Appendix A—Scoring Criteria

To develop a score to rate the conservation programs of the 15 water utilities we studied, we weighted the seven criteria we consider to be critical for sustainable water management and created a 100-point scoring system.

Per Capita Water Use (25 points)

Per capita water use is the volume of water that each person uses on a daily basis averaged over a full year—often described in gallons per capita per day (GPCD). There are several different measures of per capita use; we evaluate single-family residential use and system-wide potable use. SFR per capita use is relatively consistent across the United States because most people perform the same activities inside and outside of their homes (e.g., bathing, cooking, watering the yard)—with some fluctuation for local climate and its influence on outdoor water use. Because of this consistency, we are able to compare SFR use across communities to assess their level of water efficiency. By contrast, system-wide potable use per capita is not a relevant comparison from one community to the next because cities have very different residential, commercial, and industrial uses of water. In this case, we compare the trend in system-wide use at each utility to evaluate if individual cities are becoming more efficient in their water use over time.

Calculating Per Capita Water Use

Per capita use numbers were determined according to our methodology, which is materially different from the way ADWR determines GPCD. ADWR's methodology is complex and requires data inputs that several utilities in this study do not track. Consequently, our methodology is more simplified than ADWR's, but the basic metric of calculating water use per person is retained.

Single-family residential use is the total volume of water sold to the SFR sector, divided by the SFR population, divided by 365 (days in a year). Single-family residential population in each community was determined by multiplying the number of SFR accounts and the number of persons per household (taken from the U.S. Census).

For providers that do not separately track SFR use from other residential water uses, total residential water sales were used instead.

System-wide potable use is the total potable water provided to all accounts, divided by the service area population, divided by 365. This does not include water loss or treated effluent delivered for direct uses. In some communities not all metered consumption is potable water, but because system-wide per capita use is being compared intra-community, this bias remains constant through time.

Time Period for Comparison

Weather variability plays a role in levels of consumption, with overall water consumption changing between years that are warmer or drier than average. The years examined were not chosen to reflect "normal" weather patterns, but rather to give a snapshot of current levels of water use. The year 2003 was chosen as a baseline because this is the first year information for water providers in the Active Management Areas (AMA) is widely available. The years 2007 and 2008 were chosen because they represent the most recent water use information available for water providers within the state.

Impact of Population Growth on GPCD

Many Arizona communities have grown rapidly over the past decade, which has happened in parallel with significant improvements in water conservation technology and the implementation of more desert-appropriate landscape choices for new developments. As a result, people that reside in homes built after 2000 generally use much less water that those who live in older homes. Purely comparing one municipality's 2008 per capita water use to that of others has the potential to mask the true effectiveness of a city's water conservation plan because a large influx of new, efficient homes could artificially skew per capita values downward.

To compensate for growth's affect on GPCD, we adjust both 2008 SRF and system-wide water use rates by

multiplying the GPCD by one plus the population growth rate from 2003-2008. For example, if community A uses 150 GPCD in the SFR sector and grew at 10% over this time period, its "adjusted" GPCD is 165. Adjusted values of water use—which, when compared to a non-adjusted value, do not affect scoring for the vast majority of providers—are presented in Appendix C. Although this is a simplified measure of the impact that growth can have on water use, applied across all communities, it permits a more level comparison.

SFR Per Capita Use

+10 points if adjusted 2008 SFR per capita use is more than 40% below the median (137 GPCD)

+8 points if use is 11% to 30% below the median

+6 points if use is between 10% below and 10% above the median

+4 points if use is 11% to 30% above the median

+0 points if use is greater than 30% above the median

System-wide Potable Per Capita Trend

+15 points if adjusted 2008 system-wide potable use decreased 10% or more since 2003

+12 points if use decreased 5% to 10%

+9 points if use decreased 0% to 4%

+6 points if use increased 0% to 15%

+3 points if use increased more than 15%

Water Rate Structure (25 points)

Water rate structures play an essential role in communicating the value of water to customers and are one of the most powerful water conservation tools. Increasing block rate structures can be designed to provide stable and sufficient funding, while effectively communicating to consumers that the more water they use, the more expensive their water becomes. While increasing block rate structures can provide a strong conservation "price signal" to customers, there are several key elements that must be properly addressed in order to maximize the benefits associated with this type of rate structure, including:

- Make blocks the right size.
- Make block price differentials meaningful.
- Avoid high fixed service charges.

The effectiveness of a conservation-oriented rate structure can be evaluated by looking at the slope of the average price curve. Customers generally "see" the average price of water when looking at their bill—i.e., how much they paid divided by how much they used—which combines the volumetric cost of water plus any fixed service charges. Effective rate structures have an average price curve that slopes upwards, communicating that the more water a customer uses, the more expensive each additional gallon of water becomes.

