



Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use

*(For the Consistent Implementation of the
Water Conservation Act of 2009)*

February 2016

California Department of Water Resources
Division of Statewide Integrated Water Management
Water Use and Efficiency Branch

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Introduction

This is the third revision of the Methodologies for Calculating Baseline and Compliance Urban per Capita Water Use. The document was first released in October 2010 and then revised in February 2011 with the addition of the Provisional Method 4 for Determining Water Use Targets as Appendix C. This revision includes Methodology 8: Criteria for Adjustments for Compliance Daily per Capita Water Use and removes the former Appendix A: Alternative Methodology for Service Area Population. Methodology 8 was not included in the earlier versions of the Methodologies as it was not required for the completion of the 2010 urban water management plans and more time was needed to thoroughly develop the methodology. The former Appendix A provided instructions for using the Census Bureau's website to calculate service area population using a person per connection approach. The Census Bureau has revised its website and the links in the former document are no longer valid. Additionally, as part of its guidance for the 2015 UWMPs, DWR has included a population mapping tool as part of the on-line urban water management plan data submittal website. The population mapping tool provides a simpler and streamlined approach to estimating service area population.

In developing Methodology 8, DWR received input and guidance from the Urban Stakeholder Committee and the weather normalization subcommittee. Nine stakeholder meetings and seven subcommittee meetings were held starting in January of 2013 to discuss the development of the methodology and other topics. In 2010, DWR held two public listening sessions, five public stakeholder meetings, and two public workshops to receive comment, input and guidance in developing the first and second versions of the methodologies.

Background documents, stakeholder meeting summaries and public comments related to the development of these methodologies are available at the Water Conservation Act of 2009 website: <http://www.water.ca.gov/wateruseefficiency/sb7/>

Or contact:

SBX7-7 Urban Water Conservation Program Manager
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Background

In February 2008, Governor Arnold Schwarzenegger introduced a seven-part comprehensive plan for improving the Sacramento-San Joaquin Delta. A key component of his plan was a goal to achieve a 20 percent reduction in per capita water use statewide by the year 2020. The governor's inclusion of water conservation in the Delta plan emphasizes the importance of water conservation in reducing demand on the Delta and in reducing demand on the overall California water supply. In response to Schwarzenegger's call for statewide per capita savings, the Department of Water Resources (DWR) and the State Water Resources Control Board convened the 20x2020 Agency Team on Water Conservation. DWR released a draft 20x2020 Water Conservation Plan in April 2009 and the final 20x2020 Water Conservation Plan in February 2010. The water conservation plan developed estimates of statewide and regional baseline per capita water use and outlined recommendations to the governor on how a statewide per capita water use reduction plan could be implemented.

In November 2009, SBX7-7, The Water Conservation Act of 2009, was signed into law as part of a comprehensive water legislation package. The Water Conservation Act addresses both urban and agricultural water conservation. The urban provisions reflect the approach taken in the 20x2020 Water Conservation Plan. The legislation sets a goal of achieving a 20-percent statewide reduction in urban per capita water use and directs urban retail water suppliers to set 2020 urban water use targets. The Water Conservation Act of 2009 directs DWR to develop technical methodologies and criteria to ensure the consistent implementation of the Act and to provide guidance to urban retail water suppliers in developing baseline and compliance water use. To meet the legislative directives for consistent implementation, DWR has developed and published Methodologies for Calculating Baseline and Compliance Year Per Capita Water Use.

Overview of Methodologies, Water Use Targets, and Reporting

The Water Conservation Act of 2009 was incorporated into Division 6 of the California Water Code, commencing with Section 10608 of Part 2.55. All quotations of the Water Code in this report are from sections added by this legislation, unless otherwise noted.

The methodologies, water use targets, and reporting apply to urban retail water suppliers that meet a threshold of number of end users or annual volume of potable water supplied. Section 10698.12 (p) defines the water suppliers affected:

“Urban retail water supplier” means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes.

This overview summarizes the process that urban retail water suppliers must follow and the options they have for complying with the legislation.

Methodologies

The legislation specifically calls for developing seven methodologies and a set of criteria for adjusting daily per capita water use at the time compliance is required (the 2015 and 2020 compliance years) under Section 10608.20(h):

- (1) *The department, through a public process and in consultation with the California Urban Water Conservation Council, shall develop technical methodologies and criteria for the consistent implementation of this part, including, but not limited to, both of the following:*
 - (A) *Methodologies for calculating base daily per capita water use, baseline commercial, industrial, and institutional water use, compliance daily per capita water use, gross water use, service area population, indoor residential water use, and landscaped area water use.*
 - (B) *Criteria for adjustments pursuant to subdivisions (d) and (e) of Section 10608.24.*

Sections 10608.20 and 10608.28 of the Water Code allow water suppliers the choice of complying individually or regionally by mutual agreement with other water suppliers or regional agencies. DWR has also developed a methodology for regional compliance.

The following methodologies are included in this report:

- Methodology 1: Gross Water Use
- Methodology 2: Service Area Population
- Methodology 3: Base Daily Per Capita Water Use

- Methodology 4: Compliance Daily Per Capita Water Use
- Methodology 5: Indoor Residential Use
- Methodology 6: Landscaped Area Water Use
- Methodology 7: Baseline Commercial, Industrial, and Institutional (CII) Water Use
- Methodology 8: Criteria for Adjustments to Compliance Daily Per Capita Water Use
- Methodology 9: Regional Compliance

The methodologies provide specific guidance to water suppliers on how to calculate baseline, target, and compliance-year water use. Each methodology defines how its calculations are to be used, with direct reference to the applicable section of the Water Code.

Each methodology describes the calculations, data needed, and, where applicable, optional steps and alternative approaches that water suppliers may use depending on their specific circumstances.

The methodologies for indoor residential water use; landscaped area water use; and baseline CII water use (Methodologies 5, 6, and 7) apply only to urban retail water suppliers who use Method 2 (see Water Use Targets below) to set water use targets.

Baseline Water Use

Water suppliers must define a 10- or 15-year base (or baseline) period for water use that will be used to develop their target levels of per capita water use. Water suppliers must also calculate water use for a 5-year baseline period, and use that value to determine a minimum required reduction in water use by 2020. The longer baseline period applies to a water supplier that meets at least 10 percent of its 2008 measured retail water demand through recycled water. Methodology 3: Base Daily Per Capita Water Use describes the calculations.

Water Use Targets

An urban retail water supplier, as defined above, must set a 2020 water use target and a 2015 interim target using one of four methods. Three of these are defined in Section 10608.20(a)(1), with the fourth developed by DWR by the end of 2010. The 2020 water use target will be calculated using one of the following four methods:

- Method 1: Eighty percent of the water supplier's baseline per capita water use
- Method 2: Per capita daily water use estimated using the sum of performance standards applied to indoor residential use; landscaped area water use; and CII uses
- Method 3: Ninety-five percent of the applicable state hydrologic region target as stated in the State's April 30, 2009, draft 20x2020 Water Conservation Plan
- Method 4: An approach developed by DWR and reported to the Legislature in February 2011 (included as Appendix B)

The target may need to be adjusted further to achieve a minimum reduction in water use regardless of the target method (this is explained in Methodology 3). The Water Code directs that water suppliers must compare their actual water use in 2020 with their

calculated targets to assess compliance. In addition, water suppliers will report interim compliance in 2015 as compared to an interim target (generally halfway between the baseline water use and the 2020 target level). The years 2015 and 2020 are referred to in the methodologies as compliance years. All baseline, target, and compliance-year water use estimates must be calculated and reported in gallons per capita per day (GPCD).

Water suppliers have some flexibility in setting and revising water use targets:

- A water supplier may set its water use target and comply individually, or as part of a regional alliance (see Methodology 9: Regional Compliance).
- A water supplier may revise its water use target in its 2015 urban water management plan or in an amended plan.
- A water supplier may change the method it uses to set its water use target and report it in a 2010 amended plan or in its 2015 urban water management plan. Urban water suppliers are not permitted to change target methods after they have submitted their 2015 UWMP.

Data Reporting

DWR will collect data pertaining to urban water use targets through three documents: (1) through the individual supplier urban water management plans; (2) through the regional urban water management plans; and (3) through regional alliance reports.

Water suppliers that comply individually must report the following data in their urban water management plans (applicable urban water management plan dates are included in parentheses).

- Baseline Gross Water Use and Service Area Population (2010, 2015, 2020)
- Individual 2020 Urban Water Use Target (2010, 2015, 2020) and Interim 2015 Urban Water Use Target (2010)
- Compliance Year Gross Water Use (2015 and 2020) and Service Area Population (2010, 2015, 2020)
- Adjustments to Gross Water Use in the compliance year (2015, 2020)
- Water suppliers who choose Target Method 2 also must provide Landscaped Area Water Use and Baseline CII Water Use data (2010, 2015, and 2020).
- Water Suppliers who choose Target Method 4 must provide the components of calculation as required by Target Method 4. Appendix C describes Target Method 4 and the regional compliance reporting that applies to that method (2010, 2015, and 2020).

Water suppliers that comply regionally must fulfill additional reporting requirements. These are described in greater detail in Methodology 9: Regional Compliance.

Consequences if Water Supplier Does Not Meet Water Use Targets

Each urban retail water supplier, as defined above, must comply by establishing 2015 and 2020 water use targets, demonstrating that its water use is in compliance with its targets, and reporting water use baselines, targets, compliance year water use, and supporting data in its urban water management plan. Section 10608.56 (a) states that a water supplier not in compliance will not be eligible for water grants or loans that may be administered by DWR or other state agencies:

On and after July 1, 2016, an urban retail water supplier is not eligible for a water grant or loan awarded or administered by the state unless the supplier complies with this part.

Two exceptions to this are allowed. Section 10608.56 (c) states that a water supplier shall be eligible for a water loan or grant if it “has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for achieving the per capita reductions.”

Section 10608.56 (e) states that a water supplier can also be eligible for a water loan or grant if it “has submitted to the department for approval documentation demonstrating that its entire service area qualifies as a disadvantaged community.”

Methodology 1: Gross Water Use

Definition of Gross Water Use

Section 10608.12(g) of the Water Code defines “Gross Water Use” as:

the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:

- (1) Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier*
- (2) The net volume of water that the urban retail water supplier places into long term storage*
- (3) The volume of water the urban retail water supplier conveys for use by another urban water supplier*
- (4) The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24*

Calculation of Gross Water Use

Gross Water Use is a measure of water supplied to the distribution system over 12 months and adjusted for changes in distribution system storage and deliveries to other water suppliers that pass through the distribution system. Recycled water deliveries are to be excluded from the calculation of Gross Water Use. Water delivered through the distribution system for agricultural use may be deducted from the calculation of Gross Water Use. Under certain conditions, industrial process water use also may be deducted from Gross Water Use.

The methodology for calculating Gross Water Use broadly follows American Water Works Association (AWWA) Manual M36 guidance for calculating Distribution System Input Volume.¹ Calculating Gross Water Use entails 12 basic steps, two of which are optional.²

Step 1: Define the 12-month Calculation Period

Gross Water Use shall be calculated over a continuous 12-month period. This period can be based on the calendar year or the utility’s fiscal year.³ The same 12-month period must be used in calculations of Gross Water Use for determining Base Daily Per Capita Water Use and Compliance Daily Per Capita Water Use.

¹American Water Works Association, Manual of Water Supply Practices – M36: Water Audits and Loss Control Programs, 3rd Edition, 2009. M36 defines Distribution System Input Volume as the volume of water entering the distribution system to provide service to customers. It is equal to the water volume derived from the water utility’s own source waters, plus water imported or purchased, plus or minus the net change in water storage (if applicable and significant).

²AWWA Manual M36 contains several forms and worksheets that retail urban water suppliers can use to compile and organize data required to calculate Gross Water Use.

³As stipulated in paragraph (1) of subdivision (a) of Section 10608.20 of SBX7-7.

Step 2: Delineate Distribution System Boundary

Water supply systems can be broadly subdivided between the transmission systems that convey large amounts of water to local storage reservoirs or treatment plants, and the distribution systems that supply water to residential, commercial, industrial, and public uses such as fire safety. Water distribution systems generally comprise large networks of pipes with complex branched and loop topologies with multiple flow paths to many delivery points.⁴ In some systems, some retail customers receive water for municipal and industrial (M&I) uses directly from transmission canals and pipes, in which case the retail water supplier may treat the sections of the transmission canals and pipes delivering water to the retail M&I customers as part of its distribution system. However, transmission canals and pipelines not used for delivering water directly to retail customers should not be included as part of the distribution system.

Wherever possible, distribution system boundary limits should be defined by points of metering or measurement⁵ of the water supply. Typical measurement locations for distribution include exit points for treatment plants, treated water reservoirs, wells feeding directly into the distribution system, and imported water entering directly into the distribution system. A schematic of a typical urban retail water supply system is shown in Figure 1; actual distribution systems may vary greatly in configuration. Therefore, each urban retail water supplier must define and delineate its distribution system for purposes of calculating Gross Water Use. The rules for defining and delineating the distribution system boundary must be applied consistently in the base period and compliance years.⁶

Step 3: Compile Water Volume from Own Sources

The water supplier's own sources of supply entering the distribution system shall be identified and tallied. For systems that provide only treated water, this may consist mostly or entirely of water entering the distribution system from treatment plants (as in Figure 1). It may also include water from wells or other sources controlled by the water supplier that directly supply the distribution system (as in Figure 1).

Recycled water, as defined in subdivision (m) of Section 10608.12, directly entering the distribution system shall be excluded from the tally of own sources. Step 8 addresses how to account for recycled water indirectly entering the distribution system through potable reuse.

Measurement records for each source shall be compiled into annual volumes. AWWA's M36 manual or other appropriate references should be consulted in situations where water sources are unmetered or the water meters have not been routinely calibrated. Volumes for each source shall be reviewed and corrected for known errors that may exist in the raw

⁴ <http://censam.mit.edu/news/posters/whittle/1.pdf>

⁵ Measurements of unmetered agricultural and raw water deliveries must, at a minimum, meet an accuracy standard of +/- 6% by volume, as defined in the U.S. Bureau of Reclamation, Mid-Pacific Region's "2008 Conservation and Efficiency Criteria". Metered deliveries of M&I water must meet the measurement accuracy and calibration standards described in American Water Works Association Manual M6.

⁶ For guidance on situations in which the distribution system boundary changed during the base period, see Methodology 3: Base Daily Per Capita Water Use. For situations in which the distribution system boundary changed during the compliance period, see Methodology 4: Compliance Daily Per Capita Water Use.

measurement data. Uncorrected metered volumes shall be adjusted based on the registration accuracy of the meter, as follows:⁷

$$\text{metered volume correction} = \frac{\text{uncorrected metered volume}}{\text{registration accuracy expressed as a decimal}} - \text{uncorrected meter volume}$$

Step 4: Compile Imported Water Volume

Outside sources of finished water imported directly into the distribution system shall be identified and tabulated, excluding the following:

- Recycled water, as defined in subdivision (m) of Section 10608.12, imported from another water supplier
- Imported raw water passing through the urban retail water supplier's treatment plants, if that water has already been counted under Step 3 (as in Figure 1)

The raw measurement data shall be corrected for known errors in the same manner as for own source water.⁸

Step 5: Compile Exported Water Volume

Any water volumes sent through the distribution system to another water utility or jurisdiction shall be identified and tabulated. Recycled water, as defined in subdivision (m) of Section 10608.12, exiting the distribution system shall be excluded from the tabulation.⁹

Bulk water exports that do not pass through the distribution system also shall not be counted. The raw metering data shall be corrected for known errors in the same manner as for own source and imported water.

Step 6: Calculate Net Change in Distribution System Storage

If distribution system storage is greater at the end of the year than at the beginning, it indicates that water has entered the distribution system but has not been delivered to customers. This water would have been counted in Steps 3 and 4, but because it has not been delivered to customers, it must be deducted from the calculation of Gross Water Use.

Conversely, a decrease in end-of-year distribution system storage indicates that water has been drawn from storage to meet customer demands. This water would not have been counted in Steps 1 and 2, and therefore must be added to the calculation of Gross Water Use. Note that these calculations apply only to storage in the distribution system. Do not include changes in storage outside the distribution system. If the change in distribution system storage is expected to be insignificant, or if data needed to calculate the change in distribution system storage are not available, the water supplier may forgo this step.

⁷AWWA Manual M36 should be consulted if additional guidance on correcting raw meter data for meter registration inaccuracy is needed. Meters with errors exceeding AWWA standards should be recalibrated, repaired, or replaced.

⁸Generally, bulk water sale meters are routinely monitored for accuracy because they provide the basis for payment between the wholesaler and retailer.

⁹It is necessary to subtract recycled water exiting the system only if it was included in the tabulations of water entering the distribution system performed in Steps 3 and 4. However, the easiest way to handle recycled water directly entering the distribution system in the calculation of Gross Water Use is to exclude it entirely from each calculation step.

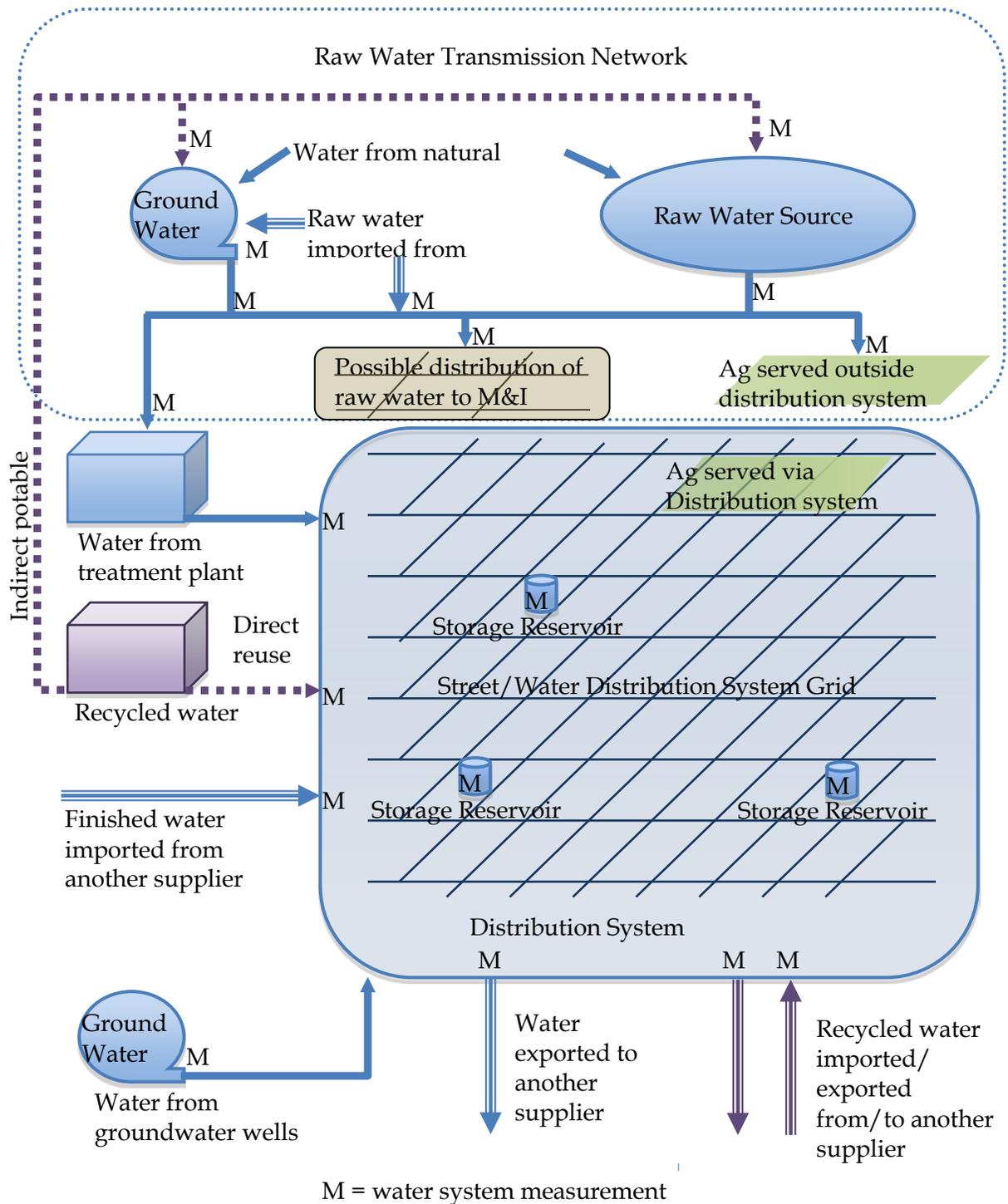


FIGURE 1 URBAN RETAIL WATER SUPPLIER SYSTEM SCHEMATIC¹⁰

¹⁰Figure 1 provides a general depiction of all of the elements that may affect the calculation of Gross Water Use. Not all of these elements may be present in a particular water system, nor is it expected that Figure 1 will accurately characterize a particular system configuration.

