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SMART
Water

A Comparative Study
of Urban Water Use
Efficiency Across
the Southwest

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Across the Southwest

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Western Resource Advocates uses law, economics, and
policy analysis to protect land and water resources and
assure that energy demands are met in environmentally
sound and sustainable ways. It collaborates with environ-
mental and community groups to protect the natural
environment of the Interior West, taking into account the
economic and cultural framework of the region.

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Chapter 3

System-wide per capita Water Consumption

System-wide daily per capita consumption is a commonly used standard in the water supply industry.[13] This indicator is intended to represent the overall per capita demand across all consumer sectors. Figure 3.9 displays the 2001 system-wide daily per capita consumption rates for the participating water providers. Per capita distribution losses (UFW) are included in these system-wide figures. The mean system-wide daily per capita consumption rate for this sampling of water providers is 229 gpcd. The rates range from 170 gpcd in Tucson to 366 gpcd in Scottsdale[14].

Although the water supply industry commonly uses this demand variable as a system demand indicator, the probability for comparison error in the system-wide per capita variable is relatively high, resulting in an "apples-to-oranges" comparison. Therefore, the displayed values in Figure 3.9 should be considered individually, instead of comparatively, to avoid erroneous conclusions on water consumption.

As discussed in Appendix A, data analysis bias in the system-wide consumption indicator can originate in municipal water service areas that:

1. function as employment centers and receive significant amounts of inflow commuting;
2. possess a relatively large industrial, commercial, or institutional (ICI) consumption sector;[15]
3. serve large airports; or
4. distribute large quantities of wholesale water.

Varying definitions of Unaccounted For Water (UFW) across water providers also contribute to the bias in the system-wide consumption variable. As a result, Chapter 3 de-emphasizes the system-wide indicator, focusing instead on Single-Family Residential per capita consumption.

Figure 3.9

2001 System-Wide Daily per capita Water Consumption
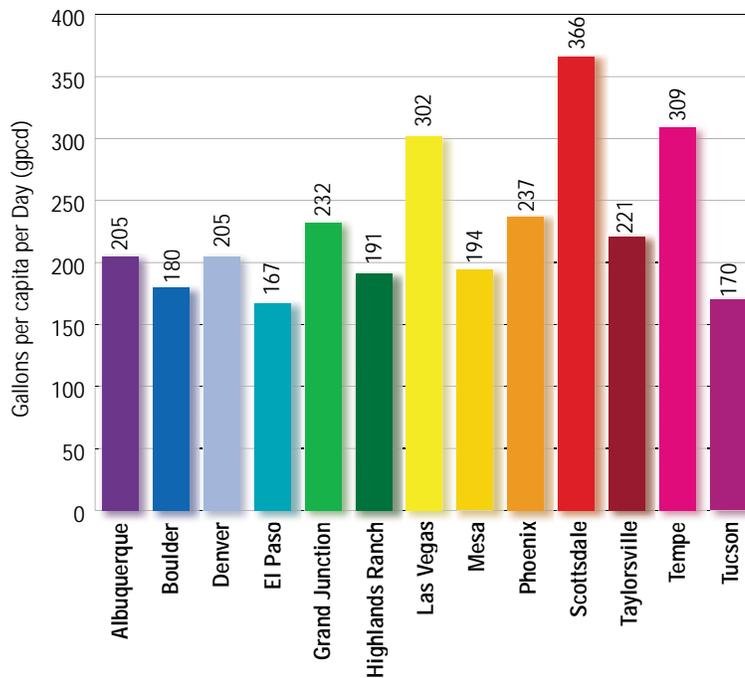
13 The industry-standard definition of system-wide per capita consumption is the total raw water extracted from supply sources divided by the water provider's service area population:

$$\text{System-wide per capita consumption} = \frac{\text{Total Raw Water Extracted from Supply Sources}}{\text{Service Area Population}}$$

14 The City of Mesa Utilities Department alluded to a possible raw water master meter discrepancy between the City and the Central Arizona Project (CAP). Apparently, the actual CAP raw water deliveries may be higher than the recorded/billed volume. CAP raw water deliveries constitute roughly 30 percent of Mesa's supply. Since the system-wide per capita figures are directly based on the volume of total raw water drawn from supply sources, Mesa's system-wide consumption rate in Figure 3.9 may be slightly lower than the actual value.

15 As an example, Tempe's system-wide consumption rate is notably higher than nearby Mesa or Phoenix. However, Tempe's non-residential consumption accounts for 45 percent of its retail water sold, compared to 30 percent and 33 percent in Mesa and Phoenix, respectively. The higher proportion of commercial, industrial, and institutional water use will yield a higher system-wide per capita figure in Tempe.