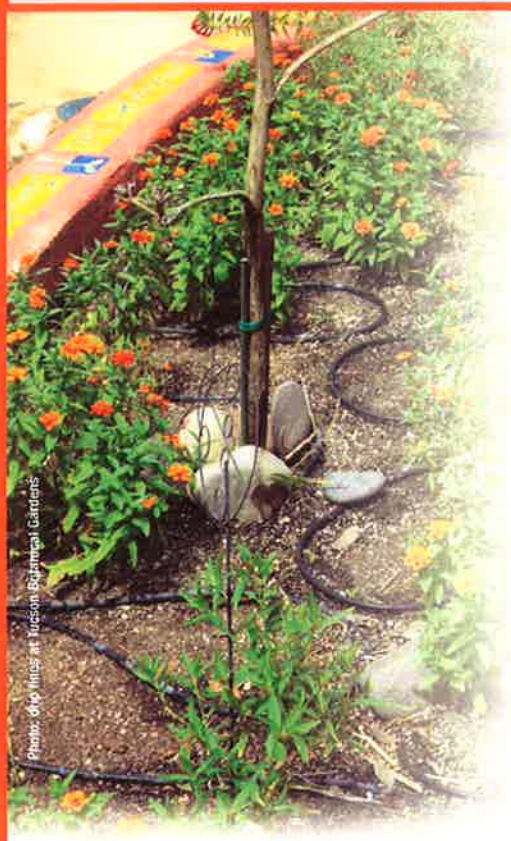
In conclusion:

The City has achieved lower consumption through public outreach, ordinances requiring customers to comply with water conservation conditions and utilizing incentives. The City's single-family residential customer uses approximately 52 gallons per day or an average of 1,582 gallons per month. Several residential water conservation outreach tips to reduce water usage during these drought conditions are as follows:

- Average household leaks waste 11,000 gallons of water, equal to 270 + loads of laundry.
- High-efficiency washing machines use less than 27 gallons per load compared to 50 gallons used by traditional models. Wash laundry using only full loads. Small laundry loads use twice as much water per pound of laundry compared to full loads. On average, each person does 3 loads of laundry per week.
- Turning off the tap while brushing your teeth or shaving can save more than 200 gallons per month. A family of four would save 1600 gallons per month.

Attachments:

1. Vogel and Longworth, *Apples to Apples: A Standardization Measure for Municipal Water*, Southwest Hydrology. November/ December 2009.



Apples to Apples: A Standardized Measure for Municipal Water

Cheri Vogel and John Longworth – New Mexico Office of the State Engineer

In the mid 1980s water conservation became a standard by which the New Mexico state engineer evaluated water-rights transfers. In 1997, the state engineer required all water-rights permits to state that the permit "shall not be exercised … in a manner that is contrary to the conservation of water within the state…". Evaluating whether an applicant is utilizing water in a manner consistent with conservation principles is difficult; ever-evolving conservation technologies and practices add to the challenge.

The most widely recognized metric for water use is gallons per capita per day (GPCD). Should a continued reduction of GPCD over time equate to a measurement of conservation? The answer is complicated. Numerous aspects affect a drinking-water supplier's GPCD, such as demographics, climate, economics, and availability of supply. These can change over time to influence GPCD, but the calculation of GPCD itself must remain constant if valid use comparisons are to be made. Yet staffing changes, public-image pressures, and other influences have caused drinking-water suppliers to modify their GPCD calculations, further complicating the evaluation of conservation efforts.

Need for Standardization

The New Mexico Office of the State Engineer (NMOSE) is charged with administering the state's water resources. It has statutory responsibility over the supervision, measurement, appropriation, and distribution of all surface water and groundwater in the state. As in most southwestern states, municipal use is the principal area of increasing demand. Therefore, to better regulate municipal water use, the agency began to condition municipal water-rights permits with a target GPCD. And, aware of the many ways GPCD calculations can vary, it began a program to standardize them.