Step 7: Calculate Gross Water Use before Indirect Recycled Water Use Deductions

Gross Water Use before Indirect Recycled Water Use Deductions equals the volume of water from own sources entering the distribution system determined in Step 3, plus the volume of water from imported water sources entering the distribution system determined in Step 4, less the volume of water delivered via the distribution system to other utilities determined in Step 5, less the net change in distribution system storage determined in Step 6.¹¹ Table 1 provides an example calculation.

Step 8: Deduct Recycled Water Used for Indirect Potable Reuse from Gross Water Use

This step is necessary only if the urban retail water supplier uses recycled water (as defined in Subdivision (m) of Section 10608.12) to supplement raw surface or groundwater for indirect potable reuse. The Step 8 deduction requires the urban retail water supplier to estimate the amount of recycled water indirectly entering the distribution system through a surface or groundwater source (as in Figure 1).¹² This calculation requires three steps: (1) estimate the amount of recycled water used to supplement a surface reservoir source of supply, (2) estimate the amount of recycled water in extracted groundwater sources of supply, and (3) adjust these volumes for losses during transmission and treatment before the water enters the distribution system.

1. **Estimate recycled water used for surface reservoir augmentation.** The allowable deduction depends on the recycled water blend percentage in the surface reservoir water entering the potable water treatment plant. For example, if the raw surface water source is 95 percent fresh water and 5 percent recycled water, no more than 5 percent of the volume from this water source can be deducted from Gross Water Use calculated in Step 7. If the blend percentage of a surface water source is unknown, it shall be estimated based on the measured or estimated volumes of recycled water, local runoff, and imported water that entered the reservoir for the three years before the year for which Gross Water Use is being calculated. For example, if Gross Water Use is being calculated for 2005, the blend percentage is estimated by dividing the volume of recycled water that entered the reservoir by the total volume of water that entered the reservoir from 2002 through 2004.
2. **Estimate recycled water used for groundwater recharge.** Three approaches are allowed to estimate the amount of recycled water extracted from groundwater and introduced into a distribution system. Because year-to-year variations can occur in the amount of recycled water applied in a groundwater recharge operation, long-term running averages are required.

¹¹If the net change is negative, Gross Water Use will increase. If it is positive, Gross Water Use will decrease.

¹²Recycled water used for indirect potable use should only be subtracted at the time it enters the potable distribution system. It cannot be subtracted when placed into storage and again when extracted for potable use.

- a. **Monitoring data at extraction wells.** If monitoring data are available to enable determination of the percent of extracted water at each extraction well that originated as recycled water (for example, using geochemical analysis), then such data can be used to estimate the amount of recycled water entering a distribution system. To account for year-to-year variations, the credit for recycled water is a five year running monthly average percentage for each well for the preceding 60 months. For recharge projects in operation less than 60 months, a period of 60 months can be created using a combination of actual monitoring data since initiation of recharge operations and projected data. The projected data can be based on an acceptable groundwater model as described in paragraph b below or a projected average of extraction using the procedure described in paragraph c below.
- b. **Groundwater model for extraction wells.** If a groundwater model is available that has the capability of tracking the movement of recycled water from recharge operations to extraction wells and estimating the percent of extracted groundwater that originated as recycled water at each well operated by the water supplier based on actual historic data of recycled water applied at groundwater recharge operations, then such data can be used to determine the amount of recycled water entering a distribution system. The groundwater model must be calibrated and approved as part of an adjudication or other regulatory process, such as the groundwater permitting process by the California Department of Public Health or a California Regional Water Quality Control Board. To account for year-to-year variations, the credit for recycled water is a five-year running monthly average percentage at each well for the preceding 60 months. For recharge projects in operation less than 60 months, the monthly running average may be derived from the model using all months of actual recycled water applied in a recharge operation and projected recycled water amounts planned to be applied for a future period to reach a combined total of 60 months of operation.
- c. **Recharge data less in-basin losses.** Where actual extraction well monitoring data or estimated data obtained from an accepted groundwater model, as described in paragraph b above, are unavailable, an estimate can be made of extracted recycled water based on amounts of recycled water applied in recharge operations adjusted for an in-basin loss factor. The allowable deduction depends on the product of three factors:
 - i. The average annual volume of recycled water recharged into the groundwater basin for the purpose of indirect potable reuse over the 5 years before the year for which Gross Water Use is being calculated. For recharge projects in operation less than 60 months, data from all months of actual recharge operations may be combined with projected volumes of recycled water recharge to reach a combined total of 60 months of operation to calculate the average annual volume of recycled water recharged.
 - ii. A loss factor to account for water losses during recharge and extraction. If a loss factor has been developed as part of a groundwater management plan,

a basin adjudication process, or some similar regulatory process, the water supplier shall use that loss factor and provide reference to the appropriate documentation. If a loss factor has not been developed as part of a local regulatory process, the water supplier shall use a default loss factor of 10 percent.¹³ The default loss factor of 10 percent is not applicable to groundwater recharge operations intended as seawater intrusion barriers. For seawater intrusion barriers, the loss factor will be determined on a case-by-case basis.

- iii. The volume of water pumped from the basin by the urban retail water supplier expressed as a percentage of the total volume of water pumped by all water users extracting water from the basin in the year for which Gross Water Use is being calculated.

For example, if the average annual recharge of recycled water for the five years before the year for which Gross Water Use is being calculated is 500 acre-feet (AF), the recharge loss factor is 10 percent, and the urban retail water supplier accounted for 25 percent of the volume of water pumped from the basin in the year for which Gross Water Use is being calculated, then no more than 113AF $= (500 \times (1.0 - 0.10) \times 0.25)$ from this supply source can be deducted from Gross Water Use calculated in Step 7.

3. Adjust for losses. Only deduct the volume of recycled water used for indirect potable reuse that enters the distribution system from Gross Water Use calculated in Step 7.

Loss factors for transmission and treatment based on recent system audit data (or other reliable sources for estimating transmission and treatment losses) shall be applied to the estimated volumes of recycled water. For example, if the volume of recycled water before transmission and treatment is estimated to be 1,000 AF, and combined losses from transmission and treatment are estimated to be 3 percent, only 970 AF shall be deducted from Gross Water Use calculated in Step 7.

Table 2 shows an example calculation of the volume of recycled water used for indirect potable reuse based on approach 2.c above.

Step 9: Calculate Gross Water Use after Deducting Indirect Recycled Water Use

This equals the volume of water determined in Step 7 less the volume of water determined in Step 8. Table 1 shows an example calculation of Gross Water Use after indirect recycled water use deductions.

¹³The default value of 10 percent is based on the loss factors applied to groundwater storage in the Arvin-Edison and Semitropic Water Storage Districts. It also is consistent with the range of 0 to 15 percent loss factors applied to California water storage projects identified in the Groundwater Banking Programs Survey-Results and Summary Report prepared for the Sacramento Groundwater Authority by Kennedy/Jenks Consultants (2008). The projects they surveyed primarily used modeling and observation to determine the specific loss factor for each project.

Step 10 (Optional): Deduct from Gross Water Use the Volume of Water Delivered for Agricultural Use

This step is necessary only if the urban retail water supplier has chosen to exclude from the calculation of Gross Water Use water delivered for agriculture per Section 10608.12 (g) (4).

Consideration of agricultural water use must be the same for calculations of Gross Water Use for determining Base Daily Per Capita Water Use and Compliance Daily Per Capita Water Use.

Identify and tabulate the volume of water delivered through the distribution system for agricultural water uses. Do not include deliveries that bypass the distribution system (see Figure 1 for examples of agricultural deliveries inside and outside the distribution system).

Delivery volumes shall be based on account records and meter data for connections in the distribution system used to supply water for the commercial production of agricultural crops or livestock.¹⁴

Step 11 (Optional): Deduct Volume of Water Delivered for Process Water Use

This step is necessary only if the urban retail water supplier has elected to exclude process water from the calculation of Gross Water Use and the supplier is eligible to do so. An urban retail water supplier is eligible to exclude process water from the calculation of Gross Water Use only if its industrial water use comprises a substantial percentage of total water use.

[NOTE: See Appendix C for guidance on whether to include or exclude process water.]

Step 12: Calculate Gross Water Use after Optional Deductions

This equals the volume of water determined in Step 9 less the volume of water determined in Steps 10 and 11. Table 1 provides an example calculation of Gross Water Use after optional deductions.

¹⁴The standard used to identify distribution system connections supplying agricultural water uses is based on subdivision (b) of Section 535 of the California Water Code. Commercial agricultural production is defined by the U.S. Department of Agriculture and the Census Bureau as any place from which \$1,000 or more of agricultural products (crops and livestock) were sold or normally would have been sold during the year. For the purposes of calculating Gross Water Use, retail nursery water use is not considered to be an agricultural water use.

Table 1: Example Urban Retail Water Supplier Gross Water Use Calculation

| Utility Name: | 12-month period: | | | | | Volume Units: | | | | |
|---|------------------|--------|--------|--------|--------|-----------------|--------|--------|--------|---------|
| | 1-Jan to 31-Dec | | | | | Million Gallons | | | | |
| Calculation | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 |
| Volume from Own Sources (raw data) | 3,480.8 | | | | | | | | | |
| Meter error adjustment (+/-) | 136.9 | | | | | | | | | |
| 1 Subtotal: Corrected Volume from Own Sources | 3,617.7 | | | | | | | | | |
| Volume from Imported Sources (raw data) | 1,005.0 | | | | | | | | | |
| Meter error adjustment (+/-) | 39.5 | | | | | | | | | |
| 2 Subtotal: Corrected Volume from Imported Sources | 1,044.5 | | | | | | | | | |
| 3 Total Volume Into Dist. System = Line 1 + Line 2 | 4,662.2 | | | | | | | | | |
| Volume Exported to Other Utilities (raw data) | 432.0 | | | | | | | | | |
| Meter error adjustment (+/-) | 17.3 | | | | | | | | | |
| 4 Subtotal: Corrected Volume Exported to Other Utilities | 449.3 | | | | | | | | | |
| 5 Change in Dist. System Storage (+/-) | -8.6 | | | | | | | | | |
| 6 Gross Water Use Before Indirect Recycled Water Use Deductions = Line 3 - Line 4 - Line 5 | 4,221.5 | | | | | | | | | |
| 7 Indirect Recycled Water Use Deduction | 304.3 | | | | | | | | | |
| 8 Gross Water Use After Indirect Recycled Water Use Deductions = Line 6 - Line 7 | 3,917.2 | | | | | | | | | |
| 9 Water Delivered for Ag. Use (optional deduction) | 0.0 | | | | | | | | | |
| 10 Process Water Use (optional deduction) | 278.8 | | | | | | | | | |
| 11 Gross Water Use After Optional Deductions = Line 8 - Line 9 - Line 10 | 3,638.4 | | | | | | | | | |

Table 2: Example Calculation of Annual Deductible Volume of Indirect Recycled Water Entering Distribution System

| Surface Reservoir Augmentation | | | Volume Discharged from Reservoir for Distribution System Delivery | Recycled Water Blend | Recycled Water Delivered to Treatment Plant | Transmission/Treatment Loss | Transmission/Treatment Losses | Volume Entering Distribution System | | |
|---|-----|-----|---|--------------------------|---|-------------------------------------|----------------------------------|-------------------------------------|-------------------------------|-------------------------------------|
| | | | (MG) | | (MG) | | (MG) | (MG) | | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | | |
| | | | | | (4) x (5) | | | (6) x (7) | | |
| | | | | | | | (6) – (8) | | | |
| Source 1 | | | 1,000 | 5% | 50 | 3% | 1.5 | 48.5 | | |
| Source 2 | | | 500 | 10% | 50 | 3% | 1.5 | 48.5 | | |
| <i>Subtotal Reservoir Augmentation:</i> | | | | | | | | 97 | | |
| Groundwater Recharge | | | 5-Year Annual Average Recharge | Recharge Recovery Factor | Recycled Water Pumped from Basin | Utility Pumping as % of Basin Total | Recycled Water Pumped by Utility | Transmission/Treatment Loss | Transmission/Treatment Losses | Volume Entering Distribution System |
| | | | (MG) | | (MG) | | (MG) | | (MG) | (MG) |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | | |
| | | | (2) x (3) | | (4) x (5) | | | (6) x (7) | | |
| | | | | | | | (6) – (8) | | | |
| Basin 1 | 500 | 90% | 450 | 25% | 113 | 3% | 3.4 | 109.1 | | |
| Basin 2 | 750 | 90% | 675 | 15% | 101 | 3% | 3 | | | |
| <i>Subtotal Groundwater Recharge:</i> | | | | | | | | 207.3 | | |
| Deductable Volume of Indirect Recycled Water Entering Distribution System: | | | | | | | | 304.3 | | |

MG = million gallons

Methodology 2: Service Area Population

Definition of the Service Area Population

Section 10608.20(f) states:

When calculating per capita values for the purposes of this chapter, an urban retail water supplier shall determine population using federal, state, and local population reports and projections.

The legislation directs DWR to develop consistent methodologies and criteria for determining Service Area Population.

To obtain an accurate estimate of GPCD, water suppliers must estimate population of the areas that they actually serve, which may or may not coincide with either their jurisdictional boundaries or with the boundaries of cities. Customers may be in the distribution area with a wholly private supply during the baseline and compliance years, and new areas may be annexed into a water supplier's distribution system over time. The area used for calculating Service Area Population shall be the same as the distribution system area used in Methodology 1, Gross Water Use.

Figure 2 illustrates the many different situations that may arise, with the background grid indicating the census blocks that overlap with the water supplier's service area boundary.

Examples include the following:

- The actual distribution area may cover only a portion of the jurisdictional boundary.
- Large water users that depend wholly or partially on a private groundwater supply (e.g., college campus, a military installation, a correctional facility) may exist in the distribution area. If such a user is wholly dependent on private supply, its residents should be excluded. If the user is partially dependent (for example, it uses a municipal source for indoor use and private groundwater wells for irrigation only), its residents served by the municipal source should be included. Estimation of compliance GPCD for customers that switch their irrigation to a municipal source between the baseline and compliance years is addressed in Methodology 4: Compliance Daily Per Capita Water Use.
- New customers outside the present distribution area may connect to the water supplier's distribution system in the future for various reasons.
- The water supplier's distribution system can geographically expand over time as a result of economic and population growth.

Although a water supplier may consult any or all federal, State, and local data sources to estimate population, these estimates must account for the above-mentioned complexities.

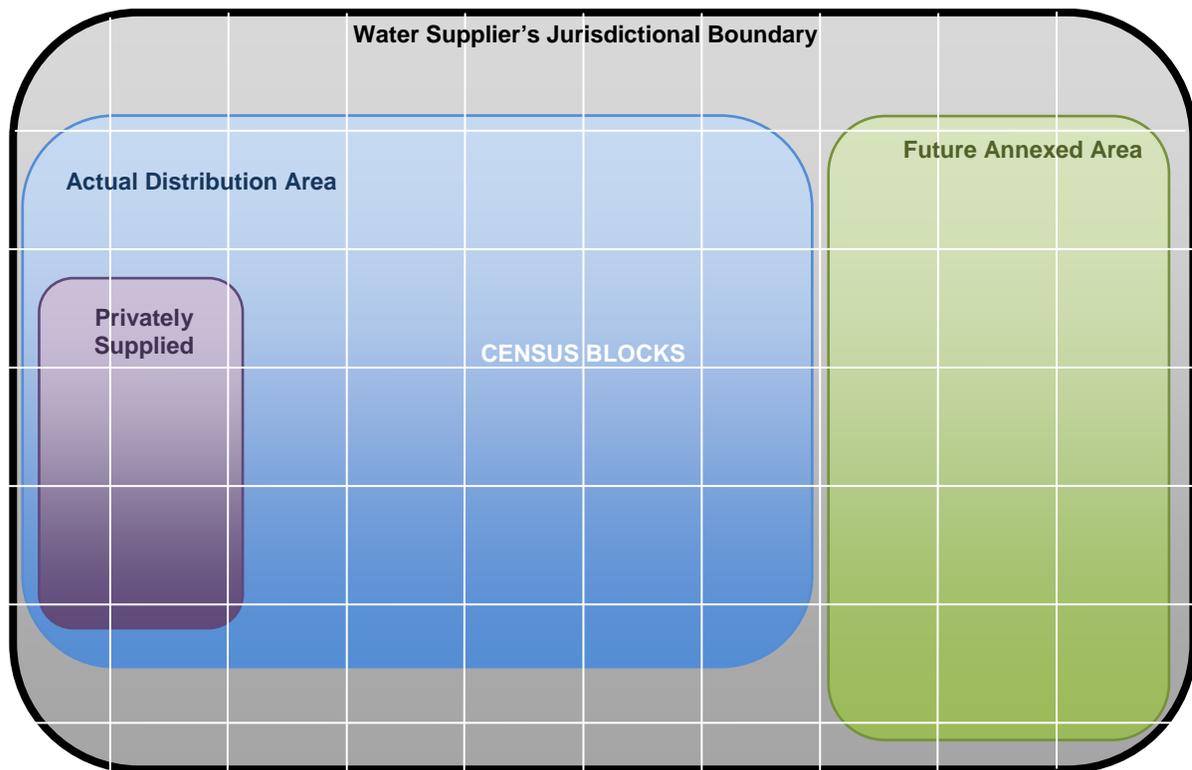


FIGURE 2 DEFINING AREA FOR POPULATION CALCULATION

Estimating the Service Area Population

Data published by the California Department of Finance (DOF) or the U.S. Census Bureau must serve as the foundational building block for population estimates. In some instances, data published by these two sources may be directly applicable. In other instances, additional refinements may be necessary. For example, to account for distribution areas that do not match city boundaries, customers with private sources of supply, or other unique local circumstances, water suppliers may have to supplement the above sources of data with additional local data sources such as county assessor data, building permits data, and traffic analysis zone data. These refinements are acceptable as long as they are consistently applied over time, and as long as they build upon population data resources of the DOF or the U.S. Census Bureau. Suppliers in any category listed below may use the person-per-connection or person per housing unit population calculation.

