STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD
INITIAL STATEMENT OF REASONS FOR REGULATORY ACTION
DIVISION 3, CHAPTER 3.5, ARTICLE 1
Title 23, California Code of Regulations

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Background

In 2018, the California State Legislature enacted Senate Bill (SB) 606 and Assembly Bill (AB) 1668 (together, 2018 conservation legislation) to establish a new foundation for improvements in water conservation and drought planning to adapt to climate change and long-term aridification. Water Code section 10609.2 directs the State Water Resources Control Board (State Water Board or Board) to adopt long-term standards for the efficient use of water, variances for unique uses that can have a material effect on urban water use, and guidelines and methodologies pertaining to the calculation of an urban water use objective (objective). Water Code section 10609.10(d) directs the Board to adopt performance measures for Commercial, Industrial, and Institutional (CII) water use. Water Code sections 10609.22 and 10609.24 direct each Urban Retail Water Supplier (supplier) to annually calculate its objective and provide a report pertaining to the objective and implementation of the CII performance measures. The Board's proposed *Making Conservation a California Way of Life* regulation (proposed regulation) would, if adopted, establish methodologies and guidelines to calculate the objectives; standards for efficient residential outdoor water use and efficient use of water on CII landscapes with Dedicated Irrigation Meters (DIMs); CII performance measures; and annual reporting requirements. For context, the 2022 California Water Supply Strategy calls for reducing annual urban water demand by at least half a million acre-feet by 2030.

Problems Addressed

Climate change is driving aridification and changing precipitation patterns. Aridification—hotter and drier conditions over longer periods—could diminish existing water supplies by up to 10 percent by 2040 (California Natural Resources Agency, 2022). Although a naturally occurring feature of California's climate, drought conditions have become more frequent and more intense. A combination of hotter temperatures and low precipitation years—especially when snowpack and snowmelt runoff are low—creates drier conditions. California has been getting drier since 1895. In California and across the southwestern United States, 2000 to 2021 were the driest 22-year period over the past 1,000 years, part of what scientists call an emerging "megadrought" era (OEHHA, 2022). California is also experiencing changing precipitation patterns, more rain instead of snow and an increase in the duration, frequency, and intensity of "atmospheric river" storms. These events lead to greater flooding risks and higher volume of releases from reservoirs early in the spring for flood control, meaning less precipitation that can be captured and stored. Toward the end of the century, warming temperatures in California could result in a 30 percent loss of snowpack and a 25 percent increase in rain, leading to a higher volume of water rushing from headwaters and washing out across the state (Huang et al., 2020). California will likely be grappling with floods and drought simultaneously, posing major challenges for water agencies and the communities they serve.

Making Conservation a Way of Life will help California adapt to aridification and changing precipitation patterns. Finding and fixing leaks along with replacing older fixtures and appliances with efficient models will save water indoors and out while also realizing important co-benefits. Saving water, for example, saves energy. By replacing just one showerhead with an efficient model, the average family can save 2,700 gallons of water and the amount of electricity needed to power its home for 11 days (EPA WaterSense, 2023). Significant water savings can also be realized by transitioning away from conventional high water-using landscapes to "climate-ready" landscapes. Climate-ready landscapes designed and maintained to reduce greenhouse gas emissions and weather more extreme conditions; they are those that save water, reduce waste, nurture soil, sequester carbon, conserve energy, reduce urban heat, protect air and water quality, and create habitat for native plants and pollinators. A study in Santa Monica showed that, over a nine-year period, a garden like this used 83% less water, generated 56% less green waste, and required 68% less maintenance than a conventional (95 percent lawn) landscape (Ackerman et al., 2013). Climate-ready landscapes use less water because they are planted with lower water-using vegetation that is irrigated much more efficiently. Because they are composed of deeply rooted vegetation and their soils enriched with mulch and compost, climate-ready landscapes are also better at retaining rainwater. According to one study, such landscapes retain 80 percent of the rain (Kent, 2017). Slowing, spreading, and sinking rainwater in our yards and gardens can help drought-proof landscapes by keeping soils hydrated through the spring and early summer, offsetting the need to irrigate with highly treated potable water delivered by a supplier. Retaining water on-site can also lessen the impact of extreme wet weather events, helping to reduce flooding in urbanized areas.

The proposed regulation would improve on past conservation efforts. The statewide conservation target set for 2020 (and most of the supplier-specific targets) established under the California Water Conservation Act of 2009 (SB X7-7), for example, were reached well in advance of 2020 (DWR et al., 2017) and yet were outpaced by climate change, with the extreme drought conditions in 2015 and 2016 necessitating additional savings. The drought emergency reduction requirements imposed by the State Water Board in 2015 and 2016 resulted in average statewide water use dropping by 21 percent in just two years.[1] Lastly, many conservation programs have been criticized for failing to equitably serve lower-income customers, who can least afford higher water bills. This, combined with the fact that lower-income customers use relatively little water and yet often pay more per gallon because of fixed fees, has raised serious equity concerns (Clary et al., 2021).