Apples and Oranges

NMOSE first looked at how other states determine GPCD. When the study began in 2007, Florida, Texas, Kansas, and Arizona all were using some form of standard GPCD calculation, for which the primary variables are gallons of water and population. Three of the states researched used total gallons diverted from surface or groundwater prior to treatment or storage, while one used gallons billed to customers. Other states not included in the original research subsequently reported including reuse, raw (diverted water that may have been stored), or diverted water. Two of the original states allowed systems to define their own populations, one used a seasonally adjusted population, while the fourth used the number of living units times a person-per-household average from the U.S. Census Bureau. These may seem like subtle variations but they make a significant difference in the calculation.

Looking within New Mexico, NMOSE found similar variations. Approaches used to estimate population, the most difficult variable to isolate, varied widely. The Census Bureau's population is most commonly used for cities or counties, however political boundaries do not always coincide with water suppliers' service boundaries. Some water providers incorporated miscellaneous populations such as tourists, undocumented workers, and estimated incoming commuter population based on commercial space. Some population figures were reduced based on estimates of homes within the service area having privately owned domestic wells, and connections assumed to be second homes. Other systems used a form of housing units multiplied by persons-per-household, where the latter figures were undocumented, "educated" guesses. These different approaches underscored the need for standardization.

NMOSE Methodology

NMOSE's goal for a GPCD method focuses on tracking individual water delivery systems rather than comparing GPCD numbers between systems. This requires detailed information that allows each system to be analyzed separately. Therefore, the agency's method provides subcategories of GPCD and requires a standard calculation of populations served. The subcategories include: system total, single-family residential, multi-family residential, CII (commercial, industrial, and institutional), other (as defined by the system), reuse, and non-revenue. The system total calculation is based on the total water diverted; all other categories use billed water except non-revenue, which uses the difference between diverted and billed. The population is calculated as the number of housing units multiplied by the Census Bureau's average persons-per-household for occupied homes within the system's service area. These details allow systems heavily influenced by a large industrial base to be distinguished from those that are primarily residential or that have spikes in commercial use during tourist season.

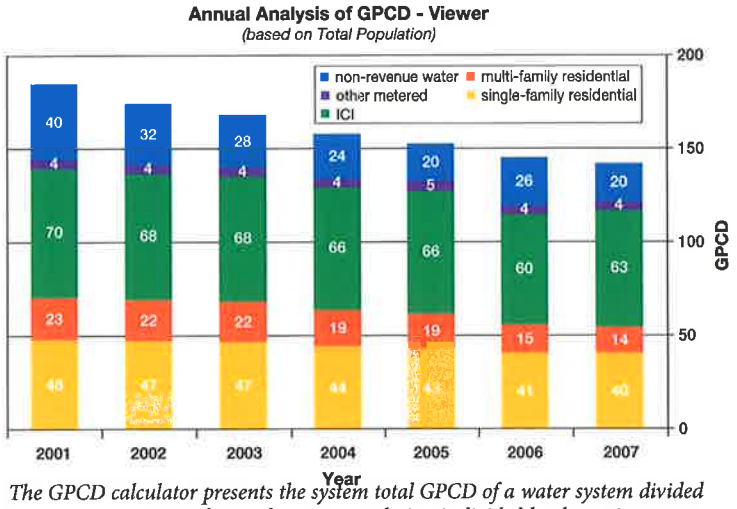
To assist with the actual calculation, NMOSE developed the GPCD Calculator, a freely downloadable Excel spreadsheet that organizes data entry and automatically calculates each subcategory's GPCD.

Lessons Learned

NMOSE pilot-tested the new methodology and calculator with six New Mexico drinking-water systems ranging in size from 116 to 120,000 connections. The tests, as well as comments collected from national water-conservation specialists, allowed the agency to fine-tune the approach.