Retail water suppliers will generally fall into one of the following three categories:

- Category 1: Water suppliers whose actual distribution area overlaps substantially ($\geq 95\%$) with city boundaries (may be a single city or a group of cities) during baseline and compliance years
- Category 2: Water suppliers not falling in Category 1 but having an electronic geographic information system (GIS) map of their distribution area

- Category 3: Water suppliers not falling in Category 1 and lacking an electronic GIS map of their distribution area.

Category 1 Water Suppliers

These water suppliers are encouraged to use population data published by the DOF's demography unit. However, population data may also be available through a water wholesaler, a local government agency, or an association of local governments. A list of associations of local governments is available through the California Association of Councils of Government (CALCOG: www.calcog.org). Many of these associations serve as census data repositories and also have GIS capabilities.

Category 1 water suppliers may use population estimates from any of these federal, state, or local agencies, as long as they clearly cite their data source, use the same source for both the baseline and compliance years, and correct these estimates for privately supplied large customers that may exist in their actual distribution area

Category 2 Water Suppliers

These water suppliers have two options:

- Water suppliers that are members of an association of local governments (or a water wholesaler) that develop population estimates for its members using GIS maps of actual distribution areas and population data from the DOF or Census Bureau should use these data for the baseline and compliance years. The water suppliers should coordinate with the local government association or wholesaler to complete the task of identifying and removing large institutions with wholly private systems in their distribution area.
- Water suppliers without such membership must develop population estimates using either a per-connection or per-housing unit methodology or another equivalent method that uses data either from the DOF or the U.S. Census Bureau as its basis.

Category 3 Water Suppliers

These water suppliers have the same two options as Category 2 water suppliers. The only difference is that to access the U.S. Census Bureau's population data resources, they first must identify which census blocks fall in their distribution area. This exercise can be performed manually, or the distribution area map boundary can be digitized. Category 3 water suppliers may be able to access these digitization capabilities and census-based population estimation capabilities through their local association of governments. Alternatively, they can develop population estimates using either the per-connection or per-housing unit methodology or another equivalent method that uses data from either the DOF or the U.S. Census Bureau as its basis.

Determining Adequacy of Current Population Estimate Methodology

Figure 3 provides a flow chart to help water suppliers determine whether their existing population estimation methodology is adequate or must be refined. If refinement is needed, it should be coordinated with the water wholesaler or the local association of governments that currently provides population estimates. Water suppliers that currently lack access to reliable population estimates that reflect characteristics of their actual distribution areas can use a per-connection methodology.

Adjusting Population Estimates

Population increases in existing developed areas or high-density infill redevelopments are estimated annually by DOF for incorporated cities and unincorporated portions of counties. These and other sources of local data may be used to estimate population for the non-census years. For water suppliers using a person-per-connection methodology, population changes largely will be captured through the changes in counts of active connections over time.

Water suppliers may revise population estimates for baseline years between 2000 and 2010 when 2010 census information becomes available. Water suppliers who did not use 2010 Census data to calculate baseline water use in the 2010 UWMPs (final 2010 Census was released in 2012), must recalculate baseline water use using the 2000 Census and the 2010 Census for the 2015 UWMP. Service area boundaries may also contract or expand during the baseline period. The latter could occur because of annexation of previously developed areas that may have been dependent upon private groundwater wells in the past but have subsequently become part of an urban retail water supplier's system. The following list provides guidance under various annexation scenarios. Additional adjustments may be required to population estimates for events that occur between the baseline and compliance years. These issues are discussed in Methodology 4: Compliance Daily Per Capita Use.

- If a portion of the distribution area is removed during one of the baseline years, water suppliers must compute their baseline after eliminating this removed portion from all their baseline years.
- If an area was annexed before the first baseline year, or the annexation involves merger with another urban retail water supplier, no data issues arise. In the latter case, population and connections data would be available for each water supplier separately. If not, appropriate estimates should be developed and documented.
- If the area was annexed before 2000, population estimates should be developed for the annexed area using the census block and person-per-connection method, or an equivalent method.
- If the area was annexed after 2000, the water supplier will know the connection count only in the year of the annexation, not in 2000 and corresponding to the population estimate. Water suppliers may apply person-per-connection ratios developed for their pre-annexation distribution area to estimate population in the annexed area, or use other defensible techniques. For example, they could obtain county assessor data to back-cast what connection counts would have been in the annexed area in 2000 to permit scaling of census population estimates for the annexed areas to the post-annexation years. These can be further improved after 2012 once data from the 2010 census become available.

Water suppliers in other unique situations, such as those experiencing a significant change in their seasonal workforce or seasonal resident population between the baseline and compliance years, may adjust their population estimates using other techniques. The water supplier must provide documentation that the technique is based on or consistent with DOF or U.S. Census Bureau population data.

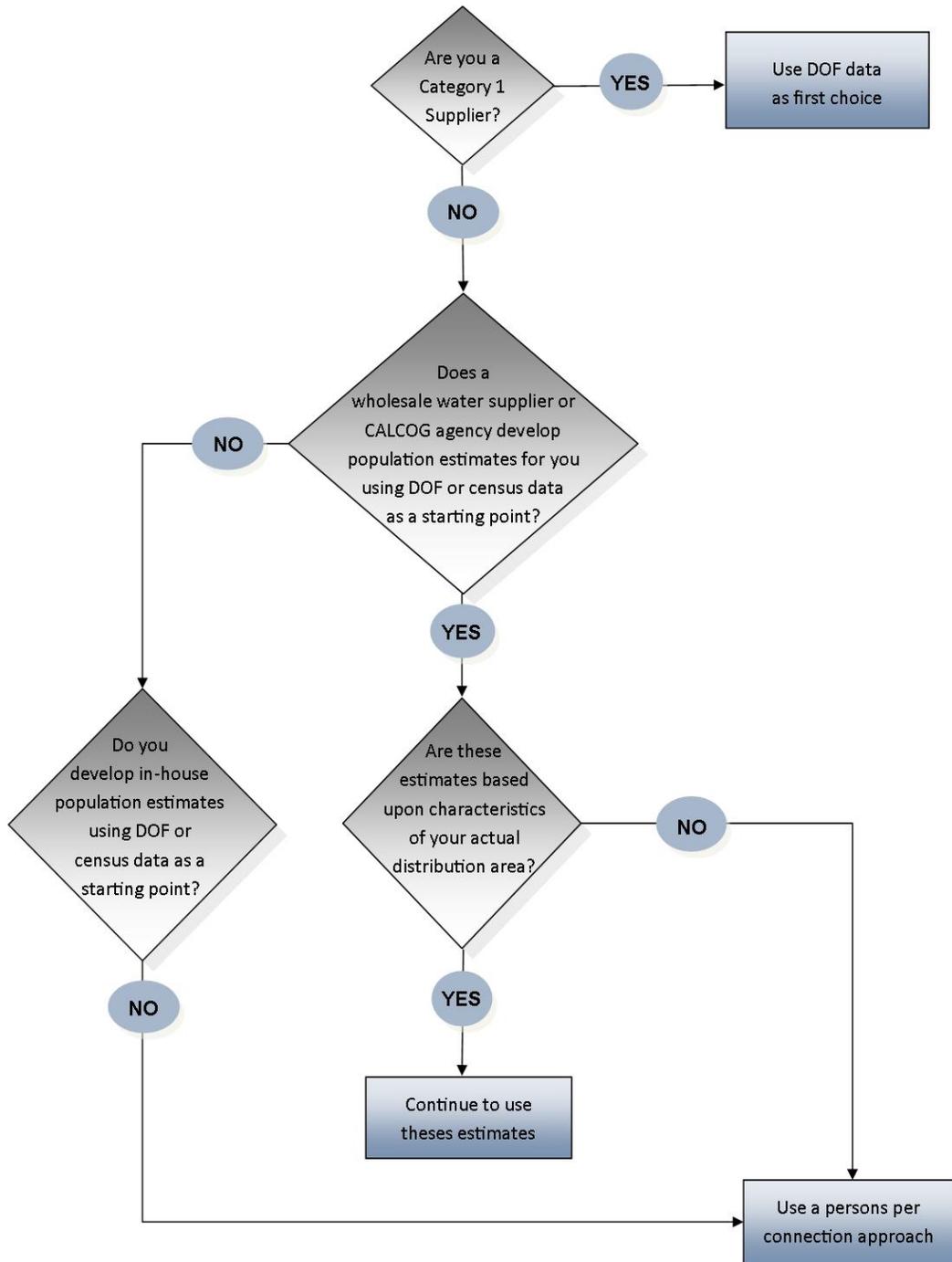


FIGURE 3 SUGGESTED PROCESS FOR DETERMINING ADEQUACY OF SERVICE AREA POPULATION ESTIMATE METHODOLOGY

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Methodology 3: Base Daily Per Capita Water Use

Definition of Base Daily Per Capita Water Use

Base Daily Per Capita Water Use is defined as average gross water use, expressed in GPCD, for a continuous, multiyear base period. The Water Code specifies two different base periods for calculating Base Daily Per Capita Water Use under Section 10608.20 and Section 10608.22:

- The first base period is a 10- to 15-year continuous period, and is used to calculate baseline per capita water use per Section 10608.20.
- The second base period is a continuous five-year period, and is used to determine whether the 2020 per capita water use target meets the legislation's minimum water use reduction requirement per Section 10608.22.

Unless the urban retail water supplier's five year Base Daily Per Capita Water Use per Section 10608.12 (b) (3) is 100 GPCD or less, Base Daily Per Capita Water Use must be calculated for both baseline periods.

Calculation of Base Daily Per Capita Water Use

Calculating Base Daily Per Capita Water Use entails four steps:

1. Estimate Service Area Population for each year in the base period using Methodology 2.
2. Calculate Gross Water Use for each year in the base period using Methodology 1. Express Gross Water Use in gallons per day (gpd).¹⁵
3. Calculate daily per capita water use for each year in the base period. Divide Gross Water Use (determined in Step 2) by Service Area Population (determined in Step 1).
4. Calculate Base Daily Per Capita Water Use. Calculate average per capita water use by summing the values calculated in Step 3 and dividing by the number of years in the base period. The result is Base Daily Per Capita Water Use for the selected base period.

¹⁵If Gross Water Use is expressed in million gallons per year, multiply by 1,000,000 and then divide the result by 365. If Gross Water Use is expressed in acre-feet, multiply by 325,851 and then divide the result by 365.



FIGURE 4 10 TO 15 YEAR BASE DAILY PER CAPITA WATER USE CALCULATIONS

Calculating Base Daily Per Capita Water Use per Section 10608.20

Calculate Base Daily Per Capita Water Use using one of the following base periods:

- If recycled water made up less than 10 percent of 2008 retail water delivery, use a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.
- If recycled water made up 10 percent or more of 2008 retail water delivery, use a continuous 10- to 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

Figure 4 illustrates the procedure. If Gross Water Use and/or population are not available for the full base period, the water supplier shall calculate base daily per capita water use for the maximum number of years for which data are available. When selecting between base periods, the water supplier shall select the base period for which the most data are available.

For example, if gross water use and/or population data are not available before 1997, the water supplier shall select a base period starting in 1997.

Distribution Area Expansion Caused by Mergers

If two or more water suppliers merged wholly, or one water supplier acquired a portion of another's service area, during a year that falls in the baseline period of the merged entity, they should derive their baseline GPCD as if they were a single entity for the entire baseline period to stay consistent with the targets and compliance GPCDs that would represent the merged entity.

Distribution Area Contraction

If during the baseline period a previously served portion of the distribution system is removed from a water supplier's service area, the baseline GPCD shall be corrected to reflect only that portion of the service area that remained consistently supplied during the baseline and compliance years.

Distribution Area Expansion by Annexation of Already Developed Areas¹⁶

For areas annexed during the baseline years, water suppliers can select one of two choices:

- Include these areas for baseline GPCD estimation and test compliance for the combined entity.
- Track baseline and compliance GPCDs for the annexed areas separately.

Determining the Minimum Water Use Reduction Requirement per Section 10608.22

The following calculation is required only if the five-year baseline per capita water use per Section 10608.12 (b) (3) is greater than 100 gpcd. The calculation is used to determine whether the water supplier's 2015 and 2020 per capita water use targets meet the legislation's minimum water use reduction requirement per Section 10608.22.

The calculation entails three steps:

1. Calculate Base Daily Per Capita Water Use using a continuous five-year period ending no earlier than December 31, 2007, and no later than December 31, 2010.¹⁷
2. Multiply the result from Step 1 by 0.95. The 2020 per capita water use target cannot exceed this value (unless the water supplier's five year baseline per capita water use is 100 gpcd or less). If the 2020 target is greater than this value, reduce the target to this value.
3. Set the 2015 target to the mid-point between the 10- or 15-year baseline per capita water use and the 2020 target determined in Step 2.

As an example, suppose a water supplier has a 10-year baseline per capita water use (per Section 10608.20) of 170 GPCD, and a 5-year baseline per capita water use (per Section 10608.22) of 168 GPCD.

- The maximum allowable GPCD target in 2020 (per Section 10608.22) is $0.95 \times 168 \text{ GPCD} = 160 \text{ GPCD}$.
- The 2020 target under Method 1 is $0.8 \times 170 \text{ GPCD} = 136 \text{ GPCD}$.

¹⁶Annexation here refers to already developed and inhabited areas that may have relied upon groundwater until this point in time, or on other sources of water for which data are not available, and that were not previously connected to a municipal source. This is not to be confused with annexation of previously undeveloped land. No adjustment is required for the latter type of annexation, whose impact on GPCD is naturally accounted for by the estimation of base period Gross Water Use and Service Area Population.

¹⁷If 5 years of continuous data are not available, use the maximum number of years for which data are available.

Because the Method 1 target is less than 160 GPCD, no further adjustment to the 2020 target is required if Method 1 is used.

Suppose the water supplier’s 2020 target under Method 3 is 167 GPCD. Because this is greater than 160 GPCD, the target would need to be reduced to 160 GPCD if Method 3 is used.

Similarly, if a target calculated using Method 2 or 4 exceeded 160 GPCD, it would need to be reduced to 160 GPCD in order to satisfy the legislation’s minimum water use reduction requirement. Figure 5 shows how the two baseline per capita water use amounts are used to determine whether the 2020 target meets the legislation’s minimum water use reduction requirement.

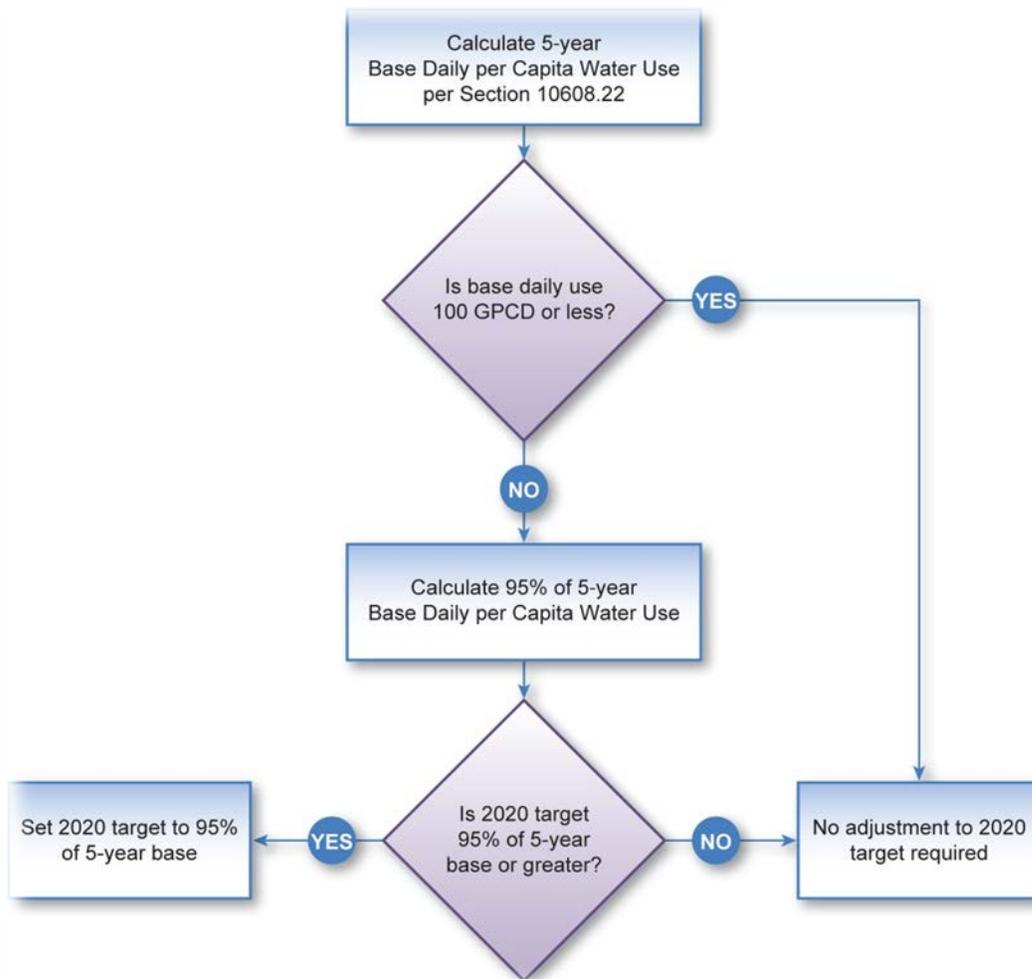


FIGURE 5 DETERMINATION OF MAXIMUM ALLOWABLE 2020 GPCD TARGET

Tables 3 and 4 may be used to organize the information needed to calculate Base Daily Per Capita Water Use under Sections 10608.20 and 10608.22.

Table 3: Base Daily Per Capita Water Use Calculation for Section 10608.22

Utility Name: _____

12-month Period: _____ to _____

(1) (2) (3) (4)

| Base Years* | Service Area Population | Gross Water Use (gal. per day) | Daily Per Capita Water Use (3) ÷ (2) |
|----------------------|-------------------------|--------------------------------|--------------------------------------|
| Year 1 | | | |
| Year 2 | | | |
| Year 3 | | | |
| Year 4 | | | |
| Year 5 | | | |
| Total of Column (4): | | | |
| Divide Total by 5: | | | |

*Most recent year in base period must end no earlier than December 31, 2007, and no later than December 31, 2010.