The proposed regulation creates a framework to achieve the 2018 conservation legislation's directives and goals while also improving upon past conservation efforts. As directed by Water Code section 10609.2, subdivision (d), the proposed regulation would achieve a higher level of efficiency than the targets established by SB X7-7. At the same time, the proposed regulation is designed to achieve water use efficiency and water savings incrementally, with the standards becoming more ambitious over time. In this way, the proposed regulation will help California communities adjust to changing hydrologic conditions in a manner that reduces unintended economic and physical impacts. The proposed regulation provides suppliers with time to expand their programs and policies, which should help the communities they serve, for example, transition existing trees away from irrigation systems designed to meet the shallow water needs of turf and to systems designed to help trees grow the deep and healthy roots they need to thrive.

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[1] While those restrictions led to impressive water savings and responded to statewide needs during that specific drought period, they were achieved at a pace that led to revenue losses for some urban water suppliers. The California Urban Water Agencies reported lower water use during the drought emergency reduced the average person's water bill (CUWA, 2019). Affected suppliers, in response, made operational changes. Mitchell et al. (2017) report that "75 percent of all water suppliers adjusted their water rates in response to the drought." These "rate adjustments and surcharges not only helped reduce use, but also helped mitigate revenue losses from the drought and [conservation] mandate."

The framework is flexible in that it allows for a variety of compliance strategies. Because a supplier must comply with the overall objective and not with the standard-based budgets, it has the flexibility to invest in the way that makes the most sense for the supplier and the communities it serves. The framework is tailored in that it reflects local conditions, such as climate and past investments in water conservation. For example, suppliers serving communities in hot, dry climates and with large lots would have larger outdoor budgets and suppliers serving communities that are already water efficient would not have to realize additional savings. Finally, the new framework aims to advance equity by encouraging compliance strategies such as adjusting rate structures and expanding tree canopy in disadvantaged communities.

In summary, the proposed regulation will help California stretch and thoughtfully use water supplies—for housing, the environment, and business—in the face of aridification and changing precipitation patterns. It builds on past conservation programs and policies while also incentivizing suppliers to maximize co-benefits. While not the primary purpose of the proposed regulation, implementation of the framework is likely to result in suppliers making investments and programmatic changes that encourage individuals, businesses, and local governments to change how they use water. Such changes have the potential to advance the Water Boards mission of preserving, enhancing, and restoring the quality of water resources and the statutory directive to advance California's climate change mitigation and adaptation goals. The proposed regulation can also support statewide policies to accelerate nature-based solutions, divert organic waste from landfills, and build healthy soils.

Specific Purpose of the Proposed Regulation

Section 965: Definitions

This section provides clear definitions for technical terms used in the proposed regulation. These definitions will ensure that all suppliers implement the proposed regulation consistently and will prevent ambiguity or confusion in the calculation of any of the objective components, in carrying out the performance measures, in reporting on progress, or in compliance assessments. These definitions have been aligned with existing definitions in the statute and the California Code of Regulations for consistency and to prevent any conflict or overlap with existing regulations. Any differences in definitions from statute or existing regulations are necessary for achieving the specific purposes of the proposed regulation and the 2018 conservation legislation.

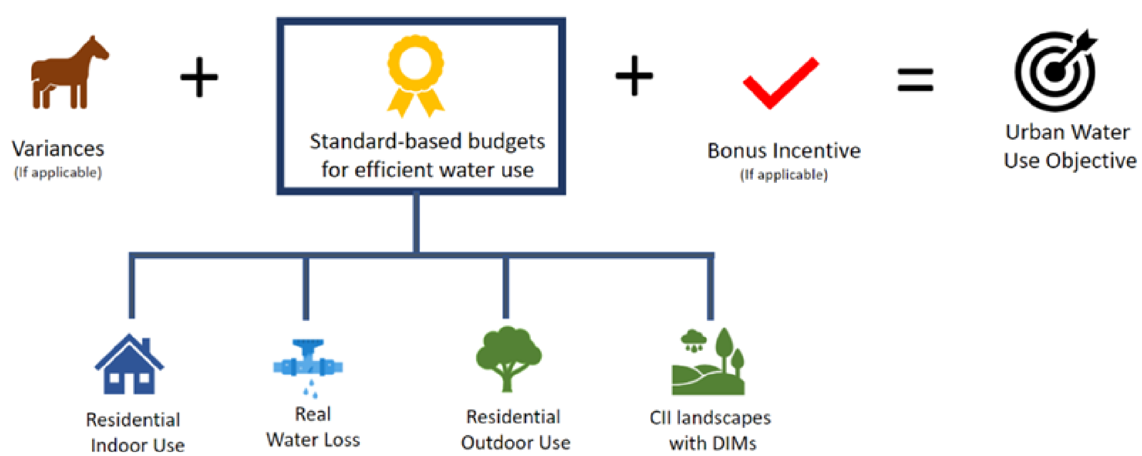
Section 966: Calculating the Urban Water Use Objective

Section 966, subdivisions (a) and (b), define the objective—an estimate of aggregate efficient water use for the previous fiscal year based on water efficiency standards and the supplier's unique local service area characteristics—and establish the frequency with which a supplier would calculate it. Subdivisions (c) and (d) identify the different components of the objective and the formula that would be used to calculate it. As shown in Figure 1, a supplier's objective would equal the sum of standard-based budgets for:

- Residential indoor use
- Residential outdoor use
- CII landscapes with DIMs
- Real water losses

When applicable, the objective would also include variances for unique uses that can have a material effect on a supplier's urban water use objective (including, for example, water use associated with livestock), temporary provisions, and a bonus incentive for potable recycled water use.