The review process provided valuable insight into the development of standardized water-use calculations. While no two methods for calculating GPCD are exactly alike, standardization is possible; however NMOSE had to be clear about how the data would be used in order to ease concerns over its regulatory use and each system's public image. Keeping the calculations simple was also key; too many options led to complications and confusion. Defining populations is difficult even with a standard methodology; variations in how connections are defined and multi-family units are counted further confound the issue. Finally, transition time is needed during which utilities may submit their existing GPCD methodology along with the new version.

NMOSE found that the biggest obstacle to fully implementing the new calculator is that drinking-water systems configure their data for customer billing, not water-use accounting. Billing software uses billing cycles that often do not correlate to calendar months, and bills include adjustments for customer credits or fees. Additionally, when software is updated or water systems are sold, older data may be lost. Finally, internal politics can make it difficult for billing departments to work with engineers, planners, or conservation staff. These problems can be addressed, but require commitment from senior management.



The GPCD calculator presents the system total GPCD of a water system divided into sector uses. Note that each sector population is divided by the entire population here; actual sector GPCDs are calculated elsewhere in the program.

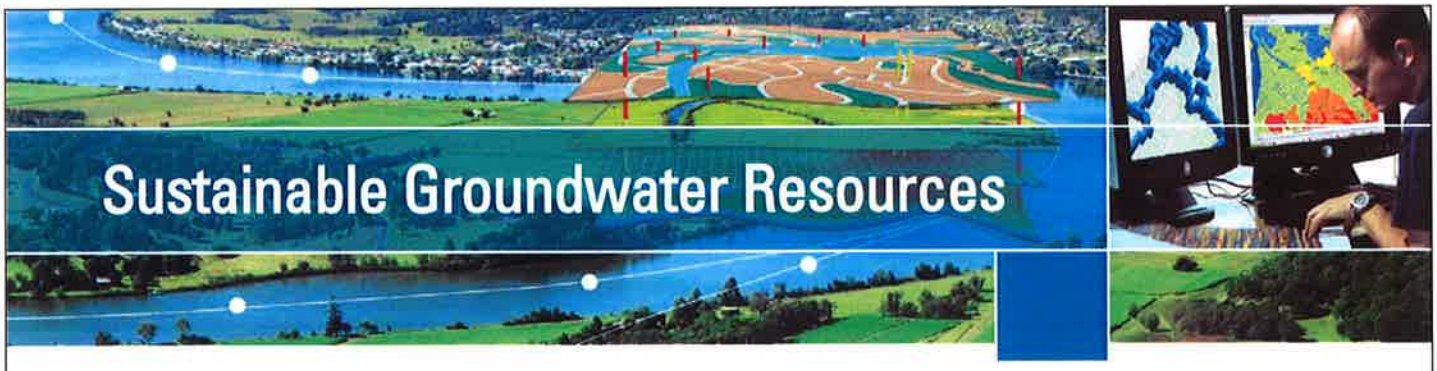
The calculation of GPCD itself must remain constant if valid use comparisons are to be made.

What's Next?

Since starting the project, NMOSE has been contacted by several state and regional authorities interested in standardizing their GPCD methods. These entities report pressure from elected officials, city managers, and even customers to track their systems' water use. In response, the American Water Works Association (AWWA) and the Alliance for Water Efficiency have teamed up to research and test methods for tracking water efficiency, including GPCD, in order to establish an accepted repertoire of water-use-efficiency metrics that can be used to uniformly compare use and savings across utilities. The results will be published in the *Journal of AWWA*.

New Mexico's standard methodology was released as a beta version on March 16, 2009. It is now the standard method used for all water-rights permits required to submit a GPCD, and a standard component of water-conservation and water-management plans submitted to NMOSE. It provides the agency with a defensible method for evaluating water use in New Mexico's water-supply systems. ■

NMOSE's GPCD methodology and calculator are available at www.ose.state.nm.us/wucp_gcpd.html. Contact Cheri Vogel at cheri.vogel@state.nm.us.



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