Table 4: Base Daily Per Capita Water Use Calculation for Section 10608.20

Utility Name: _____

12-month Period: _____ to _____

(1) (2) (3) (4)

| Base Years* | Service Area Population | Gross Water Use (gal. per day) | Daily Per Capita Water Use (3) ÷ (2) |
|---------------------------------------|-------------------------|--------------------------------|--------------------------------------|
| Year 1 | | | |
| Year 2 | | | |
| Year 3 | | | |
| Year 4 | | | |
| Year 5 | | | |
| Year 6 | | | |
| Year 7 | | | |
| Year 8 | | | |
| Year 9 | | | |
| Year 10 | | | |
| Year 11 | | | |
| Year 12 | | | |
| Year 13 | | | |
| Year 14 | | | |
| Year 15 | | | |
| Total of Column (4): | | | |
| Divide Total by Number of Base Years: | | | |

* Enter the actual year of the data in this column. The most recent year in base period must end no earlier than December 31, 2004, and no later than December 31, 2010. *The base period cannot exceed 10 years unless at least 10 percent of 2008 retail deliveries were met with recycled water.*

Revisions to Base Daily Per Capita Water Use or Targets

A water supplier may revise its calculated Base Daily Per Capita Water Use after submitting its 2010 urban water management plan if better information becomes available. The revisions may be included in the water supplier's 2015 and subsequent plans or may be submitted as an amended plan, provided it follows the process required for amendments to such plans. If the revisions to the Base Daily Per Capita Water Use changes the water use target, the water use target must be revised as well.

In addition, a water supplier may change the method it uses to set its water use target, and report the method change and target revision in a 2010 amended plan or in its 2015 urban water management plan. Target method changes are not permitted in the 2020 plan or amended 2015 plans.

Methodology 4: Compliance Daily Per Capita Water Use

The following methodology addresses estimation of compliance daily per capita water use (in GPCD) in the years 2015 and 2020.

Definition of Compliance Daily Per Capita Use

Section 10608.12(e) states:

“Compliance daily per-capita use” means the gross water use during the final year of the reporting period, reported in gallons per capita per day.

Estimation of Compliance-Year GPCD

Methodology 1: Gross Water Use and Methodology 2: Service Area Population shall be used to develop the two basic components for estimating compliance-year GPCD. This section discusses adjustments to compliance-year GPCD because of changes in distribution area caused by mergers, annexation, and other scenarios that occur between the baseline and compliance years.

Adjustments are allowed in calculating compliance-year GPCD for factors described in Section 10608.24. These adjustments are discussed in Methodology 8: Criteria for Compliance-Year Adjustment.

Distribution Area Expansion Caused by Mergers

If water suppliers merge, or one water supplier acquires a portion of another’s service area, between the baseline period and the compliance year, they have two choices:

- Test compliance separately for each service area.
- Calculate a (compliance year) population weighted average of each system’s target and determine compliance as a single entity using this weighted average.

Distribution Area Contraction

If a previously supplied portion included in the baseline is removed from the distribution area before the compliance years, water suppliers shall re-compute their baseline GPCD after eliminating the removed portion for all baseline years.

Distribution Area Expansion by Annexation of Already Developed Areas¹⁸

For areas annexed between the baseline and compliance years, a water supplier must determine Base Daily Per Capita Water Use, target water use, and compliance water use.

- Base Daily Per Capita Water Use for the annexed area shall be determined using the same baseline period as the water supplier's original service area (before the annexation). If such data are not available, the water supplier shall use a baseline period starting with the earliest year available for the annexed area and including ten years, if available. If no data exist for years before annexation, the water supplier shall use data from the year of annexation.
- Annexed areas shall be assigned a prorated target based upon the number of years between annexation and the end of 2020. For example, if a water supplier's target is based on a 20 percent reduction by 2020, and it annexes an area in 2017, this annexed area should show a 6 percent reduction in GPCD by 2020 relative to its 2017 GPCD.
- Compliance may be determined for the separate service areas (annexed and original), or for the combined service area using a (compliance year) population weighted average.

If compliance is determined separately for separate service areas, both areas must be in compliance for supplier to be in compliance.

Distribution Area Expansion by Annexation of Undeveloped Areas

No special adjustment calculation is needed for areas that were undeveloped during the baseline period but which were annexed and developed between the baseline period and compliance year. The impact on GPCD is accounted for by the estimation of compliance year Gross Water Use and compliance-year population.

Existing Large Partial Customers Become Whole Customers

Large customers that pump groundwater or take surface water for landscape irrigation or other uses (depending on their municipal source solely for indoor use) may switch and use only the municipal source. This change will disrupt the baseline and compliance year comparison. Two adjustments are provided below:

- If the switch occurs during the baseline years, the landscape irrigation or other use should be included in the compliance-year gross water calculation.
- If the switch occurs between the baseline and compliance years, the water associated with irrigation use switches, properly documented and subjected to the requirements of the Model Water Efficient Landscape Ordinance adopted by DWR in 2009, may be excluded from the calculation of compliance-year Gross Water Use. Otherwise, the irrigation or other use must be included in both the baseline and compliance year gross water use calculations.

¹⁸ Annexation here refers to already developed and inhabited areas that may have relied upon groundwater until this point in time and were not previously connected to a municipal source.

Water Supplier Subject to Urban Water Management Plan Reporting Requirements between 2010 and 2020

Water suppliers that become subject to urban water management plan reporting requirements after 2010 also become subject to the new requirements of Section 10608 of the Water Code from the same year onward. These water suppliers are required to estimate their baseline GPCD and establish their 2020 GPCD targets using the same methodological guidelines that apply to other water suppliers. However, for testing compliance, such water suppliers may prorate these targets depending on the year the water supplier became subject to the new requirements.

For example, if a water supplier chooses a 2020 target that is 20 percent below its baseline GPCD, but it became subject to the new requirements only in 2017, it shall test compliance against a target that is 6 percent below its baseline GPCD.

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Methodology 5: Indoor Residential Use

Definition of Indoor Residential Use

Section 10608.20(b)(2)(A) states:

For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of the department's 2016 report to the Legislature pursuant to Section 10608.42, this standard may be adjusted by the Legislature by statute.

Section 10608.42 states:

The department shall review the 2015 urban water management plans and report to the Legislature by December 31, 2016, on progress towards achieving a 20-percent reduction in urban water use by December 31, 2020. The report shall include recommendations on changes to water efficiency standards or urban water use targets in order to achieve the 20-percent reduction and to reflect updated efficiency information and technology changes.

Section 10608.20(b)(2)(A) sets a provisional standard for efficient indoor use (55 GPCD) that urban retail water suppliers using target Method 2 must use to set their 2020 target.

However, they are not required to demonstrate that this indoor residential target has actually been met – only that the overall target, which includes additional components for landscaped area water use and CII water use, has been met.

Section 10608.42 requires DWR to submit a report to the Legislature in 2016 that will include recommendations on changes to water use efficiency standards to reflect updated efficiency information and technological changes. DWR will conduct a study to assess whether the provisional indoor residential standard of 55 GPCD should be adjusted.

Based on the report DWR submits in 2016, the Legislature may change the indoor residential standard. The indoor residential standard is used only to set the target under Method 2; calculation of indoor usage by water supplier is not required for determining compliance with Method 2.

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Methodology 6: Landscaped Area Water Use

The calculation of Landscaped Area Water Use requires a measurement (or estimate) of landscaped area and of the landscape water use per unit area (based on reference evapotranspiration [ET]). As with other urban water use measures under Section 10608, Landscaped Area Water Use is defined as a daily per capita rate of water use; consequently, Methodology 2: Service Area Population is used in calculating Landscaped Area Water Use.

Definition of Landscaped Area Water Use

For the Landscaped Area Water Use component of target Method 2, Section 10608.20 (b) (2) (B) states:

For landscape irrigated through dedicated or residential meters or connections, water efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in Chapter 2.7 (commencing with Section 490) of Division 2 of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992. An urban retail water supplier using the approach specified in this subparagraph shall use satellite imagery, site visits, or other best available technology to develop an accurate estimate of landscaped areas.

All landscape irrigated by dedicated or residential meters must be included, including multifamily residential parcels. Definitions and calculations contained in the Model Water Efficient Landscape Ordinance (MWELo) are provided in Appendix A. These calculations give the Landscaped Area Water Use as a function of landscaped area and reference ET. The MWELo defines landscaped area as planting areas, turf areas, and water features. Landscaped area excludes footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or non-pervious hardscapes, and other non-irrigated areas designated for non-development (such as open spaces and existing native vegetation). Section 10608.20 (b)(2)(B) restricts the landscaped area to include only landscape irrigated through dedicated or residential meters or connections.

Landscaped area for the purposes of calculating the Method 2 target shall mean the water supplier's estimate or measurement of 2020 landscaped areas. Water suppliers shall develop a preliminary estimate (forecast) of 2020 landscaped areas for purposes of setting urban water use targets and interim urban water use targets under Subdivision 10608.20 (a) (1).

For final compliance-year calculations, water suppliers shall update the estimate of 2020 landscaped areas using one of the techniques described in the following sections.

Approach to Calculating Landscaped Area Water Use

Water suppliers shall follow five steps to calculate Landscaped Area Water Use:

1. Identify applicable MWELo (1992, 2010 or 2015) for each parcel.

2. Estimate irrigated landscaped area for each parcel.
3. Determine reference evapotranspiration for each parcel.
4. Use the Maximum Applied Water Allowance (MAWA) equation from the applicable MWELo to calculate annual volume of landscaped area water use.
5. Convert annual volume to GPCD.

Identify Applicable MWELo for Each Parcel

Before computing landscaped area, water suppliers must determine how MWELo ordinances apply to specific parcels in their service areas. Two versions of MWELo apply according to the date when landscaping was installed in a given parcel:

- For landscaped areas installed on or after December 1, 2015, the MAWA equation and all applicable criteria from the 2015 version of the ordinance or its equivalent shall be used.
- For landscaped areas installed on or after January 1, 2010, the MAWA equation and all applicable criteria from the 2009 version of the ordinance or its equivalent shall be used.
- For landscaped areas installed before January 1, 2010, the MAWA equation and all applicable criteria from the 1992 version of the ordinance or its equivalent shall be used.

For the purposes of this methodology, two important differences between the two ordinances are the ET adjustment factor and the inclusion of a special landscaped area for calculating a water allowance in the 2010 ordinance. The applicable definitions and calculations in these ordinances are provided in Appendix A.

Landscaped Area Water Use shall be calculated for each parcel (or groups of parcels with the same reference ET and applicable MWELo) using Maximum Applied Water Allowance (MAWA) computations from the applicable MWELo.

Water suppliers should use the best available information to determine which MWELo applies to each parcel. This may include date of submittal for MWELo design review, date of service establishment, and remote sensing information.

The calculations provided in Appendix A will yield water use estimates in gallons per year.

The total Landscaped Area Water Use for the water supplier will equal the total Landscaped Area Water Use of all parcels in the water supplier's service area. Because Landscaped Area Water Use is defined in units of GPCD, the result of the calculation above must be divided by Service Area Population and then converted from annual to daily use.

Measure Landscaped Area

The water supplier shall select a technique for measuring landscaped area that satisfies the following criteria:

- The landscaped area must be measured or estimated for all parcels served by a residential or dedicated landscape water meter or connection in the water supplier's service area.

- Only irrigated landscaped area served by residential or dedicated landscape water meter or connection shall be included in the calculation of Landscaped Area Water Use. Landscape served by CII connections and non-irrigated landscape shall be excluded. (All references to landscaped area below shall mean irrigated landscaped area served by a residential or dedicated landscape meter or connection.)

Measurement Techniques

The following sections describe techniques that may be used to measure landscaped area. Water suppliers may use one or a combination of these techniques.

Field-Based Measurement. Field-based measurement of parcels' landscaped area may be accomplished by physical measurement using devices such as a total station, measuring wheel and compass, global positioning system (GPS), or other measuring devices having accuracy similar to these devices. Field-based measurement also may be obtained from landscape designs submitted to the water supplier for compliance with the MWEL0 or for other planning and billing purposes.

Measuring with Remote Sensing. The landscaped area may be measured by using remote sensing (aerial or satellite imaging) to identify the landscaped areas in conjunction with a GIS representation of the parcels in the water supplier's service area. A variety of remote sensing techniques are available, and additional techniques may become available between now and 2020. DWR will allow the water supplier to select the remote-sensing technique that it prefers. However, the following conditions shall be met:

- The remote-sensing information must be overlaid onto a GIS representation of each parcel boundaries to estimate the irrigated landscaped area in each parcel.
- The remote-sensing imagery must have a resolution of 1 meter or less per pixel.
- The remote-sensing technique must be verified for accuracy by comparing its results to the results of field-based measurement for a subset of parcels selected using random sampling. The water supplier shall report the resulting percent error between the estimates of landscaped area produced by the remote-sensing technique and those produced by field-based measurements for the sampled parcels.
- DWR has not set its own standards for remote-sensing verification and sampling design. The water supplier shall provide a description of its remote-sensing technique (including imagery, data processing, and verification) when it reports its landscaped area for purposes of complying with provisions of the Water Code. Congalton and Green (1999)¹⁹ and Stein et al. (2002)²⁰ are two references that describe professional standards for remote sensing.

¹⁹Congalton, R. G., and K. Green, 1999. *Assessing the Accuracy of Remotely Sensed Data: Principles and Practices*. CRC Press, Boca Raton, FL.

²⁰Stein, A., F. van der Meer, and B. Gorte, eds. 2002. *Spatial Statistics for Remote Sensing*. Kluwer Academic Publishers, Netherlands.

Using Sampling to Estimate Landscaped Area on Small Parcels. The landscaped area for smaller-sized parcels may be calculated by measuring the percentage of total parcel area that is landscaped in a sample of similar parcels and applying that percentage to the remaining parcels. This technique may be used only for parcels with a total land area of 24,000 square feet or less. The parcels for which this technique is used shall be divided into groups, or strata, based on parcel size increments of 4,000 square feet or less. (For example, parcels up to 4,000 square feet would form one group, parcels between 4,001 and 8,000 square feet would form another group, and so forth.) Field-based measurement or remote sensing must be used to calculate the landscaped area for a subset of parcels sampled at random in each parcel size group. The percentage of landscaped area to total land area for the sampled parcels in each group can then be used to calculate the landscaped area for all other parcels in the group. Parcels greater than 24,000 square feet shall be measured directly.

Statistical sampling is a means to provide adequate information at reasonable cost. If implemented carefully, sampling allows the water supplier to develop accurate estimates of landscaped area for all relevant parcels from a subset of parcels. However, sampling shall not be used to estimate landscaped area for parcels larger than 24,000 square feet. Stratified sampling (random sampling in identified subgroups of parcels) should be used to estimate the landscaped area in different parcel size groups, as described earlier. Other characteristics of parcels may be used as a basis for selecting the strata in addition to parcel size.

DWR has not developed specific standards for sampling design. Urban water suppliers should follow standards of professional practice sufficient to demonstrate unbiased estimates of landscaped area. For example, Cochran (1977)²¹ and Lohr (2010)²² provide guidance for sound sampling design.

Other Measurement Techniques. The water supplier may use another technique to measure landscaped area for each parcel other than the ones described previously if one becomes available in the future. However, the technique must meet similar conditions to those described above for remote sensing:

- The landscaped area information must be gathered or reported on a parcel basis, or it must be overlaid onto a GIS representation of each parcel's boundaries to calculate the landscaped area in each parcel.
- The technique must be tested for accuracy by comparing its results to the results of field-based measurement for a subset of parcels. Field-based measurement should be performed for a subset of parcels selected at random from those for which the technique has been used. The water supplier should report the percent error between the calculations of landscaped area produced by the selected technique and those produced by field-based measurements for the sampled parcels.

²¹Cochran, William G. 1977. *Sampling Techniques*. 3rd edition. Wiley; NY, NY.

²²Lohr, Sharon. 2010. *Sampling: Design and Analysis*. Brooks/Cole Cengage, Boston, MA. 2nd edition.

Estimate Reference Evapotranspiration

Calculations under the MWELo require determination of reference ET. Each parcels served by a residential or dedicated landscape water meter or connection in the water supplier's service area shall be assigned a reference ET based on one of the following methods:

- Appendix A of the 2015 ordinance contains tables of reference ET. In some cases, the water supplier may choose a single reference ET value most appropriate for all parcels in its service area. For parcels in geographic areas not covered in the Appendix A table, the ordinance provides the following direction for selecting the appropriate reference value: "For geographic areas not covered in Appendix A, use data from other cities located nearby in the same reference evapotranspiration zone, as found in the CIMIS Reference Evapotranspiration Zones Map, Department of Water Resources, 1999."
- DWR has developed a spatial program (Spatial CIMIS) that provides interpolated ET data between weather stations.²³ The program can provide estimates of reference ET for any part of California with a resolution of 2 kilometer (km) by 2 km. Water suppliers may use this tool to assign reference ET to parcels. Any other CIMIS enhancements or additional stations formally adopted by DWR between 2010 and 2020 also may be used.
- Water suppliers may use local reference ET estimates that are not formally part of CIMIS or that make adjustments to CIMIS station estimates, provided that such estimates or adjustments are scientifically derived and of comparable reliability to CIMIS estimates.

The water supplier shall explain why neither the CIMIS nor other approved DWR reference ET information is adequate, and shall provide the data and calculations used to develop the local reference ET estimate.

Apply MAWA Equation to Calculate Annual Volume

Appendix A provides the MAWA equations that apply to parcels. These equations, or their equivalents, will yield water use estimates in gallons per year. The total Landscaped Area Water Use for the water supplier will equal the total Landscaped Area Water Use of all parcels in the supplier's service area.

Convert Annual Volume to GPCD

After the MAWA for all parcels has been summed to determine the total Landscaped Area Water Use portion of the Method 2 target, the total must be divided by Service Area Population and then by 365 to calculate the Landscaped Area Water Use in GPCD. Refer to Methodology 2: Service Area Population to complete this step. Because Landscaped Area Water Use is defined in units of GPCD, the result must be converted from annual to daily use.

²³California Irrigation Management Information System. The spatial model is available at <http://www.cimis.water.ca.gov/cimis/cimiSatSpatialCimis.jsp>.

Summary of Steps to Calculate Landscaped Area Water Use

Calculating Landscaped Area Water Use requires the following process:

1. Assign applicable MWELO (1992, 2009 or 2015) to each parcel.
2. Estimate landscaped area for each parcel.
 - a. Select measurement technique(s) for landscaped area (for example, field based, remote sensing, or sampling).
 - b. Apply technique(s) to calculate total landscaped area for each parcel. (This applies only to parcels for which landscaped area has not yet been measured.)
 - c. Measure special landscape area (SLA) where applicable.
3. Determine the reference ET for each parcel.
4. Use the MAWA from the applicable MWELO to calculate Landscaped Area Water Use for all parcels.
 - a. Use the equations, or their equivalents, to calculate the MAWA for each parcel or group of parcels (grouped according to applicable MWELO, reference ET, and presence of SLA).
 - b. Sum the MAWA over all parcels to calculate the total annual Landscaped Area Water Use portion of the Method 2 target.
5. Divide the total from Step 4 by Service Area Population and then by 365 to calculate the Landscaped Area Water Use in GPCD.

Methodology 7: Baseline Commercial, Industrial, and Institutional Water Use

Baseline Commercial, Industrial and Institutional (CII) Water Use is needed for urban water use target Method 2 (along with the indoor residential and landscape uses). It also affects the adjustment factors that agencies may consider at the time of testing compliance in 2015 and 2020 by allowing them to make adjustments based on “substantial changes” in CII relative to Baseline CII Water Use per Section 10608.24 (d)(1)(B). The definition of “substantial change” and adjustments are discussed in Methodology 8: Criteria for Adjustments to Compliance Daily Per Capita Water Use.