Figure 1: How a supplier calculates its urban water use objective



Subdivision (g) clarifies that suppliers must adhere to the overall objective. Apart from the supplier-specific water loss standards, which were established by regulation pursuant to separate statutory authority, the proposed regulation would not require suppliers to comply with the standard-based budgets, but rather the overall objective.

Subdivision (h) provides a backstop to ensure that water use objectives do not result in greater water use than the targets established by SB X7-7.

Subdivision (i) outlines the criteria a supplier must meet to continue to apply the 2030 outdoor standards (landscape efficiency factors of 0.63) through 2040. There are differing criteria for suppliers that serve primarily disadvantaged communities and those that do not.

Section 967: Calculating the Budgets for Indoor Residential Water Use and Associated Variances

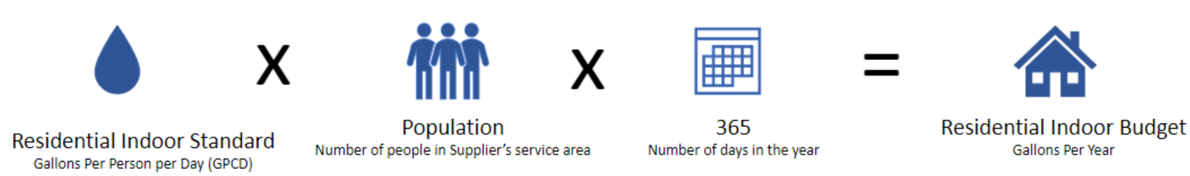
Section 967, subdivision (a), incorporates the standards for residential indoor water use in statute (Wat. Code, § 10609.4.). As shown in Table 1, the residential indoor standard, expressed in Gallons Per Capita per Day (GPCD), lowers over time.

Table 1: Residential indoor standard as defined in Water Code Section 10609.4

	Residential Indoor Standard (GPCD)
Through December 31, 2024	55
From January 1, 2025, through December 31, 2029	47
January 1, 2030, onwards	42

Subdivision (a) also establishes the formula that would be used to calculate the residential indoor budget. The residential indoor standard, along with unique service area data, would be used to calculate an efficient residential indoor use budget. The standard is multiplied by the supplier's service area population and by the number of days in the year (Figure 2).

Figure 2: How a supplier would calculate its Residential Indoor Budget



As directed by Water Code section 10609.14, this section specifically includes unique uses that may have a material impact on a supplier's water use. Subdivision (b) identifies variances that a supplier may use to augment its objective and the threshold of significance for each variance. For the evaporative coolers and fluctuations in seasonal population variances, "significant water use” would mean 5 percent or more of the sum of the budgets associated with each of the standards. For the seasonal population variance, a supplier would also have the option of using two different methods; if the supplier were to use the more accurate method, “significant water use” would mean 1 percent or more of the sum of the budgets associated with each of the standards.

Subdivision (c) establishes how the water use budgets for the evaporative cooler and seasonal population variances would be calculated. The methodology for calculating these variances generally follows recommendations from the Department of Water Resources (Department or DWR) that were required by statute.

Subdivision (d) establishes that suppliers may request temporary provisions to respond to negative impacts to wastewater collection, treatment, and reuse systems.

Subdivision (e) describes the process suppliers follow to request and receive approval for the use of variances.

The values, equations, and procedures identified in section 967 will ensure suppliers understand how to calculate the efficient indoor residential water use budget.

Section 968: Outdoor Residential Water Use and Associated Variances

The purpose of subdivision (a) is to set standards for efficient residential outdoor water use. The standard for residential outdoor water use will be a Landscape Efficiency Factor (LEF) of 0.80 until 2030, 0.63 until 2035, and 0.55 thereafter. The LEF is a factor used to indicate the amount of water a supplier may need to deliver to customers so that they can maintain healthy and efficient landscapes across the supplier’s service area. A higher LEF value corresponds to a service area characterized by higher water-using, less efficiently irrigated landscapes; a lower LEF value corresponds to a service area characterized by lower water-using, more efficiently irrigated landscapes. Table 2 summarizes how the residential outdoor standard changes over time.

Table 2: Residential Outdoor standards

	Landscape Efficiency Factor
Through June 30, 2030	0.80
From July 1, 2030, to June 30, 2035	0.63
July 1, 2035, onwards	0.55

The proposed long-term standard of 0.55 will drive investments in outdoor water use efficiency, including by facilitating the transition to climate-ready landscapes. The long-term standard is informed by the Model Water Efficient Landscape Ordinance (MWELO), which establishes factors for designing, installing, maintaining, and managing water efficient landscapes in new construction and for rehabilitated landscapes. In 2015, MWELO set the residential evapotranspiration factor — a factor that accounts for plant water needs and irrigation efficiency at the scale of an individual landscape — at 0.55.