Slope of the Average Price Curve

+20 points if the slope of the average price curve is greater than 0.1, as measured between 10,000 gallons and 70,000 gallons

+15 points if the slope is between 0.031 and 0.1

+10 points if the slope is between 0.011 and 0.03

+5 points if the slope is between 0 and 0.01

+0 points if the slope is negative

Block Thresholds

+3 points if there is a threshold at or before 5,000 gallons in the utility's 2010 rate structure to target efficient indoor use

+2 points if there is a threshold at or above 30,000 gallons to target excessive outdoor use

Conservation Measures (15 points)

Conservation measures raise community awareness and motivate residents to use water more efficiently — they are an integral part of any community's water management strategy. Because of cultural, historical, and regional differences, there is no one-size-fits-all set of conservation measures, and what works in one community may not be well received in another.

The scoring for conservation measures is guided by 29 best management practices established in ADWR's Modified Non-Per Capita Conservation Program, because 1) these BMPs were identified and developed in Arizona through an extensive stakeholder process; and 2) the Arizona Corporation Commission (ACC) uses this list of BMPs in its regulatory practices. The BMPs are designed to reduce water use within the service area, and are grouped into categories commensurate with MNPCCP Categories 1, 2, 3, 6, and 7.*

Water consumption depends on both the number of measures implemented and how well they are implemented. It is critical that utilities examine how effectively their conservation programs are working. Penetration and implementation assessments allow utilities to make more informed, cost-effective decisions by adapting their respective conservation programs to local circumstances and changing demands.

Like the MNPCCP, each conservation measure is given equal value in recognition that providers should use measures that are appropriate for their service area. In our scoring system, utilities are awarded points for both the number of measures and the assessment of those measures. Total points in each sub-section are rounded to the nearest whole number.

Number of Measures (8 points maximum)

+0.25 points for each specific conservation measure.

Assessment of Measures (7 points maximum)

+0.50 points for each assessment of a conservation measure.

* Smart Irrigation is the only additional BMP that we score that is not explicitly included in the MNPCCP's BMPs.

Conservation Ordinances (15 points)

Municipal ordinances or regulations are passed by local governments and establish rules that must be complied with, or prohibit certain actions or conduct. In Arizona, state and local statutes and regulations have been critical in promoting wise water use, protecting utility infrastructure, and assuring that municipalities have adequate water supply to support population growth. Ordinances affect every customer in a provider's service area. They can be more powerful at influencing city-wide water use than rebate programs, which are only utilized by a small percentage of the population.

We use the ordinance list established in ADWR's MNPCCP Category 5 to guide the scoring of this section as well, with slight variations in some categories to capture additional information. Ordinances that cover the list of MNPCCP BMPs (described in the "Conservation Ordinances" section of the main report) are designed to increase water use efficiency by limiting or reducing water used for specific purposes.

Like the MNPCCP, each ordinance is given equal value in recognition that providers should use ordinances that are most appropriate for their service area. In our scoring system, utilities are awarded points according to the following scale. Total points are rounded to the nearest whole number, and 15 points is the maximum points awarded for this section.

+1 point for having an ordinance in a particular BMP category

+0.25 extra points for each distinct regulation or standard within the same category

Funding for Conservation (5 points)

It is nearly impossible to run an effective conservation program if no financial and staffing resources are set aside for that purpose. The amount of resources a water provider dedicates to efficiency and conservation efforts reflects upon how they value conservation. Funding for conservation is calculated by dividing the total water conservation budget by the service area population.

+5 points if the utility spends more than $2.00 per customer on conservation (for 2008)

+4 points if spending is between $1.51 and $2.00

+3 points if spending is between $1.01 and $1.50

+2 points if spending is between $0.50 and $1.00

+1 point if spending is less than $0.50

+0 points if spending is not tracked separately from other utility expenditures

Water Loss (10 points)

Reducing system-wide losses increases the efficiency of the overall system, allowing more water to make it to the end user. System-wide water loss can occur due to malfunctioning meters, small leaks, water main breaks, data handling errors, and unauthorized uses. Water loss is the difference between total water deliveries and total water supplies (not including direct use of effluent), expressed as a percentage of total water supplies. All systems are expected to have some water loss—10% or less is the benchmark established by the ADWR—yet many communities in Arizona keep water loss at much lower rates than 10%. Our scoring system awards:

+10 points for the city with the lowest water loss in 2008; each subsequent city receives one less point. For example, the utility with the second-lowest water loss receives 9 points; the third-lowest receives 8 points; etc.

+1 point guaranteed if water loss is less than 10%

+0 points if water loss is greater than 10%

Effluent Use (5 points)

In an arid state such as Arizona, it is vital to maximize the use of water supplies. Highly treated wastewater, known as effluent, reclaimed water, or recycled water, is appropriate to use for recharging groundwater aquifers, irrigation of high-water-use landscapes, environmental restoration, process water for industrial facilities, return flow credits, cooling tower water, and many other purposes. Scoring for effluent is calculated by dividing the quantity of effluent used for recharge, direct, and other uses by the total amount effluent generated.

+5 points if the city utilized 100% of the effluent it generated in 2008

+4 points if reuse is between 81% and 100%

+3 points if reuse is between 61% and 80%

+2 points if reuse is between 40% and 60%

+0 points if reuse is less than 40%