Definition of Baseline CII Water Use

Section 10608.12 defines Baseline CII Water Use and related concepts as follows:

- (c) *“Baseline commercial, industrial, and institutional water use” means an urban retail water supplier’s base daily per capita water use for commercial, industrial, and institutional users.*
- (d) *“Commercial water user” means a water user that provides or distributes a product or service.*
- (h) *“Industrial water user” means a water user that is primarily a manufacturer or processor of materials as defined by the North American Industry Classification System code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development.*
- (i) *“Institutional water user” means a water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches, hospitals, government facilities, and nonprofit research institutions.*

Use of Baseline CII Water Use

Urban retail water suppliers are given several methods for calculating water use targets. Method 2 allows them to calculate a target by using three components: Indoor Residential Use, Landscaped Area Water Use, and Baseline CII Water Use. Section 10608.20 (b)(2)(C) specifies that the CII portion of the target is to be calculated as follows:

For CII uses, a 10 percent reduction in water use from the baseline CII water use by 2020.

Calculation of Baseline CII Water Use

Baseline periods that a retail water supplier may use to determine Baseline CII Water Use shall follow the same direction required for Base Daily Per Capita Water Use under Section 10608.12.(b):

“Base daily per capita water use” means any of the following:

- (1) *The urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.*
- (2) *For an urban retail water supplier that meets at least 10 percent of its 2008 measured retail water demand through recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier, the urban retail water supplier may extend the calculation described in paragraph (1) up to an additional five years to a maximum of a continuous 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.*

A retail water supplier must have CII data for the entire baseline period used in the water supplier's calculation of Base Daily Per Capita Water Use. If the CII data do not exist, the retail water supplier should use another water use target method.

For each year in the baseline period, the volume of Baseline CII Water Use shall be divided by the Service Area Population (see Methodology 2), and the average of those calculations, converted to a daily rate, is the Baseline CII Water Use for the purpose of calculating the Method 2 target as defined in Section 10608.20(b)(2). The procedure for averaging the annual per capita CII use is the same as for calculating Base Daily Per Capita Water Use (refer to Methodology 3: Base Daily Per Capita Water Use).

The CII component of the 2020 target for Method 2 shall be the Baseline CII Water Use (in GPCD) multiplied by 0.9.

Process Water Exclusion

A retail water supplier may elect to exclude process water from its calculation, consistent with Section 10608.24(e):

When developing the urban water use target pursuant to Section 10608.20, an urban retail water supplier that has a substantial percentage of industrial water use in its service area, may exclude process water from the calculation of gross water use to avoid a disproportionate burden on another customer sector.

If a water supplier elects to exclude process water, it must do so for baseline and compliance year per capita water use and for baseline CII water use. DWR regulations that define when and how process water can be excluded from Gross Water Use and Baseline CII Water Use calculations are provided in Appendix C.

Adjustments for Multifamily Residential Connections

A retail water supplier whose baseline CII data includes some multifamily residential uses must demonstrate that it can accurately adjust the data to remove those uses.

In cases where the retail water supplier can estimate the population in multifamily residences included in the CII data, the supplier must do both of the following:

1. Use the adjustment procedure described below in Adjustments for Residential Uses in CII Connections to remove indoor residential uses from the CII data.
2. Assure that landscaped area in the CII data is excluded from the calculations of Landscaped Area Water Use.

In situations where the supplier cannot estimate the population in multifamily residences included in the CII data, Method 2 cannot be used to set the water supplier's water use target.

Adjustments for Residential Uses in CII Connections

Some CII connections also may serve group quarters or other residential uses. Examples could include campus dormitories, military base housing, and apartments that are served by a CII connection. Water use target Method 2 already provides an indoor use allowance of 55 GPCD for such residents. To ensure that this indoor use is not double-counted, the following steps must be used to adjust the CII component of the target water use under Method 2:

1. Estimate the average population served by CII connections during the baseline period and whose residents use is included in the water supplier's unadjusted Baseline CII Water Use.
2. Calculate the average daily volume of target Indoor Residential Use associated with this population by multiplying the result of Step 1 by the 55-GPCD target indoor use specified for Method 2.
3. Convert the unadjusted CII GPCD target (the Baseline CII Water Use times 0.9) to an average daily volume by multiplying by Service Area Population.
4. Subtract the average daily volume calculated in Step 2 from the unadjusted CII daily volume calculated in Step 3.
5. Divide the result from Step 4 by Service Area Population to give the adjusted Baseline CII Water Use in GPCD for use in calculating the water use target for Method 2.

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Methodology 8: Criteria for Adjustments to Compliance Daily Per Capita Water Use

Introduction

In writing SBx7-7, the legislature recognized that factors outside of a water supplier's control could cause water use during a compliance year (2015 or 2020) to exceed the supplier's water use target despite the supplier's efforts to improve water use efficiency. The legislature addressed this issue in Section 10608.24 (d) by providing three possible adjustments water suppliers can use in calculating compliance daily per capita water use. These include adjustments for:

1. weather that is different from the average of the baseline years,
2. changes in water use due to new or expanded institutions, or economic activity beyond what is accounted for by population growth, and
3. extraordinary events such as increased water use to fight a large fire.

Methodology 8 was not included in the October 2010 publication of the Methodologies for Calculating Baseline and Compliance Urban per Capita Water Use as the methodology was not required for water suppliers to complete their 2010 urban water management plans.

Methodology 8 describes the process that urban retail water suppliers must follow if they are eligible and choose to adjust their compliance daily per capita water use. The methodology addresses:

- The conditions under which suppliers are eligible to adjust compliance year daily per capita water use,
- The order in which adjustments are to be made in cases where water suppliers consider making more than one adjustment, and
- The information suppliers must provide to justify and calculate the compliance year adjustments.
- Adjustment calculations and application to the supplier's compliance daily per-capita water use.

Definition of Adjustments to Compliance Daily Per Capita Water Use

Section 10608.24 of SBx7-7 states:

(1) When determining compliance daily per capita water use, an urban retail water supplier may consider the following factors:

(A) Differences in evapotranspiration and rainfall in the baseline period compared to the compliance reporting period.

(B) Substantial changes to commercial or industrial water use resulting from increased business output and economic development that have occurred during the reporting period.

(C) Substantial changes to institutional water use resulting from fire suppression services or other extraordinary events, or from new or expanded operations, that have occurred during the reporting period.

(2) If the urban retail water supplier elects to adjust its estimate of compliance daily per capita water use due to one or more of the factors described in paragraph (1), it shall provide the basis for, and data supporting, the adjustment in the report required by Section 10608.40.

Water Code Section 10608.12(i) defines “Institutional water user” as a water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches, hospitals, government facilities, and nonprofit research institutions.

Water Code Section 10608.12(d) defines “Commercial water user” as “a water user that provides or distributes a product or service.”

Water Code Section 10608.12(h) defines “Industrial water user” as “a water user that is primarily a manufacturer or processor of materials as defined by the North American Industry Classification System code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development.”

Water Code Section 10608.12(e) defines “Compliance daily per-capita water use” as “the gross water use during the final year of the reporting period.”

Overview of Process and Sequence of Adjustments to Compliance Daily Per Capita Water Use

The adjustments described in this chapter are to be applied to compliance year water use. No adjustments should be made to the target water use and/or baseline water use. Baseline and target water use may be revised, but the revisions should be based on revised population and/or gross water use data or the selection of another target method. Directions for baseline and target revisions are provided in Methodologies 1, 2 and 3. Water suppliers may choose to adjust their compliance year water use regardless of the target method chosen.

Prior to making compliance year adjustments, the supplier should first calculate an unadjusted compliance daily per capita water use following Methodologies 1, 2 and 4 for gross water use, service area population and compliance daily per capita water use. Suppliers who are eligible and elect to exclude industrial process water use from the gross water use calculations must also exclude industrial process water use from all other calculations for compliance year adjustments.

Methodology 8 separates substantial changes in institutional water use into two adjustments (CWC 10608.24 (c)). Adjustment 1 is used for substantial changes to institutional water use due to extraordinary events such as fire suppression. Increases in institutional water use due to extraordinary events are primarily unmetered and are one time or rare occurrences. Adjustment 2 is used for substantial changes in institutional water use due to new or expanded operations, as well as substantial changes in commercial or industrial water use due to increased business output and economic development. The increase in institutional water use due to new or expanded operations should be based on metered data and the adjustment should be addressed in a manner consistent with adjustments for increased commercial or industrial water use.

Adjustments to compliance daily per capita water use should be applied via one of the two optional sequences:

Option 1

Step 1) Adjustments for institutional water use resulting from fire suppression services and other extraordinary events.

Step 2) Adjustments to institutional water use resulting from new or expanded operations and adjustments to commercial or industrial water use resulting from increased business output and economic development.

Step 3) Adjustments for differences in evapotranspiration and rainfall between the baseline and compliance reporting periods.

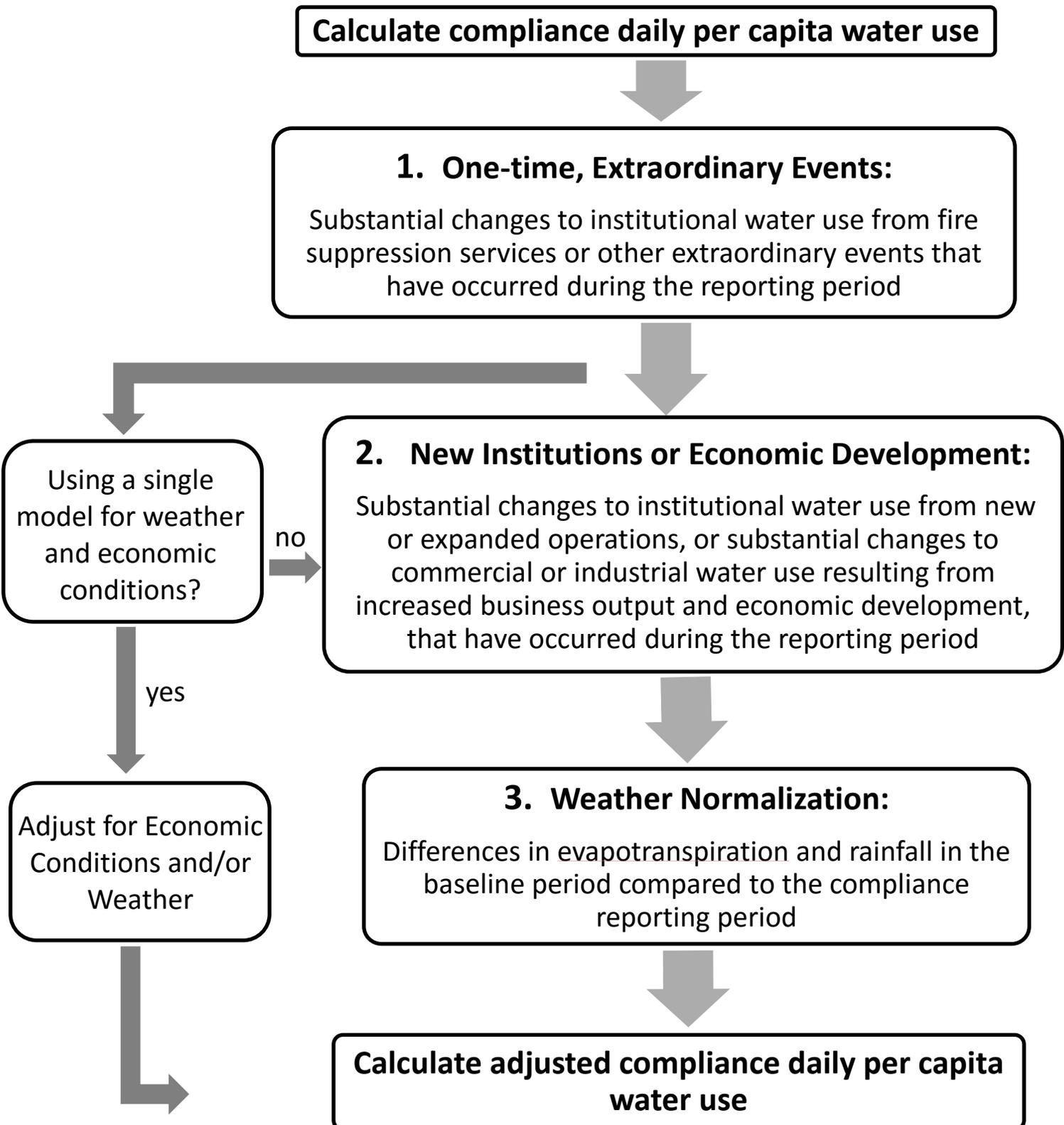
Option 2

It may be possible to develop both the weather and economic adjustments from a single statistical model. Within this single statistical model approach, water suppliers have the option of taking a credit due to unusual weather, or a credit due to differences in economic conditions, or both. They do not have to take both credits, even though both weather and economic effects could be included in the statistical model. However, water suppliers cannot engage in double-counting, by first adjusting their Gross Water Use for unusual economic conditions, then fitting a dual weather/economy normalization model to already adjusted Gross Water Use. Therefore the following sequence should be followed:

Step1) Adjust Gross Water Use for fire suppression services and other extraordinary institutional events.

Step 2) Further adjust Gross Water Use, using results of the statistical model fitted to Gross Water Use developed in Step 1 above, for differences in evapotranspiration, rainfall and economic factors between the baseline and compliance reporting periods.

Sequence of Adjustments to Compliance Daily Per Capita Water Use



Adjustment 1: Calculating Adjustments to Institutional Water Use for Fire Suppression Services or Other Extraordinary Events

This category of adjustments accounts for one-time, extraordinary events that substantially increased a supplier's compliance year water use and did not occur on a regular basis either in the baseline or compliance reporting years. The institutional water use associated with extraordinary events, such as fire suppression is typically unmetered. To document an unmetered increase in water use, water suppliers can use water production records during the time of the event, as shown in Step 2A below. Adjustments for metered institutional use for extraordinary events should use Step 2B. Adjustments to metered commercial or industrial use for extraordinary events should use Adjustment 2.

Step 1: Document that the event was extraordinary – for both metered and unmetered institutional water use

Water suppliers must provide documentation illustrating that the event and its associated increase in water use was a one time or rare event and did not occur on a regular basis in the baseline period. This documentation can be in the form of fire department or emergency service records, media reports or other historical records.

Step 2: Document Use for Extraordinary Event

Step 2A: For Unmetered Institutional Water Use:

Since water use under this category of adjustment is rarely metered, water suppliers shall estimate the water use for the extraordinary event through other available data such as water treatment plant production data, or drawdown from storage in the distribution system. When using water production data, the water supplier must calculate the increase in production for the time period of the event relative to the normal water production for that time period. The calculation of increased water use is only for water that is included in the gross water calculation. Water that is used for the extraordinary event that comes from sources outside of the distribution area defined in the gross water use calculation should not be included in the extraordinary event adjustment calculations.

Step 2B: For Metered Institutional Water Use:

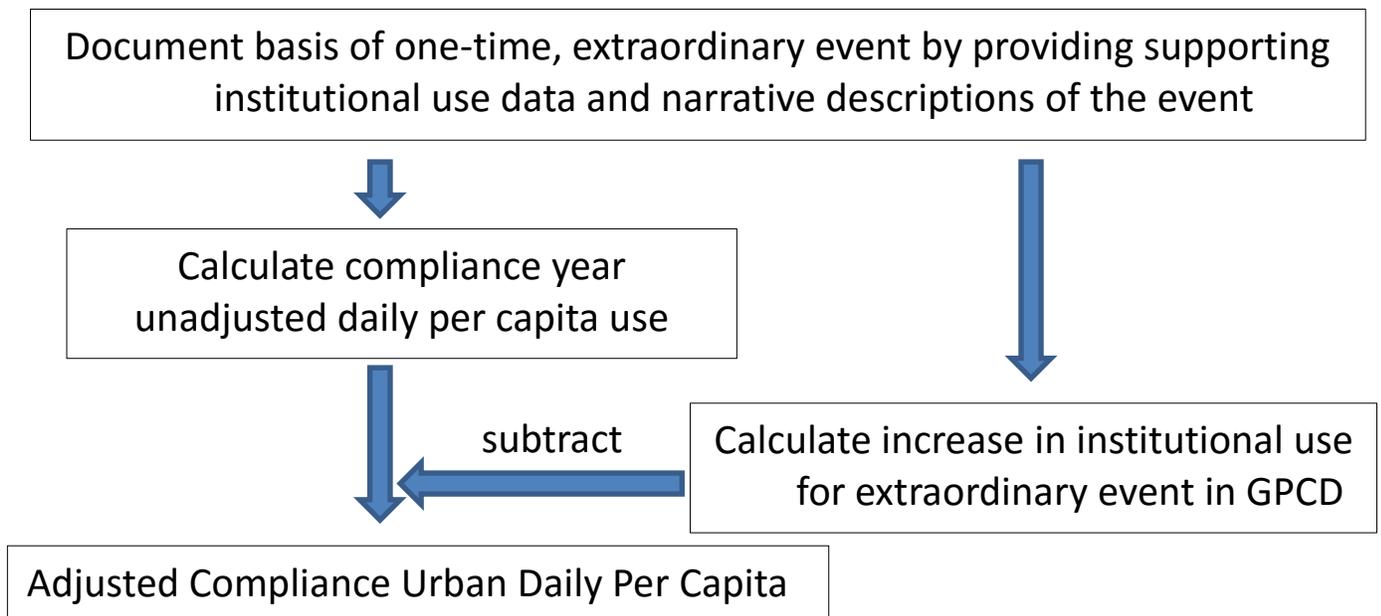
The water supplier shall document the quantity of increased water use during the time period of the extraordinary event, relative to the normal water use for that time period and relative to the use immediately prior and after the event, based on metered data. The calculation of increased water use is only for water that is included in the gross water calculation. Water that is used for the extraordinary event that comes from sources outside of the distribution area defined in the gross water use calculation should not be included in the extraordinary event adjustment calculations.

Step 3: Calculate Extraordinary Event Institutional Water Use Adjustment

- 3.1. Convert the volume of water from Step 2A or Step 2B into daily per capita water use units. Divide the volume of water from Step 2A or Step 2B by the water supplier’s compliance year service area population and 365 days of the year. This constitutes the extraordinary event institutional water use adjustment, in GPCD.

- 3.2. Calculate the compliance year water use adjusted for an extraordinary event. Subtract the extraordinary event water use in units of GPCD (Step 3.1) from the unadjusted compliance year daily per capita water use. The result is the compliance year daily per capita water use adjusted for an extraordinary event.

Institutional Use Adjustment for Fire Suppression or Extraordinary Events



Example 1A: Extraordinary Fire Suppression Services

Water Supplier A provides water for fire suppression services. In the interim compliance year 2015, there was an extraordinary fire event that lasted for five days named the Cleveland Fire. Fire Department reports and a local news story documented that the fire was the largest and longest lasting fire the region had experienced. Using water treatment plant records, Water Supplier A estimated that the quantity of treated water produced and sent into the distribution system during the five-day period increased by 8.6 million gallons (MG).