Individual residential landscapes can be designed to meet the MWELO standard in many ways. One option would be for approximately a quarter of the landscape area to be planted with high water-using vegetation such as cool-season grass; the remainder could be planted with low- and medium water-using plants which, unlike grass, can be irrigated by more efficient irrigation systems that don't lose as much as 50 percent of applied water to wind, runoff, and evaporation (EPA WaterSense, 2022). At the scale of a supplier's service area, the proposed long-term standard for residential outdoor water use, 0.55, could be realized if, for example, approximately 25 percent of residential landscape area were covered with cool-season turf (LEF of 1.0) and the remainder with efficiently irrigated low and medium water-using plants (LEF of 0.4).

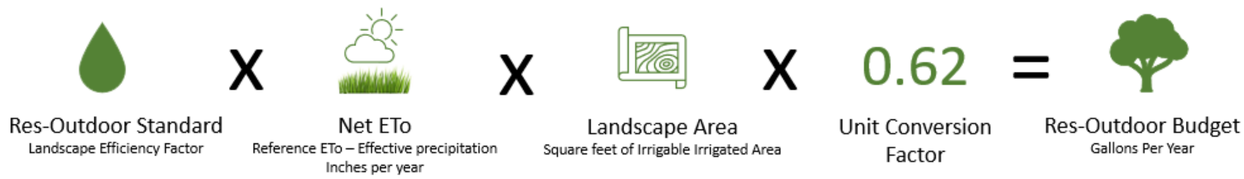
The Department's analysis of residential outdoor water use suggested that average statewide use in 2018 ranged from a high of 0.76 to a low of 0.60, depending on the method used (DWR 2022). Subsequent analysis of the empirically derived residential outdoor use data showed that the average statewide LEF was 0.65, with 25 percent of sampled suppliers having a LEF of 0.44 or less (State Water Board, 2023). In aggregate, Californians have made great strides in using water more wisely in our yards and gardens and the long-term residential outdoor standard will help to ensure those trends continue. The proposed standard of 0.55 is achievable. While achievable at the landscape and service-area scale, the proposed regulation does not require individual residential landscapes to meet the standard; nor does it require suppliers to meet the service-area wide budget for efficient residential outdoor use. Rather the proposed regulation would require suppliers to meet the overall objective, of which the residential outdoor budget is one component. The achievability of the proposed long-term standard is due, in part, to the flexibility of the overarching framework.

Facilitating the transition to climate-ready landscapes is critical to realizing the water savings outlined in the water supply strategy and meeting the statutory directive to advance the state's goals to mitigate and adapt to climate change. It also supports cross-cutting policies to divert organic waste from landfills, build healthy soils, and accelerate nature-based solutions. Additionally, the gradual pace of tightening of the standards overtime, along with other safeguards in the proposed regulation, provides suppliers and their customers with a reasonable period to mitigate potentially negative near-term economic impacts (e.g., revenue losses) or environmental impacts (e.g., tree mortality).

Subdivisions (b) through (d) establish how the annual budget for residential outdoor water use would be calculated. The standard would be multiplied by a supplier's unique service area data (specifically, the square footage of residential landscape area and net evapotranspiration[2] (Net ETo)) and by a conversion factor of 0.62 (Figure 3).

[2] Net evapotranspiration is equal to reference evapotranspiration minus effective precipitation. Reference evapotranspiration and effective precipitation vary from year-to-year and throughout the state. Reference evapotranspiration is a standard measurement of environmental parameters that affects the water use of plants; it's expressed in inches per year and is an estimate of the evapotranspiration of a large field of four- to seven-inch tall, cool-season grass that is well watered. Effective precipitation is the portion of total precipitation that becomes available for plant growth.

Figure 3: How a supplier would calculate its Residential Outdoor Budget



The square footage of residential landscape area and net evapotranspiration values would be provided by the Department unless a supplier has produced alternative data that are, in terms of quality and accuracy, demonstrably equal or superior to what has been provided by the Department.

The Department has provided every supplier with estimates of *Irrigable Irrigated (II)* and *Irrigable Not Irrigated* area. Subdivision (b)(2) specifies that a supplier would calculate its budget by applying the standard to II area. Subdivision (b)(3) specifies that, through 2027, a supplier may include up to twenty percent of INI area, if the supplier's actual urban water use for the reporting year would otherwise be greater than its urban water use objective.

Subdivision (c) establishes that all residential landscapes considered Special Landscape Areas (SLA) shall be granted a LEF of 1.0 and describes the method a supplier would use to account for SLAs in its residential outdoor use budget. SLAs for residential landscapes would be the same as defined under MWELO; this includes areas dedicated solely to edible plants or areas irrigated with recycled water, or both.

Subdivision (d) establishes a process and a method that allows suppliers to account for the water use associated with newly constructed residential landscapes.