The extraordinary fire suppression adjustment is calculated as 2.4 GPCD by dividing 8.6 MG by the water supplier’s 2015 service area population of 10,000 and further divided by 365 days of the year. Water Supplier A had calculated an unadjusted compliance daily per capita water use of 148.2 GPCD. Subtracting 2.4 GPCD, Water Supplier A’s compliance daily per capita water use adjusted for the Cleveland fire is 145.8 GPCD.

Adjustment 2: Calculating Adjustments to Institutional Water Use from New or Expanded Operations or Adjustments to Commercial or Industrial Water Use Resulting from Increased Business Output and Economic Development

Adjustment 2 accounts for substantial changes to commercial, industrial or institutional (CII) water use due to new or expanded institutional water use or increased commercial and/or industrial business output and economic development. The increase in water use due to economic activity should be as a result of factors outside of service area population growth. Therefore, any adjustment may primarily be driven by institutions and businesses that serve nonresident populations and customers. Examples include the expansion of a college or university that draws students from outside the service area, a regional mall, or a business making a product that is sold broadly.

Increases in water use from institutions or businesses that are started or expanded to serve a new residential development or a larger population are not eligible for this adjustment. Since compliance year water use is reported on a daily per capita basis, the increase in water use for institutions or businesses which expand to serve larger population should not increase the compliance year daily per capita water use.

To account for possible changes in water use between sectors (an industrial facility becoming a commercial facility) water suppliers must first document that the percentage reduction in CII water use between baseline years and the compliance year is less than the percent reduction from the baseline water use required to meet the supplier's water use target. Water suppliers whose CII percentage reduction is greater than the water use target percent reduction are not eligible for Adjustment 2.

Water suppliers must document that the increase in commercial, industrial or institutional water use proposed for adjustment has increased due to new or expanded institutions, or to increased business output and economic development. Water suppliers can document the increase through measures such as institutional enrollments, employment statistics, and statistics on business output or trade.

Step 1: Quantify CII Water Use Reduction

This step is intended to identify CII water use that may be eligible for adjustment. The calculations also separate the effect of changes in CII water use due to new or expanded institutions and economic development from that due to growth in population. Only the former may be eligible for this adjustment.

- 1.1. Calculate daily CII water use per capita for both the baseline period and the compliance year(s) using Methodology 7. Calculate the percentage reduction achieved in CII daily per capita water use for the compliance year(s) compared to the baseline period.

- 1.2. If the percentage reduction in CII daily per capita water use in the compliance year(s) (from Step 1.1) equals or exceeds the target percentage reduction in baseline GPCD, no economic adjustment can be made.

Step 2: Documentation of Basis and Supporting Data for the Adjustment

Water suppliers making the economic adjustment must provide both a narrative description and numeric water use data to substantiate the adjustments. The data must illustrate the specific changes in commercial, industrial, or institutional water use by customer accounts where possible, between the baseline period and the compliance year(s).

- 2.1 For substantial changes to institutional water use from new or expanded operations:
 - 2.1.1 Provide a narrative that identifies and documents new institutions or existing institutions with expanded operations within the service area that have caused institutional water use to increase significantly during the reporting period.
 - 2.1.2 Calculate the change in the compliance year's institutional daily per capita water use compared to that in the baseline period.
- 2.2 For substantial changes to commercial or industrial water use from increased business output and economic development:
 - 2.2.1 Provide a narrative that identifies and explains the increase in commercial and industrial water use within the service area due to increased business output and economic development.
 - 2.2.2 Document the change in compliance year(s) daily commercial and/or industrial water use per capita compared to that in the baseline period.

Step 3: Correlation with Institutional or Economic Development Indicators

Demonstrate that the increase in commercial, industrial, or institutional water use is directly related to a net expansion in institutional operations, or a net increase in business output and economic development between the supplier's baseline period and compliance year(s). This step is necessary to prove that the increase in CII use is driven by economic factors and is not a result of service area population growth or change in water management.

- 3.1 Provide the institutional or economic development indicators that correlate with the increase in commercial, industrial, or institutional water use documented in Step 2. Institutional or economic indicators include:

- Employment statistics that show net increases in the specific commercial, industrial, or institutional sectors.¹
- Net increase in institutional enrollment, census, employment, or occupancy.
- Net gain in measures of business output and economic development such as production volume, sales tax revenue, U.S. Department of Commerce measures of retail trade, or other indicators of manufacturing and wholesale activities.²
- Net gain in measures of non-resident population such as hotel occupancy rates, or measures of consumer expenditures such as attendance at entertainment venues.
- Net increase in commercial sector activities due to an extraordinary mega-event, such as hosting the Olympic Games or Super Bowl, during the compliance year.
- Other economic indicators.

3.2 Adjust any economic indicators measured in dollars for inflation by using the Consumer Price Index (CPI) (reference to specific CPI series, such as USACPIBLS).

Step 4: Document CII Water Use Reduction Programs and Efforts

Describe, in the demand management section of the supplier's urban water management plan or through the California Urban Water Conservation Council BMP reports submitted in lieu of the UWMP Demand Management Measures (DMM) section, the CII demand management measures the water supplier has implemented. Water suppliers not implementing CII DMMs are not eligible for the compliance year economic adjustment.

Step 5: Calculate the Economic Adjustments due to New or Expanded Institutions or Increased Business Output and Economic Development

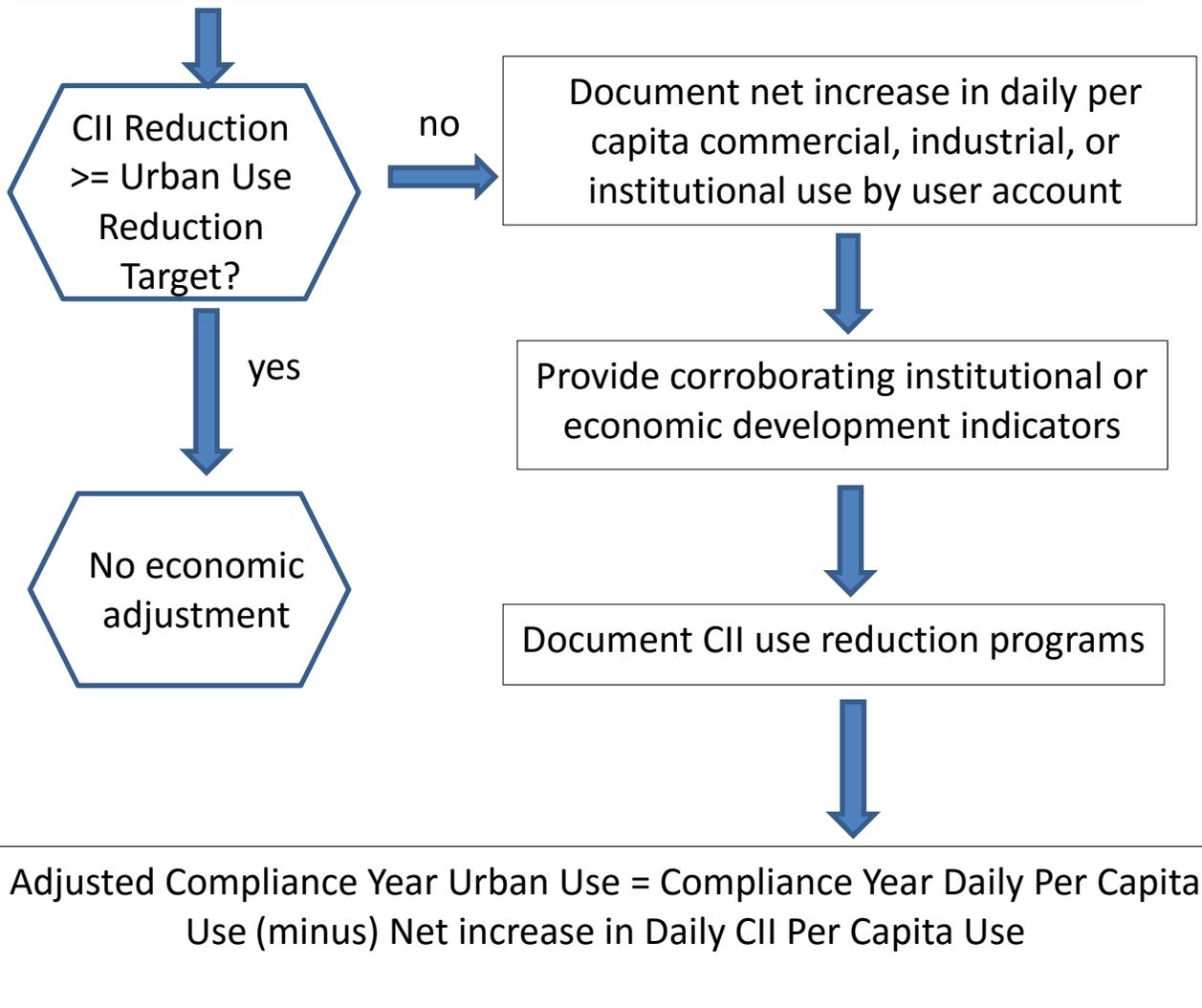
To calculate the compliance daily per capita water use adjusted for economic activity, subtract the net change in commercial daily per capita water use, institutional daily per capita water use, or industrial daily per capita water use (from Step 2.1.2 or 2.2.2) from the unadjusted compliance year daily per capita water use.

¹ Employment Development Department publishes monthly labor force data by county.

² Board of Equalization publishes annual reports on local sales tax distribution by city.

CII Use Adjustment from Expanded Institutional Operations or Increased Business Output and Economic Development

- Calculate daily CII use per capita for baseline and compliance year(s)
- Calculate CII use percent reduction achieved
- Calculate daily per capita use % reduction target to be achieved in the compliance year(s)



Example 2A: Expanded Operation at a University Campus

Retail Water Supplier A provides water service to University U. Between the baseline period and year 2020, University U expanded its campus and enrollment increased. Water Supplier A needs to compare the CII use reduction achieved in year 2020 to the 2020 urban water use reduction target, after factoring in the increase in resident population. The CII use reduction achieved in 2020 was 16 percent, smaller than the 2020 urban water use reduction target of 19 percent. Water Supplier A is thus eligible to make the expanded institutional water use adjustment.

Although institutional water use for University U increased between 2020 and the baseline period, the net increase in total institutional water use within Water Supplier A's service area was only 2.3 GPCD, due to downsizing of some government facilities. The net institutional water use adjustment is 2.3 GPCD, to be subtracted from the 2020 urban daily per capita water use.

Example 2B: Increased Industrial Water Use Resulting from Increased Business Output and Economic Development

There was a net increase in industrial water use between the baseline period and year 2015 within the service area of Water Supplier B. After performing the eligibility step, the supporting data show a decrease of industrial water use in the Fruit and Vegetable Preserving and Specialty Food Manufacturing Sector and an increase in industrial water use in the Dairy Product Manufacturing Sector. The net increase in daily per capita industrial water use is 1.2 GPCD and constitutes the economic adjustment to be subtracted from the compliance year unadjusted daily per capita water use.

Example 2C: Increased Commercial Water Use Resulting from Economic Development

In the intervening years between the baseline period and the compliance reporting year 2015, City C built a new sports stadium. There were also new commercial establishments such as retail businesses and restaurants built in the area. Existing commercial establishments also reported a general increase in sales. The water supplier that serves City C performed the eligibility step and provided supporting economic data including: employment figures, sales revenue, hotel occupancy rates, and stadium attendance records. Commercial water use in the Entertainment, Food Sales and Hospitality sectors show a net increase of Y GPCD in year 2015 compared to the baseline period. This Y GPCD is the magnitude of economic adjustment that can be subtracted from the 2015 urban daily per capita water use to arrive at the adjusted 2015 compliance urban daily per capita water use.

Adjustment 3: Approach to Calculating Adjustments due to Differences in Evapotranspiration and Rainfall and Economic Activity in the Baseline Period Compared to the Compliance Reporting Year

It is expected that water suppliers who adjust compliance year GPCD for unusual weather conditions will use a statistical model calibrated using data from their selected baseline period. Suppliers may also choose to include economic and other factors in their statistical model in addition to weather to develop a model-based correction for unusual economic conditions.

DWR has evaluated several different approaches using real-world water supplier data for normalizing compliance year GPCD. As a result of that exploratory modeling, DWR is in a position to offer several guidelines for water suppliers to follow while developing their weather normalization, or their combined weather/economic normalization models. DWR will examine several model efficacy metrics to determine if the adjustments to compliance GPCD generated by said models meet DWR's criteria. However, DWR's exploratory modeling included a thorough evaluation of the California Urban Water Conservation Council's (Council's) weather normalization model and criteria and DWR has decided to waive the documentation and criteria requirements below (except for input data documentation submission) for 2015 if water suppliers use the Council's model as specified by the Council.

DWR Modeling Criteria

DWR has separated out the criteria into the following topics:

- A. Model Specification Criteria
- B. Regression Output Criteria

A. Model Specification Criteria

These criteria are intended to ensure that weather and economic adjustments are produced using an appropriate method and that the resulting adjustments are used in an appropriate manner. For each criterion that is not met, an explanation with justification must be provided for DWR review.

1. To weather normalize compliance year GPCD, total water demand (Gross Water Use) should be modeled at the monthly level, or finer. Analysis at an annual level does not provide an adequate basis for weather normalization because the impact of weather on water demand is considerably attenuated. Water suppliers wishing to develop a combined weather/economic normalization model should include the unemployment rate or labor-force participation rate, as economic variables in these models. If these economic measures are available at a monthly level then monthly data should be used. Otherwise, annual economic values can be used by interpolating to obtain monthly values.

2. Water demands normally show variation from month to month, hitting minimum in winter and maximum in summer. This normal variation due to climate should be captured by inclusion of eleven monthly indicator variables or other alternatives, such as Fourier harmonics in the model specification. If one or more of these eleven monthly indicator variables is excluded, suppliers must demonstrate that excluded coefficients had p-values exceeding 0.32 (or t-statistic below 1). This criterion will help ensure that variation due to climate is not erroneously attributed to weather.
3. Changes in service area characteristics, including conservation, rate increases, rate structure changes, etc. may cause GPCD to change over time. The model specification should, at a minimum, include a trend term to capture these effects. Service areas that have experienced rapid changes (rate structure changes, large price increases, drought restrictions, metering of formerly unmetered accounts, etc.) coinciding with the model calibration period should include additional variables in their model to capture the impact of these changes instead of simply relying on a trend variable. The inclusion of these additional variables becomes paramount if suppliers choose to develop a fully-specified water demand model for estimating the impact of weather and economic factors on demand, especially if suppliers discover that estimation of statistically significant relationships between demand and economic factors requires extending the model calibration period beyond the 10-year baseline period.
4. Unusual weather can cause deviations in the month-to-month variation in water demand that is otherwise considered normal for a given area. The model specification should include measures of weather to capture these deviations. Weather measures should include rainfall and temperature, or rainfall and evapotranspiration; should be representative of the majority of the population in the service area; and should be from a credible source. DWR will make available these weather measures with statewide coverage.
5. Models should be specified to account for the seasonal differences in the influence of weather on water demand. Weather variables for at least three seasons should be included in the model specification.
6. If water suppliers choose to construct a combined weather/economic normalization model, economic measures should include the unemployment rate or the labor force participation rate for the geographic jurisdiction that best overlaps with a water supplier's service area. These data should be obtained from a state or federal source.
7. For the purpose of model estimation, the dependent variable (monthly GPCD) should first be logarithmically transformed. The log specification has a long, respected pedigree in water demand modeling. A model with a log transformed dependent variable generates compliance year corrections (because of deviations in weather and/or economic variables between the compliance year and baseline period) directly in the form of percentages, making it a more robust way for adjusting compliance year GPCD. Example calculations are provided in DWR's Weather Normalization Guidelines document.

B. Regression Output Criteria

These criteria are intended to ensure that, by meeting specific objectives, the model results can be reasonably applied to adjust compliance year GPCD.

1. Model coefficients associated with the weather and, if applicable, economic variables that are used for adjusting compliance year GPCD should be statistically significant at the 5 percent level at a minimum (p-value ≤ 0.05).
2. Normality assumption for linear regression should not be unacceptably violated. Any appropriate statistical test for residual normality may be deployed. Up to four outliers may be excluded before performing the test. The test should demonstrate at a significance level of 10 percent that model residuals are distributed normally. If the normality test is still not met, suppliers should use Robust Regression or other appropriate techniques instead of Ordinary Least Squares Regression techniques to estimate their statistical model. See DWR's Weather Normalization Guidelines document for guidance.
3. Coefficients for the weather and economic variables should have the expected sign.
4. The model's annual GPCD prediction error band should be within $\pm 10\%$ (i.e., the percentage difference between actual and predicted annual GPCD across all the years included in the model calibration time period is within $\pm 10\%$).

Modeling Documentation

The following documentation is necessary to allow DWR to verify that the modeling and regression output criteria have been met.

Water suppliers must submit:

1. Source and type of weather data with an explanation justifying how these are representative of the supplier's service area.
2. Source and type of economic data, if a dual weather/economic model is being estimated, with an explanation justifying how these are representative of the supplier's service area.
3. Model description, including dependent and independent variables used in the model.
4. Statistical software used.
5. Model input data.
6. Regression output, including R-square and estimated regression coefficients with the significance (p-values) of each coefficient.
7. Indicators of the credibility of regression significance metrics.
 - Probability plot of model residuals.
 - Results from a test of residual normality.
 - Results from a test for serial correlation.

8. Percent difference between actual GPCD and model predicted GPCD for each year during the baseline period (error band for the model calibration years).
9. Compliance year weather adjustment calculations and, if used, economic adjustment calculations.

Model and weather data options are described in greater detail in DWR's Weather Normalization Guidelines document.

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Methodology 9: Regional Compliance

According to Sections 10608.20(a)(1) and 10608.28, urban retail water suppliers may plan, comply, and report on a regional basis, an individual basis or both. Each group of water suppliers agreeing among themselves to plan, comply, and report as a region is referred to in this methodology as a “regional alliance.”

Legislative Guidance for Regional Compliance

Section 10608.20(a)(1) states:

Each urban retail water supplier shall develop urban water use targets and an interim urban water use target by July 1, 2011. Urban retail water suppliers may elect to determine and report progress toward achieving these targets on an individual or regional basis, as provided in subdivision (a) of Section 10608.28, and may determine the targets on a fiscal year or calendar year basis.

Section 10608.28 states:

- (a) *An urban retail water supplier may meet its urban water use target within its retail service area, or through mutual agreement, by any of the following:*
- (1) *Through an urban wholesale water supplier.*
 - (2) *Through a regional agency authorized to plan and implement water conservation, including, but not limited to, an agency established under the Bay Area Water Supply and Conservation Agency Act (Division 31 commencing with Section 81300)).*
 - (3) *Through a regional water management group as defined in Section 10537.*
 - (4) *By an integrated regional water management funding area.*
 - (5) *By hydrologic region.*
 - (6) *Through other appropriate geographic scales for which computation methods have been developed by the department.*
- (b) *A regional water management group, with the written consent of its member agencies, may undertake any or all planning, reporting, and implementation functions under this chapter for the member agencies that consent to those activities. Any data or reports shall provide information both for the regional water management group and separately for each consenting urban retail water supplier and urban wholesale water supplier.*

Criteria for Water Suppliers that May Report and Comply as a Region

To form a regional alliance, water suppliers must meet at least one of the following criteria:

- Water suppliers are recipients of water from a common wholesale water supplier. For this purpose, the State Water Project and the Central Valley Project are not considered wholesale water suppliers. Wholesale water suppliers are not required to establish and meet targets for daily per capita water use. Wholesale water suppliers serving in the role of a regional alliance are representing the urban retail water suppliers that are members of the alliance and compliance with a regional target is on behalf of the member suppliers and not the wholesaler supplier itself.
- Water suppliers are partners with a common regional agency authorized to plan and implement water conservation.
- Water suppliers are part of a regional water management group as defined in Water Code section 10537.
- Water suppliers are part of an integrated regional water management funding area, which for this purpose is interpreted to mean an Integrated Regional Water Management (IRWM) planning area.
- Water suppliers are located in the same hydrologic region, which for this purpose refers to the 10 hydrologic regions as shown in the California Water Plan. For situations where water suppliers may serve areas in more than one hydrologic region, the majority of each water supplier's Service Area Population must be in the hydrologic region being identified as a regional alliance.
- Water suppliers join through appropriate geographic scales for which these methodologies can be applied. For this provision, water suppliers' service area boundaries must be contiguous.

Tiered Regional Alliances

In general, urban retail water suppliers can belong to only one regional alliance for the purpose of establishing and complying with urban water use targets. An exception is when regional alliances are tiered so that the members of the smallest alliance are all members of the larger alliance or alliances.

Tiered Regional Alliances

Regional Alliances **1**, **2**, **3**, ...
 Urban Retail Water Suppliers **A**, **B**, **C**, ...

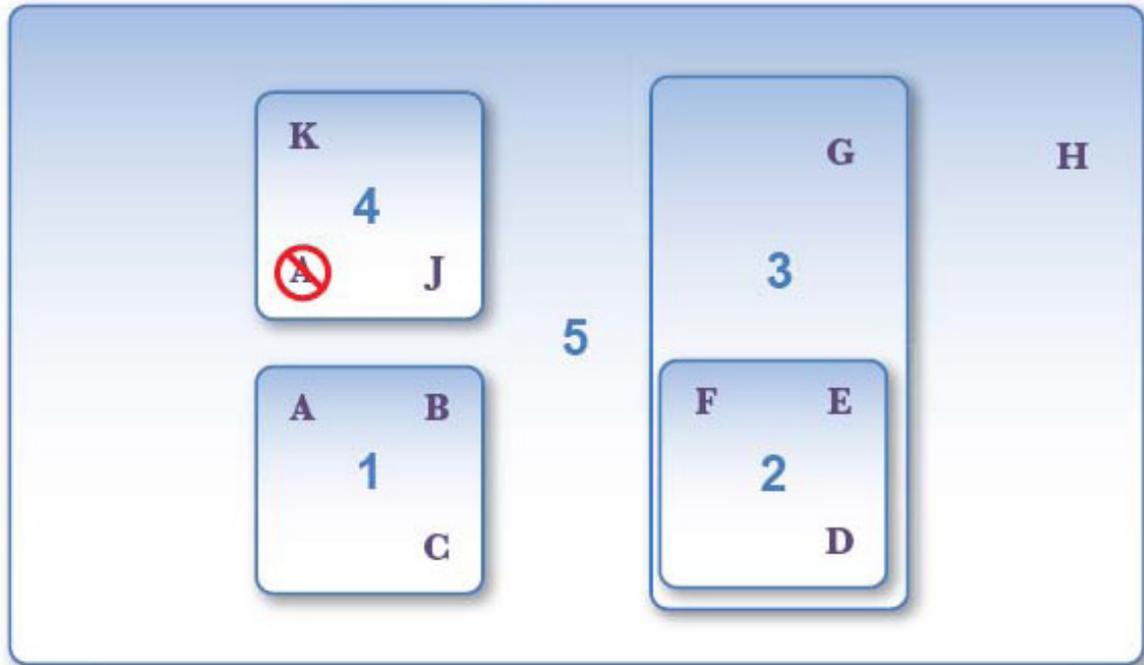


FIGURE 6: EXAMPLE OF TIERED ALLIANCES

Figure 6 illustrates tiered alliances. For example, supplier A forms an alliance with suppliers B and C (Alliance 1). Supplier A cannot also form an alliance with suppliers J and K unless the A, J, K alliance were to include B and C as well. Water suppliers D, E, and F could comply as regional Alliance 2, or include supplier G and comply as regional Alliance 3. Alternatively, all suppliers in Figure 6 could comply as Alliance 5. The tiered alliance requirements are only for compliance with urban water use targets and do not apply to other regional water management activities or partnerships.

Calculation of Targets and Compliance GPCD

Calculation of Regional Targets

Water suppliers wishing to test compliance regionally are permitted to do so. Water suppliers in a regional alliance have three options for calculating their regional targets.

Under the first option, which preserves maximum flexibility at the supplier level, each supplier in a regional alliance would first calculate its individual target as if it were complying individually. These individual targets should then be weighted by each supplier's population and averaged over all members in the alliance to obtain the regional target.²⁴ For the 2011 urban water management plans, suppliers may use their current population data for generating the regional targets. However, for testing compliance in 2015 and 2020, the population weighting of the individual targets must be based upon the compliance-year population data. A retail water supplier may update its target in 2015 (see Water Code section 10608.20(g) and any such modifications made to individual targets after 2011 must be incorporated into updated regional targets and reported in the compliance year 2015. For those urban retailers or alliances that choose method 2 for developing a target (see Water Code section 10608.20(b)(2)), the target must be revised and reported in 2020. A modification in any individual target or a change in membership in a regional alliance will require a recalculation of the regional target.

A second approach for an alliance to calculate a regional target is to sum up the individual supplier's gross water use and service area populations to develop regional gross water use and population. The alliance would then calculate regional base daily per capita use and choose one target method to calculate a regional target. Alliances must have all their members use the same baseline period.

A third approach is to calculate regional gross water use or population directly for the entire regional alliance area. Regional base daily per capita use and a regional water use target would then be derived. Like the second approach, members of alliances using this approach must use the same baseline period and the same target method. A regional alliance must meet the requirements of Section 10608.22. The regional target may not exceed 95 percent of the region's 5-year Base Daily Per Capita Water Use. Methodology 3: Base Daily Per Capita Water Use describes in detail the interpretation and calculations required under Section 10608.22.

Calculation of Regional Compliance Daily Per Capita Water Use

Gross Water Use and Service Area Population must be reported for each supplier during the compliance year. If applicable, adjustments for evapotranspiration and rainfall, fire suppression, and changes in distribution area should be made for each individual water supplier. Adjustments to Gross Water Use for extraordinary economic growth can be

²⁴Assume there are (N) suppliers in an alliance, with individual targets (T_1, T_2, \dots, T_N) and population (P_1, P_2, \dots, P_N), where the subscript on the individual targets and population denote the identity of each supplier. Then, total population in a regional alliance (RP) becomes:

$$RP = P_1 + P_2 + \dots + P_N$$

The regional target (RT) can be derived as a weighted average of the individual supplier targets as follows:

$$RT = (P_1 * T_1 + P_2 * T_2 + \dots + P_N * T_N)/RP$$

applied either to the individual supplier's data or to the aggregate regional alliance data (but not both), depending upon availability of suitable data and methods. Regional compliance daily per capita water use shall be calculated as the aggregate regional Gross Water Use divided by the aggregate Service Area Population.

Data Reporting for a Regional Alliance

A regional alliance must send DWR a letter stating that an alliance has been formed and provide a list of the water supplier members. This letter should be sent by July 1, 2011, for alliances formed before submitting 2010 urban water management plans, or in ninety days after an alliance has been formed after July 1, 2011. In the case of tiered alliances, a retail water supplier cannot be cited as a member of a regional alliance unless it acknowledges its membership in that alliance in its urban water management plan.

DWR will collect data pertaining to regional alliances through three documents: (1) through the individual supplier urban water management plans; (2) through the regional urban water management plans; and (3) through the regional alliance reports.

Individual Supplier Urban Water Management Plans

All members of a regional alliance must include the following data in their individual urban water management plans unless they are participating in a regional urban water management plan (applicable urban water management plan dates are shown in parentheses):

- A list of all of its regional alliances. If a supplier is a member of tiered alliances, it must name all the alliances it is a member of
- Baseline Gross Water Use and Service Area Population (2010, 2015, 2020)
- Individual 2020 Urban Water Use Target (2010, 2015, 2020) and Interim 2015 Urban Water Use Target (2010)
- Compliance Year Gross Water Use (2015 and 2020) and Service Area Population (2010, 2015, 2020)
- Adjustments to Gross Water Use in the compliance year (2015, 2020)
- Water suppliers who choose Target Method 2 also must provide Landscaped Area Water Use and Baseline CII Water Use data (2010, 2015, 2020)
- Water Suppliers who choose Target Method 4 must provide the components of calculation as required by Target Method 4. Appendix B describes Target Method 4 and the regional compliance reporting that applies to that method (2010, 2015, 2020)

Regional Urban Water Management Plans

Members of regional alliance can forgo submitting individual urban water management plans and instead submit a regional urban water management plan. These regional urban water management plans are different from the regional alliance reports in that they must meet all the urban water management plan reporting requirements. The water use target data can be reported in the regional plan in either of two ways:

- The regional plan can report all the data elements that are now required to be included in the individual urban water management plans pertaining to this program (see section above titled Individual Supplier Urban Water Management Plans), for each supplier in the alliance. It would also report the same data elements aggregated over all members in the alliance.
- The regional plan may report some data elements only in aggregate for the alliance as a whole (not for each individual member). For example, the plan may report Service Area Population only for the regional alliance if the regional population data are more accurate or available. If the Service Area Population is only reported on a regional basis, then Base Daily per Capita Use, Compliance Daily per Capita Use, and Urban Water Use Targets would be calculated and reported only on a regional basis. Water suppliers that are part of a regional alliance that only reports a regional population can only develop a regional Urban Water Use Target and comply with this target regionally. Developing individual targets and testing compliance at the individual level is not possible unless an individual Service Area Population is calculated.

Regional Alliance Report

For regional alliances that do not submit a regional urban water management plan, DWR will require a regional alliance report. This report shall include all the water use target data elements that are now required to be included in the individual urban water management plans (see section above titled Individual Supplier Urban Water Management Plans) for each supplier in the alliance, and also shall include the alliance-level aggregates.

Memoranda of Understanding or Agreements for Regional Alliances

DWR will not review or approve the terms of memoranda of understanding (MOUs) or legal agreements that water suppliers use to create and manage regional alliances. However, terms of the agreements shall be consistent with all applicable sections of the Water Code. DWR will presume that water suppliers understand the consequences if partner suppliers withdraw from a regional alliance.

Compliance Assessment for Water Suppliers Belonging to a Regional Alliance

Compliance will be assessed based upon how an individual retail water supplier performs relative to its individual target or how the retail water supplier's regional alliance performs as a whole relative to its regional target. Wholesale suppliers are not themselves subject to compliance assessment. The following guidelines will be used to assess compliance:

- If a regional alliance meets its regional target, all suppliers in the alliance will be deemed compliant. For tiered alliances, if a smaller alliance does not meet its water use target, the member agencies can still be in compliance if a larger alliance is in compliance. Conversely, members of a smaller alliance can be in compliance if the smaller alliance complies while the larger alliance fails. If a regional alliance fails to meet its regional

target, water suppliers in the alliance that meet their individual targets will be deemed compliant.

- Water suppliers in alliances that meet neither their individual targets nor their regional targets will be deemed noncompliant. These suppliers can still apply for grant funds if their application is accompanied by a plan that demonstrates how the funds being sought will bring them into compliance with their targets (Section 10608.56).

Withdrawal from a Regional Alliance before 2020

If a water supplier withdraws from a regional alliance, the withdrawing water supplier must then comply individually. The water suppliers remaining in the regional alliance must revise regional baseline and target data and alliance membership in the subsequent UWMP plan. The memorandum of understanding or other legal agreements governing the alliance may define additional consequences or remedies.

Dissolution of a Regional Alliance before 2020

If a regional alliance dissolves before 2020, each affected water supplier must then comply individually or form or join another alliance. An affected water supplier that had not previously submitted an individual urban water management plan (for example, if it had participated in a regional urban water management plan for a regional alliance that has dissolved) has to submit an urban water management plan or a regional water management plan. The memorandum of understanding or other legal agreements governing the alliance may define additional consequences or remedies.

APPENDIX A

Model Water Efficient Landscape Ordinance Definitions and Calculations

The Model Water Efficient Landscape Ordinance (MWELO) was originally added to the California Code of Regulations (Title 23, Division 2, Chapter 2.7) in 1992 and revised in 2009 and 2015. Paragraph 492.4 defines the calculation of Maximum Applied Water Allowance (MAWA).

For landscaped areas that are installed on or after December 1, 2015, the MAWA equation and all applicable definitions of terms from the 2015 ordinance are provided below.

$$\text{Maximum Applied Water Allowance (MAWA)} = (ET_o) (0.62) [(ETAF \times LA) + [(1 - ETAF) \times SLA]]$$

Maximum Applied Water Allowance (MAWA) is in gallons per year

ET_o = Reference Evapotranspiration (inches per year). Reference evapotranspiration is used as the basis of determining the Maximum Applied Water Allowance so that regional differences in climate can be accommodated. Reference Evapotranspiration values for each location can be found in Appendix A of the 2015 Model Water Efficient Landscape Ordinance.

0.62 = Conversion Factor (from inches/year to gallons/sq ft/year)

0.55 = ET Adjustment Factor for residential landscapes (ETAF). When applied to reference evapotranspiration, the ETAF “adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape.”

0.45 = ET Adjustment Factor for non-residential landscapes (ETAF). When applied to reference evapotranspiration, the ETAF “adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape.”

LA = Landscaped Area including SLA (square feet), which includes “all the planting areas, turf areas, and water features in a landscape design plan subject to the Maximum Applied Water Allowance calculation. The landscape area does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or non-pervious hardscapes, and other non-irrigated areas designated for non-development (e.g., open spaces and existing native vegetation).”

[(1-ETAF) x SLA] = Additional Water Allowance for Special Landscape Area (SLA), resulting in an effective ETAF for SLA of 1.0.

SLA = Special Landscaped Area (square feet), which is defined as “an area of the landscape dedicated solely to edible plants, recreational areas, areas irrigated with recycled water, or water features using recycled water.”

For landscaped areas that are installed on or after January 1, 2010, up to November 30, 2015 the MAWA equation and all applicable definitions of terms from the 2010 ordinance are provided below.

Maximum Applied Water Allowance (MAWA) = (ET_o) (0.62) [(0.7 x LA) + (0.3 x SLA)]

Maximum Applied Water Allowance (MAWA) is in gallons per year

ET_o = Reference Evapotranspiration (inches per year). Reference evapotranspiration is used as the basis of determining the Maximum Applied Water Allowance so that regional differences in climate can be accommodated.” Reference Evapotranspiration values for each location can be found in Appendix A of the 2010 Model Water Efficient Landscape Ordinance.

0.62 = Conversion Factor (from inches/year to gallons/sq ft/year)

0.7 = ET Adjustment Factor (ETAF). When applied to reference evapotranspiration, the ETAF “adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape.”

LA = Landscaped Area including SLA (square feet), which includes “all the planting areas, turf areas, and water features in a landscape design plan subject to the Maximum Applied Water Allowance calculation. The landscape area does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or non-pervious hardscapes, and other non-irrigated areas designated for non-development (e.g., open spaces and existing native vegetation).”

0.3 = Additional Water Allowance for Special Landscape Area (SLA), resulting in an effective ETAF for SLA of 1.0.

SLA = Special Landscaped Area (square feet), which is defined as “an area of the landscape dedicated solely to edible plants, areas irrigated with recycled water, water features using recycled water and areas dedicated to active play such as parks, sports fields, golf courses, and where turf provides a playing surface.”

For landscaped areas that are installed before January 1, 2010, the MAWA equation and all applicable definition of terms from the original 1992 version of the ordinance are as follows:

$$\text{Maximum Applied Water Allowance (MAWA)} = (ET_o) (0.62) (0.8 \times LA)$$

Maximum Applied Water Allowance (MAWA) is in gallons per year

ET_o = Reference Evapotranspiration (inches per year). Reference Evapotranspiration values for each location can be found on page 38.10 of the Model Water Efficient Landscape Ordinance.

0.62 = Conversion Factor (from inches/year to gallons/sq ft/year)

0.8 = ET Adjustment Factor (ETAF). When applied to reference evapotranspiration, the ETAF “adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape.”

LA = Landscaped area includes the entire parcel less the building footprint, driveways, non-irrigated portions of parking lots, landscapes such as decks and patio, and other non-porous areas. Water features are included in the calculation of the landscaped area. Areas dedicated to edible plants, such as orchards or vegetable gardens are not included.

APPENDIX B

PROVISIONAL METHOD 4 FOR DETERMINING WATER USE TARGETS

DWR developed Provisional Target Method 4 in accordance with Water Code Section 10608.20(b)(4). Urban retail water suppliers that adopt Target Method 4 to determine their 2020 urban water use target must use the provisional procedures described in this document. This target method has been developed with the assistance of the California Urban Water Conservation Council, the California State Water Resources Control Board, and the Urban Stakeholder Committee, composed of technical experts and representatives of water suppliers and environmental and other organizations.

Water Code Section 10608.20(d) provides that DWR will update Target Method 4 by December 31, 2014. It is anticipated that improvements will be made to the target method based on new data and analytical techniques in the update. Provisional Target Method 4 described here will be in effect until the update by 2014.

A Target Method 4 Calculator (Calculator) using an Excel spreadsheet has been developed for use with Provisional Target Method 4. The Calculator will be required to accomplish some of the procedures for this method. Other procedures may be accomplished without use of the Calculator but have been incorporated into the Calculator to automate the calculation of the 2020 target.

Overview

The overall framework for Provisional Target Method 4 is described in this section. Details are presented in the Detailed Procedures section. For this target method, savings are assumed between the baseline period and 2020 due to metering of unmetered water connections and achieving water conservation measures in three water use sectors.

The 2020 water use target for individual urban water suppliers is determined by Equation 1 in units of gallons per capita per day (GPCD).

Equation 1

$$\boxed{\text{Urban Water Use Target}} = \boxed{\text{Base Daily per Capita Water Use}} - \boxed{\text{Total Savings}}$$

The base daily per capita water use is separated into three sectors for the purpose of Target Method 4:

1. Residential indoor
2. Commercial, Industrial, and Institutional (CII)
3. Landscape water use, water loss, and other unaccounted-for water

Because accurate methods are not generally available to estimate the water use in these three sectors, a standard of 70 GPCD is assumed for residential indoor water use. For the purpose of Target Method 4, CII water use does not include landscape irrigation use served by dedicated landscape irrigation meters. Dedicated landscape meters often serve large commercial or institutional irrigation sites such as golf courses, parks, or school grounds. CII water use includes irrigation water use served by mixed use water meters. Landscape irrigation water use in item 3 above is composed of residential irrigation and irrigation served by dedicated landscape irrigation meters or connections. Unaccounted for water is water that is lost in water distribution systems. Other unaccounted for water may include unmetered uses such as construction water or discrepancies in water meter accuracy. For simplification, water loss and other unaccounted for water are referred to as “water loss” in this document.