By incorporating local conditions into the standard-based budgets for efficient outdoor water use, the proposed regulation abides by statutory directives as well as ensures that urban water use objectives are comprehensive, accommodating, and will drive meaningful water savings statewide.

As directed by Water Code section 10609.14, this section specifically includes unique uses that may have a material impact on a supplier's water use. Subdivision (e) identifies the variances that a supplier may use to augment its residential outdoor budget and the threshold of significance for each variance. For most of the variances, "significant water use" would mean 5 percent or more of the sum of the budgets associated with each of the standards. For the variance for irrigating landscapes with recycled water containing high levels of total dissolved solids, a supplier would have the option of using two different methods to calculate the associated budget; if the supplier were to use the more accurate method, "significant water use" would mean 1 percent or more of the sum of the budgets associated with each of the standards. For the variance for irrigating residential agricultural landscapes, a supplier would also have the option of using two different methods; if the supplier were to use the more accurate method, "significant water use" would mean 1 percent or more of the sum of the budgets associated with each of the standards. There would be no threshold of significance for the variance for supplementing ponds and lakes to comply with permits and ordinances.

Subdivision (f) establishes how the water use budgets for variances will be calculated. Variance calculations generally follow the methodologies recommended by the Department.

The inclusion of variances is necessary because some suppliers' service areas have unique uses of water that can have a material effect on the Supplier's urban water use objective.

Subdivision (g) identifies temporary provisions that a supplier may use to adjust its objective. Temporary provisions are time-constrained additional budgets for existing pools, spas, and similar water features; newly planted, climate-ready trees; and the establishment of certain landscapes that require temporary irrigation.

Subdivision (h) establishes how the budgets for temporary provision will be calculated.

The inclusion of temporary provisions is necessary because some widespread activities may reasonably require a larger amount of water on a temporary basis and a supplier's objective should reflect that.

Subdivision (i) establishes what must be included in a supplier's request to include a variance, temporary provision, or special landscape area in its objective. This is necessary because for a Supplier to include variances, temporary provisions, or special landscape area, it must annually provide information that quantifies and substantiates the request and documents its efforts to prioritize water for existing trees, an important multi-benefit component of urban landscapes.

The values, equations, and procedures identified in section 968 will ensure suppliers understand how to calculate their budgets for efficient outdoor residential water use.

Section 969: Calculating the Budgets for Commercial, Industrial, and Institutional (CII) landscapes with Dedicated Irrigation Meters (DIMs) and Associated Variances

The purpose of subdivision (a) is to set standards for efficient outdoor water use for CII landscapes with DIMs. Under the proposed regulation, a supplier would have until 2028 to measure the square footage of CII landscape area associated with dedicated irrigation meters within their service area. Until then, a supplier would add to its objective the volume of water delivered to landscape irrigation accounts. Delaying until 2028 provides suppliers additional time to gather the necessary data to calculate the budget for efficient water use on CII landscapes with DIMs. Starting in 2028, a supplier would apply the standard for CII landscapes with DIMs. The proposed standard for CII landscapes with DIMs will be a LEF of 0.80 until 2030, 0.63 until 2035, and 0.45 there afterward. Table 3 summarizes how the standard for CII landscapes with DIMs changes over time.

Table 3: Standard for CII Landscapes with Dedicated Irrigation Meters

	Landscape Efficiency Factor
Through June 30, 2030	0.80
From July 1, 2030, to June 30, 2035	0.63
July 1, 2035, onwards	0.45

SLAs will have a standard of 1.0, consistent with MWELO. SLAs for CII landscapes with DIMs would be the same as defined under MWELO, (i.e., areas dedicated solely to edible plants, recreational areas, and areas irrigated with recycled water), with the following additional landscape types classified as SLAs: bioengineered slopes; ponds for recreation or for sustaining wildlife; public swimming pools; existing plant collections, botanical gardens and arboretums; and cemeteries built before 2015. A higher standard is needed to accommodate special landscape uses that require a higher water use to be maintained properly. Newly constructed CII landscapes with DIMs will have a standard that is the same as the evapotranspiration adjustment factor for new non-residential areas identified in MWELO. This standard reflects existing law ensuring new construction is designed to promote water conservation.

The proposed long-term standard of 0.45 will drive investments in outdoor water use efficiency, including by facilitating the transition to climate-ready landscapes. The long-term standard is informed by MWELO, which establishes factors for designing, installing, maintaining, and managing water efficient landscapes in new construction and for rehabilitated landscapes. In 2015, MWELO set the evapotranspiration factor for CII landscapes— a factor that accounts for plant water needs and irrigation efficiency at the scale of an individual landscape — at 0.45.

Individual CII landscapes can be designed to meet the MWELO standard in a diversity of ways. One option would be for approximately a quarter of the landscape area to be planted with medium water-using vegetation such as warm-season grass; the remainder could be planted with low water-using plants which, unlike grass, can be irrigated by more efficient irrigation systems that don't lose as much as 50 percent of applied water to wind, runoff, and evaporation (EPA WaterSense, 2022). At the scale of a supplier's service area, the proposed long-term standard for CII landscapes with DIMs outdoor water use, 0.45, could be realized if approximately a quarter of CII landscapes with DIMs were covered with medium-using plants (LEF of 0.8) and the remainder with efficiently irrigated low water-using plants (an average LEF of 0.34).

The proposed standard of 0.45 is ambitious but achievable. While achievable at the landscape and service-area scale, the proposed regulation does not require individual CII landscapes with DIMs to meet the standard or require suppliers to meet the service-area wide budget for efficient water use for CII landscapes with DIMs. Rather, the proposed regulation would require suppliers to meet the overall objective, of which the budget for CII landscapes with DIMs is one component. The achievability of the proposed long-term standard is due, in part, to the flexibility of the overarching framework.

Same as the standard for residential outdoor use, the standard for CII landscapes with DIMs can facilitate the transition to climate-ready landscapes and the accompanying benefits previously discussed in the Outdoor Residential Water Use and Associated Variances section. The gradual pace of tightening of the standards overtime, along with other safeguards in the proposed regulation, provides suppliers and their customers with a reasonable period to mitigate potentially negative near-term economic impacts (e.g., revenue losses) or environmental impacts (e.g., tree mortality).

Subdivisions (b) through (d) establish how the annual budget for the water use of CII landscapes with DIMs will be calculated using applicable standards. The standard would be multiplied by a supplier's unique service area data (specifically, the square footage of CII landscapes with DIMs and net evapotranspiration) and by a unit conversion factor of 0.62 to calculate an annual CII landscapes with DIMs budget (Figure 4).

Figure 4: How a supplier would calculate its Outdoor Budget for CII landscapes with DIMs

Net evapotranspiration, comprising of reference evapotranspiration and effective precipitation, will annually be provided by the Department unless a supplier has produced alternative data that are, in terms of quality and accuracy, demonstrably equal or superior to what has been provided by the Department. The Department will provide every supplier with estimates of CII landscape areas by 2026. Suppliers can use this data to inform their measurement of CII landscapes with DIMs. Subdivision (b)(2) specifies that beginning in 2028, suppliers will annually quantify the measured square footage of CII landscape area associated with dedicated irrigation meters.

Subdivision (c) establishes a method for a supplier to account for SLAs in its outdoor use budget for CII landscapes with DIMs. Subdivision (d) establishes a process and a method that allows suppliers to account for the water use associated with newly constructed CII landscapes with DIMs.

By incorporating local conditions into the standard-based budgets for efficient outdoor water use, the proposed regulation abides by statutory directives as well as ensures that urban water use objectives are comprehensive, accommodating, and will drive meaningful water savings statewide.

As directed by Water Code section 10609.14, this section specifically includes unique uses that may have a material impact on a supplier's water use. Subdivision (e) identifies the variances that a supplier may use to augment its outdoor budget for CII landscapes with DIMs and the threshold of significance for each variance. For most of the variances, "significant water use" would mean 5 percent or more of the sum of the budgets associated with each of the standards. For the variance for irrigating landscapes with recycled water containing high levels of total dissolved solids, a supplier would have the option of using two different methods to calculate the associated budget; if the supplier were to use the more accurate method, "significant water use" would mean 1 percent or more of the sum of the budgets associated with each of the standards. There would be no threshold of significance for the following variances: responding to emergency events and supplementing ponds to comply with permits and ordinances.

Subdivision (f) establishes how the water use budgets for variances will be calculated. Variance calculations generally follow the methodology recommended by the Department.

The inclusion of variances is necessary because some suppliers' service areas have unique uses of water that can have a material effect on the supplier's urban water use objective.

Subdivision (g) identifies temporary provisions that a supplier may use to adjust its objective. Temporary provisions are time-constrained, additional budgets for newly planted, climate-ready trees and the establishment of certain landscapes that require temporary irrigation.

Subdivision (h) establishes how the budgets for temporary provision will be calculated.

The inclusion of temporary provisions is necessary because some widespread activities may reasonably require a larger amount of water on a temporary basis and a supplier's objective should reflect that.

The values, equations, and procedures identified in section 968 will ensure suppliers understand how to calculate their budgets for efficient outdoor residential water use.

Section 970: Calculating the Budget for Water Loss

Water Code section 10608.34 required the State Water Board to develop and adopt performance standards for water loss for suppliers while considering lifecycle cost accounting. In 2022, a separate State Water Board regulation established system-specific standards for real water losses (Cal. Code Regs., tit. 23, §§ 980-986). Water code sections 10609.12 and 10609.2 specify that the Board shall set standards for a volume of water losses that are a component of supplier's water use objectives, using the standards adopted by the Board pursuant to Water Code section 10608.34.

The purpose of adding subdivisions (a) and (b) is to outline how suppliers' volumetric annual water loss budgets will be calculated using the system-specific standards for real water loss. A supplier would calculate its annual water loss budget by multiplying its system-specific standard by the number of days in the year, and, depending on the units associated with the standard, by either the number of total service connections or the length of the distribution system, in miles (Figure 5). Suppliers that operate multiple systems would calculate an annual water loss budget by summing the estimated efficient water loss budgets associated with each system.