For the purpose of Target Method 4 it is necessary to calculate landscape water use and loss using Equation 2. The units for Equation 2 are GPCD.

Equation 2

$$\boxed{\begin{array}{l} \text{Landscape and} \\ \text{Water Loss per} \\ \text{Capita Use} \end{array}} = \boxed{\begin{array}{l} \text{Base Daily per} \\ \text{Capita Water} \\ \text{Use} \end{array}} - \boxed{\begin{array}{l} \text{Standard Indoor} \\ \text{Residential} \\ \text{70 gpcd} \end{array}} - \boxed{\begin{array}{l} \text{CII Water} \\ \text{Use} \end{array}}$$

Potential water savings are estimated for each of these water use sectors and for reduced water use due to installation of meters on unmetered connections, as shown in Equation 3. The units for Equation 3 are GPCD.

Equation 3

$$\boxed{\begin{array}{l} \text{Total} \\ \text{Savings} \end{array}} = \boxed{\begin{array}{l} \text{Metering} \\ \text{Savings} \end{array}} + \boxed{\begin{array}{l} \text{Indoor} \\ \text{Residential} \\ \text{Savings} \end{array}} + \boxed{\begin{array}{l} \text{CII} \\ \text{Savings} \end{array}} + \boxed{\begin{array}{l} \text{Landscape and} \\ \text{Water Loss} \\ \text{Savings} \end{array}}$$

Detailed Procedures

Step 1: Baseline Water Use and Midpoint Year

The Base Daily Per Capita Water Use is an average calculated for the base period selected by the urban retail water supplier, as described in Methodology 3 in *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* (Methodologies Report).

The data required for some of the following steps of Target Method 4 must be provided for the midpoint year for the base period. For a base period with an even number of years, the midpoint year will be the 12 months preceding the midpoint date.

The Calculator has been designed for calendar years. For water suppliers that choose to use a fiscal year reporting basis, the Calculator can be adapted by entering the fiscal year period representing the year designated in the Calculator.

Step 2: Metering Savings

For service areas with water service connections without water meters, a water supplier must estimate the total amount of water delivered to unmetered connections during the midpoint year of the baseline period. The metering savings is calculated using Equation 4.

Equation 4

$$\begin{array}{r}
 \boxed{\text{Metering Savings, GPCD}} \\
 = \\
 \frac{\boxed{\text{Water Deliveries to Unmetered Connections in Midpoint Baseline Year, gallons}} \times \boxed{0.20}}{\boxed{\text{Service Area Population in Midpoint Baseline Year}} \times \boxed{365 \text{ days}}}
 \end{array}$$

Step 3: Indoor Residential Savings

Indoor residential water savings are estimated based upon anticipated increases in the installation of more efficient toilets, residential clothes washers, and showerheads. The savings estimates are based on a comparison of saturation levels of fixtures, at certain water use efficiencies, during the midpoint year of the baseline period and with saturation goals in 2020. Separating toilets in single-family and multi-family dwellings, the 2020 saturation goals for the four plumbing fixtures categories are listed in Table 1.

Table 1. Saturation Goals for Indoor Residential Fixtures

| Fixture Type | 2020 Saturation Goals |
|-------------------------|--|
| Single-family Toilets | 85% 1.28 gal/flush toilets 15% average flush volume at midpoint baseline year |
| Multi-family Toilets | 85% 1.28 gal toilets 15% average flush volume at midpoint baseline year |
| Residential Washers | 85% Water Factor (WF) of 6 15% average WF at midpoint baseline year |
| Residential Showerheads | 95% low flow showerheads 5% non-low flow showerheads |

There are two alternatives for calculating indoor residential water savings, one using the Target Method 4 Calculator based on historic data for a water supplier and the other using a default savings of 15 GPCD.

Alternative 1:

To calculate indoor residential savings using the historic data of an individual water supplier the following types of data may be required to enter into the Calculator:

- Persons per household
- Toilets per household
- Showers per household
- Numbers of single- and multi-family dwelling units for years 1991 through the midpoint of baseline period
- Population residing in group quarters in the midpoint year of baseline period
- Either (1) numbers of efficient toilets, showerheads, and clothes washers either distributed, installed, or credited through incentives, such as rebates for years 1991 through the midpoint of baseline period or (2) saturation levels of fixtures at various efficiencies at the midpoint year of the baseline period

After entry of the required data, the Calculator will determine the indoor residential savings in terms of GPCD.

Alternative 2:

If a water supplier does not have historic data for the midpoint baseline and prior years, the supplier can use a default indoor residential water savings of 15 GPCD. While the Calculator allows Alternative 2 for the convenience of calculating the target, if this alternative is chosen, the Calculator is unnecessary.

Determining whether to use the default value, the following information may be helpful. In developing the Provisional Target Method 4, a random sample of 52 water suppliers were selected to test the Calculator. The sample represented a variety of climatic and demographic characteristics. An analysis of this random sample developed a statewide average savings from the four indoor residential elements was 14.1 GPCD, with a range of

7.9 to 16.8 GPCD. Sixty percent of the suppliers fell within the range of 13.1 to 15.1 GPCD and 15 percent exceeded 15.1 GPCD.

Step 4: CII Savings

CII water savings is assumed to be 10 percent of baseline CII water use, which is an average for the baseline period calculated following procedures in Methodology 7 in the Methodologies Report. For the purpose of Target Method 4, CII water use does not include landscape irrigation served by dedicated landscape irrigation meters. CII savings is calculated using Equation 5.

Equation 5

$$\boxed{\text{CII Savings, GPCD}} = \boxed{\text{Average baseline CII Water Use, GPCD}} \times \boxed{0.10}$$

Step 5: Landscape Irrigation and Water Loss Savings

Landscape water use and water loss savings are based on a 21.6 percent reduction in that sector for all suppliers. The 21.6 percent reduction was derived from an analysis of 52 sample water suppliers and was calculated so that the average water use target for the 52 sample suppliers would meet the overall goal of a cumulative 20% percent savings. Landscape water use and water loss use is calculated using Equation 2 and represents irrigation water use, water loss and other unaccounted-for water uses. The savings is calculated using Equation 6.

Equation 6

$$\boxed{\text{Landscape water use and Water Loss Savings, GPCD}} = \boxed{\text{Landscape Irrigation and Water Loss Sector Use per Eq. 2, GPCD}} \times \boxed{0.216}$$

Step 6: Total Savings

The total savings required using Target Method 4 is calculated using Equation 3, entering results from Steps 2 through 5.

Step 7: 2020 Urban Water Use Target

The 2020 urban water use target in GPCD is calculated using Equation 1.

Example

To illustrate the procedures for the Provisional Target Method 4, calculations for the fictional Whispering Glen Water District are shown below.

Step 1. Baseline Water Use and Midpoint Year

Whispering Glen Water District selected a 10-year baseline period of 1996-2005. The average base daily per capita water use for this period was calculated to be 228 GPCD. The savings are calculated based on water deliveries in the midpoint year of the baseline period, which is 2000.

Step 2. Metering Savings (Equation 4)

| | | | | | | |
|------------------------|---|---|---|----------|--|----------|
| Metering Savings, GPCD | | Water Deliveries to Unmetered Connections in Midpoint Baseline Year, gallons <hr/> 2,541,637,800 | X | 0.20 | | 8.3 GPCD |
| | = | | = | | | |
| | | Service Area Population in Midpoint Baseline Year <hr/> 168,118 | X | 365 days | | |

Step 3. Indoor Residential Savings

Alternative 1, Target Method 4 Calculator:

| | | | | | | | | | | |
|--|---|--|---|---|---|--|---|--|---|-----------|
| Total Indoor Residential Savings, GPCD | | Single-family Toilets Savings, GPCD <hr/> 7.6 | + | Multi-family Toilets Savings, GPCD <hr/> 1.6 | + | Residential Washers Savings, GPCD <hr/> 6.0 | + | Residential Showers Savings, GPCD <hr/> 1.3 | | 16.5 GPCD |
| | = | | | | | | | | = | |

Alternative 2, Default:

| | | |
|--|---|--------------|
| Total Indoor Residential Savings, GPCD | = | 15.0 GPCD |
|--|---|--------------|

Step 4. CII Savings (Equation 5)

| | | | | | | |
|----------------------|---|---|---|------|---|----------|
| CII Savings, GPCD | = | Average baseline CII Water Use, GPCD <hr/> 69.0 | X | 0.10 | = | 6.9 GPCD |
|----------------------|---|---|---|------|---|----------|

Step 5. Landscape Irrigation and Water Loss Savings (Equations 2 and 6)

| | | | | | | | | |
|--|---|--|---|--|---|--|---|--------------|
| Landscape Irrigation and Water Loss Sector Use, GPCD | = | 2000 Base Daily per Capita Water Use <hr/> 227.7 | - | Standard Indoor Residential Use, GPCD <hr/> 70.0 | - | CII Water Deliveries in Midpoint Baseline Year, GPCD <hr/> 68.7 | = | 89.0 GPCD |
|--|---|--|---|--|---|--|---|--------------|

| | | | | | | |
|--|---|--|---|-------|---|-----------|
| Landscape Irrigation and Water Loss Savings, GPCD | = | Landscape Irrigation and Water Loss Sector Use, GPCD <hr/> 89.0 | X | 0.216 | = | 19.2 GPCD |
|--|---|--|---|-------|---|-----------|

Step 6. Total Savings

Because there are two alternative methods to calculate indoor residential savings, there are two alternatives for total savings, calculated using Equation 3.

Alternative 1 (based on Target Method 4 Calculator for Indoor Residential Savings):

| | | | | | | | | | | |
|---------------------------|---|---|---|---|---|--------------------------------------|---|--|---|--------------|
| Total Savings, GPCD | = | Metering Savings, GPCD <hr/> 8.3 | + | Indoor Residential Savings, GPCD <hr/> 16.5 | + | CII Savings, GPCD <hr/> 6.9 | + | Landscape Irrigation and Water Loss Savings, GPCD <hr/> 19.2 | = | 50.9 GPCD |
|---------------------------|---|---|---|---|---|--------------------------------------|---|--|---|--------------|

Alternative 2 (based on default for Indoor Residential Savings):

| | | | | | | | | | | |
|------------------------|---|---------------------------|---|-------------------------------------|---|----------------------|---|--|---|--------------|
| Total Savings, GPCD | = | Metering Savings, GPCD | + | Indoor Residential Savings, GPCD | + | CII Savings, GPCD | + | Landscape Irrigation and Water Loss Savings, GPCD | = | 49.4 GPCD |
| | | 8.3 | | 15.0 | | 6.9 | | 19.2 | | |

Step 7. 2020 Urban Water Use Target (Equation 1)

Alternative 1 (based on Target Method 4 Calculator for Indoor Residential Savings):

| | | | | | | |
|---------------------------------|---|--|---|------------------------|---|------------|
| Urban Water Use Target, GPCD | = | Base Daily per Capita Water Use, GPCD | - | Total Savings, GPCD | = | 176.8 GPCD |
| | | 227.7 | | 50.9 | | |

Alternative 2 (based on default for Indoor Residential Savings):

| | | | | | | |
|---------------------------------|---|--|---|------------------------|---|------------|
| Urban Water Use Target, GPCD | = | Base Daily per Capita Water Use, GPCD | - | Total Savings, GPCD | = | 178.3 GPCD |
| | | 227.7 | | 49.4 | | |

APPENDIX C

Regulations for Implementing Process Water Provision

California Code of Regulations
Title 23. Waters
Division 2. Department of Water Resources
Chapter 5.1. Water Conservation Act of 2009
Article 1. Industrial Process Water Exclusion in the Calculation of Gross Water Use

§596. Process Water

(a) An urban retail water supplier that has a substantial percentage of industrial water use in its service area is eligible to exclude the process water use of existing industrial water customers from the calculation of its gross water use to avoid a disproportionate burden on another customer sector.

(b) The Department of Water Resources will review and assess the implementation of this article and may amend its provisions upon considering the recommendations of the Commercial, Industrial and Institutional task force convened pursuant to section 10608.43 of the Water Code.

Note: Authority cited: Section 10608.20, Water Code. Reference: Sections 10608.20(e), 10608.24(e), and 10608.43 Water Code.

§596.1. Applicability and Definitions

(a) Sections 596.2 through 596.5 describe criteria and methods whereby an urban retail water supplier may deduct process water use when calculating their gross water use in developing their urban water use targets.

(b) The terms used in this article are defined in this subdivision.

(1) “commercial water user” means a water user that provides or distributes a product or service. Examples include commercial businesses and retail stores, office buildings, restaurants, hotels and motels, laundries, food stores, and car washes.

(2) “disadvantaged community” means a community with an annual median household income that is less than 80 percent of the statewide annual median household income.

(3) “distribution system” means a water conveyance system that delivers water to a residential, commercial, or industrial customer and for public uses such as fire safety where the source of water is either raw or potable water.

(4) “drought emergency” means a water shortage emergency condition that exists when there would be insufficient water for human consumption, sanitation and fire protection, as set forth in California Water Code Section 350-359 and Government Code Section 8550-8551.

(5) “gross water use” means the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:

(A) Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier

(B) The net volume of water that the urban retail water supplier places into long-term storage

(C) The volume of water the urban retail water supplier conveys for use by another urban water supplier

(D) The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24 of the Water Code.

(6) “incidental water use” means water that is used by industry for purposes not related to producing a product or product content or research and development. This includes incidental cooling, air conditioning, heating, landscape irrigation, sanitation, bathrooms, cleaning, food preparation, kitchens, or other water uses not related to the manufacturing of a product or research and development.

(7) “industrial water user” means a manufacturer or processor of materials as defined by the North American Industry Classification System (NAICS) code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development. An industrial water user is primarily involved in product manufacturing and processing activities and research and development of products, such as those related to chemicals, food, beverage bottling, paper and allied products, steel, electronics and computers, metal finishing, petroleum refining, and transportation equipment. Data centers dedicated to research and development are considered an industrial water user.

(8) “institutional water user” means a water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches, hospitals, government facilities, and nonprofit research institutions.

(9) “local agency” means any municipality, such as a city or county government or public water agency.

(10) “non-industrial water use” means gross water use minus industrial water use.

(11) “process water” means water used by industrial water users for producing a product or product content, or water used for research and development. Process water includes, but is not limited to; the continuous manufacturing processes, water used for testing, cleaning and maintaining equipment. Water used to cool machinery or buildings used in the

manufacturing process or necessary to maintain product quality or chemical characteristics for product manufacturing or control rooms, data centers, laboratories, clean rooms and other industrial facility units that are integral to the manufacturing or research and development process shall be considered process water. Water used in the manufacturing process that is necessary for complying with local, State and federal health and safety laws, and is not incidental water, shall be considered process water. Process water does not include incidental, commercial or institutional water uses.

(12) “recycled water” means water that is used to offset potable demand, including recycled water supplied for direct use and indirect potable reuse that meets the following requirements, where applicable:

(A) For groundwater recharge, including recharge through spreading basins, water supplies that are all of the following:

(i) Metered.

(ii) Developed through planned investment by the urban water supplier or a wastewater treatment agency.

(iii) Treated to a minimum tertiary level.

(iv) Delivered within the service area of an urban retail water supplier or its urban wholesale water supplier that helps an urban retail water supplier meet its urban water use target.

(B) For reservoir augmentation, water supplies that meet the criteria of subdivision (A) and are conveyed through a distribution system constructed specifically for recycled water.

(13) “urban retail water supplier” means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes.

(14) “Urban Water Management Plan” means a plan prepared pursuant to California Water Code Division 6 Part 2.6. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

Note: Authority cited: Section 10608.20, Water Code. Reference: Sections 10608.12, 10608.20, and 10631 Water Code.

§596.2 Criteria for Excluding Industrial Process Water Use from Gross Water Use Calculation

When calculating its gross water use, an urban retail water supplier may elect to exclude up to 100 percent of process water use from its gross water use if any one of the following criteria is met in its service area:

- (a) Total industrial water use is equal to or greater than 12 percent of gross water use, or
- (b) Total industrial water use is equal to or greater than 15 gallons per capita per day, or
- (c) Non-industrial water use is equal to or less than 120 gallons per capita per day if the water supplier has self-certified the sufficiency of its water conservation program with the Department of Water Resources under the provisions of section 10631.5 of the Water Code, or
- (d) The population within the supplier's service area meets the criteria for a disadvantaged community.

Note: Authority cited: Section 10608.20, Water Code. Reference: Sections 10608.20 and 10608.24 Water Code.

§596.3. Quantification and Verification of Total Industrial Process and Industrial Incidental Water.

The volumes of water uses in Section 596.3 shall be for the same period as urban water suppliers calculate their baseline daily per capita water use and reported in their Urban Water Management Plans.

(a) The volume of process water use shall be verified and separated from incidental water use.

(1) To establish a baseline for determining process water use, urban retail water suppliers shall calculate the process water use over a continuous ten year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

(2) Verification of process water can be accomplished by metering, sub-metering or other means determined suitable and verifiable by the urban retail water supplier and reported in their Urban Water Management Plans and reviewed by the Department of Water Resources.

(b) In cases where the urban retail water supplier provides only a portion of an industrial water user's water supply, the urban retail water supplier shall prorate the volume of process water use excluded from gross water use by considering the average share of the industrial water use that it supplied over a continuous ten year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

The verification of the proportion of industrial water use supplied shall be accomplished through metering, sub-metering, or other means determined suitable and verifiable by the

urban water supplier such as audits, historic manufacturing output or suppliers' billing records and as reported in their Urban Water Management Plans.

Example. If an urban water supplier delivered only 60 percent of the average annual water used by an industrial water user, the urban supplier can only use that 60 percent of industrial water in determining if it is eligible to exclude process water from its gross water use; and if it is eligible, it can exclude only 60 percent of the volume of process water used by such industrial water user.

Note: Authority cited: Section 10608.20, Water Code. Reference: Sections 10608.20 and 10608.24 Water Code.

§596.4. Existing Industrial Customers

When implementing this article, urban retail water suppliers shall meet the following provisions:

- (a) Any ordinance or resolution adopted by an urban retail water supplier after November 10, 2009 shall not require industrial water customers existing as of November 10, 2009 to undertake changes in product formulation, operations, or equipment that would reduce process water use.
- (b) An urban retail water supplier may encourage existing industrial customers to utilize water efficiency technologies, methodologies, or practices through the use of financial and technical assistance.
- (c) This section shall not limit an ordinance or resolution adopted pursuant to a declaration of drought emergency by an urban retail water supplier.

Note: Authority cited: Section 10608.20, Water Code. Reference: Section 10608.26 Water Code.

§596.5 New and Retrofitted Industries

Local agencies and water suppliers shall encourage newly-established and retrofitted industries to adopt industry-specific water conservation practices and technologies where such technologies exist.

Note: Authority cited: Section 10608.20, Water Code. Reference: Section 10608.20 Water Code.