Figure 5: How a supplier would calculate its Water Loss Budget

Subdivision (c) establishes that a supplier may, until 2028, add reported real water losses rather than its standard-based budget to its objective.

The system-specific standards established for water loss will reduce water loss and reduce the energy and associated greenhouse gas emissions associated with supplying and treating water that is lost to leakage. By incorporating the standard-based budgets for efficient real water losses into suppliers' water use objectives, the proposed regulation will abide by the statutory directives as well as ensure that urban water use objectives are comprehensive and drive meaningful water savings statewide.

Section 971: Calculating the Bonus Incentive

The State Water Board's implementation of its Recycled Water Policy recognizes the importance of recycled water as a critical component of the State's diversified water supply to improve the State's self-reliance and drought resiliency. Water code section 10609.20 directs the State Water Board to include in its long-term standards for the efficient use of water a bonus incentive for potable reuse. The bonus incentive is an additional volume of water that a supplier, if it delivers water from a source that is augmented by potable reuse water, may add to its urban water use objective. As such, it incentivizes investments in potable water reuse.

The purpose of adding subdivisions (a) and (b) is to establish the method suppliers will use to calculate the bonus incentive. There are two different methods: one that a supplier would use if it delivered water obtained from a groundwater basin augmented with potable recycled water; and another a supplier would use if it delivered water obtained from a surface water reservoir augmented with potable recycled water. Both methods account for water losses and rely on data averaged over a five-year period. The bonus incentive is capped at 15 percent of the urban water use objective for existing facilities and 10 percent for all other facilities, per statute.

Sections 972 – 974: CII Performance Measures

Water code section 10609.10 directs the State Water Board to adopt performance measures for CII water uses that are excluded from the objective. Performance measures are actions to be taken by suppliers that would result in increased water use efficiency by CII water users. All CII water uses— except for water used on CII landscapes with DIMs, which is part of the objective, and CII process water, which is excluded by statute— are subject to performance measures.

CII water use is subject to performance measures and not standards because CII water use is relatively heterogeneous (e.g., how much water any given restaurant uses will depend on factors unrelated to the efficiency of water-using fixtures and appliances, including the type of food served, the number of customers, etc.). Also, there is currently little information available about how water is used by the CII sector. These performance measures will also provide suppliers and Californians with an opportunity to better understand CII water use.

Under the proposed regulation, suppliers would be required to carry out several CII performance measures. Under the proposed regulation, there are three CII performance measures. The purpose of sections 972 through 974 is to outline each of these CII performance measures.

Section 972, subdivisions (a) through (d), establish the classification system and guidelines suppliers will use to aggregate their CII accounts. Suppliers will be required to classify their CII customers according to the broad classification categories used by the U.S. Environmental Protection Agency's ENERGYSTAR Portfolio Manager tool as well as the following categories:

CII laundries, large landscapes, water recreation, and car washes. This section also establishes timelines and compliance milestones for suppliers to complete classification of all CII accounts.

Section 973, subdivision (a), establishes the threshold for either installing dedicated irrigation meters (DIMs) or employing in-lieu technologies on CII landscapes with mixed use meters. Additionally, this section outlines approved in-lieu water management technologies a supplier may employ and appropriate best management practices to ensure increased water use efficiency. Suppliers would be required to install DIMs or employ in-lieu technologies for CII landscapes that a) do not have a DIM, and b) the supplier estimates to use 500,000 gallons of water or more annually. Suppliers employing in-lieu technologies must employ at least two of the recommended efficient water use technologies (e.g., hardware improvements), and all water management practices (e.g., irrigation scheduling). Subdivision (b) identifies the formula suppliers would use to estimate the volume of water used to irrigate CII landscapes. Consistent with the Department's horticultural method, the formula integrates an evapotranspiration factor of 0.76[3] (DWR, 2022). Subdivision (c) establishes timelines and compliance milestones for suppliers.

Section 974, subdivisions (a) through (d), establish CII customer thresholds and the best management practices suppliers would offer to customers exceeding the thresholds. Subdivision (a) establishes disclosable buildings[4] as a threshold and requires, as a best management practice, that suppliers provide to customers that own or manage a disclosable building, annual water use data in a format compatible with ENERGYSTAR's Portfolio Manager tool. Subdivision (a) also establishes timelines and compliance milestones for suppliers.

Subdivision (b) establishes as a threshold the top 20 percent of water-using customers in each CII classification category (e.g., lodging). Subdivision (c) establishes as a threshold the top 2.5 percent of CII water users, regardless of classification category. For customers exceeding the thresholds defined by subdivisions (b) and (c), suppliers would design and implement a conservation program that includes at least one BMP (e.g., educational bill inserts) from five discrete BMP categories (e.g., Outreach, Education, and Technical Assistance).

Subdivision (d) identifies the non-functional CII turf as a threshold and, as a best management practice, requires water supplier to ban the irrigation of non-functional CII turf with potable water by July 1, 2025.

Section 975: Reporting

The purpose of adding subdivisions (a) through (d) is to provide clear direction on data submissions supporting the standards in the proposed regulation and the criteria for being granted variances and temporary provisions affecting the standards specified in sections 966 through 971. The requirement that the data be submitted on a form provided by the Board will facilitate analysis and tracking compliance. Suppliers are expected to submit the total volume of their water use as well as the measured components of the equations used to calculate their

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[3] Using average plant factors from the American Society of Agricultural and Biological Engineering Standard 623 (ASABE S623) with irrigation efficiency of 0.80, average ETF for this horticultural and irrigation science approach was estimated to be 0.76.
[4] As defined under the California Energy Commission's "Benchmarking" regulation (Cal. Code Regs., tit. 20, § 1681, subd. (d)).

water use objectives, to aid in finding computation errors and increase transparency between suppliers and the Board.

Subdivision (d) specifically details the data required pertaining to sections 972 through 974 in the proposed regulation. This allows the Board to track CII water use and efficiency as directed by statute.

Section 978: Enforcement

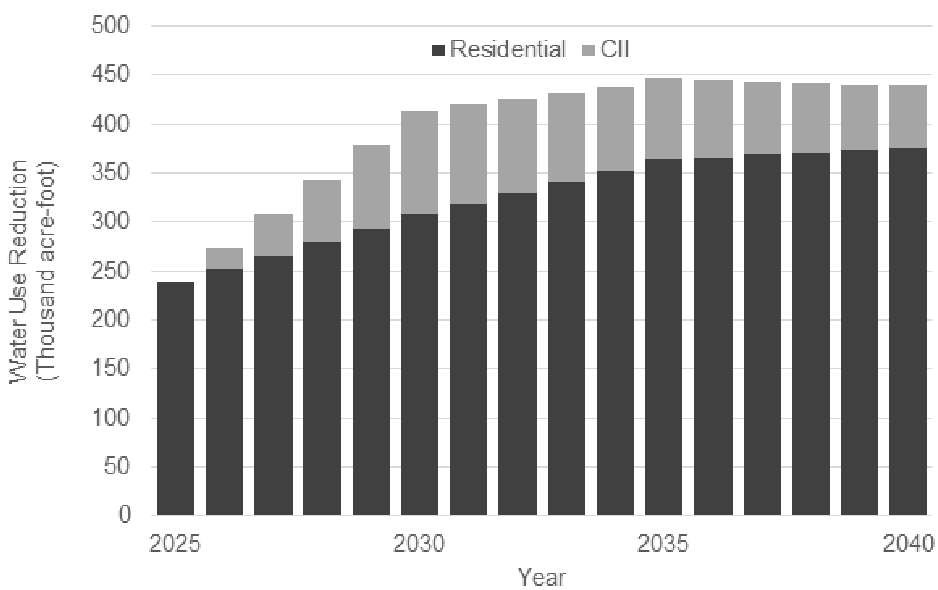
The purpose of this section is to clarify expectations and parameters with respect to potential Board enforcement. Statute identifies other parameters about potential Board enforcement actions. This section also specifies the process for a supplier seeking reconsideration and/or judicial review of Board decisions or orders issued under the proposed regulation.

Anticipated Benefits

The proposed regulation creates a new framework for managing urban water use by California's largest water suppliers. It would establish unique efficiency goals for each supplier based on local conditions, while leaving flexibility to implement locally appropriate solutions. In addition to establishing long-term standards for the efficient use of water throughout California's urban areas and a framework that incorporates local conditions and provides flexibility to suppliers to make locally appropriate implementation choices, the proposed regulation is expected to save a significant amount of water.

A recent assessment of urban water supplies found that adopting proven technologies and practices could reduce urban water use in California by 2.0 million to 3.1 million acre-feet per year (AFY), or by 30 to 48 percent (Cooley et al., 2022). The proposed regulation would help California begin to realize that potential. By 2035, the proposed regulation is expected to reduce statewide urban water use by approximately 15 percent from 2020 levels. As shown in Figure 6 below, staff estimated that the proposed regulation would save approximately 235,000 acre-feet of water in 2025 (compared to the assumed 2025 baseline water use) and increased amounts in subsequent years, reaching almost 440,000 acre-feet of water 2040 (compared to the assumed 2040 baseline water use). In this way, the proposed regulation would help to realize the California Water Supply Strategy goal of building upon the conservation achievements of the last two decades to reduce annual water demand in towns and cities by at least half a million acre-feet by 2030.

Figure 6: Projected residential and commercial, industrial, and institutional water use reduction due to proposed regulation. Total cumulative amount of water savings in the 2025-2040 period would be approximately 6.3 million acre-feet.



The proposed regulation would help realize the water savings outlined in the Water Supply Strategy. It is also expected to create indirect benefits beyond water savings. While not the primary goal of the proposed regulation, implementation of the framework is likely to result in suppliers making investments and programmatic changes that encourage individuals, businesses, and local governments to change how they use water. Such changes have the potential to advance the Water Boards mission of preserving, enhancing, and restoring the quality of water resources and the statutory directive to advance California's climate change mitigation and adaptation goals. The proposed regulation can also support statewide policies to accelerate nature-based solutions, divert organic waste from landfills, and build healthy soils.

Protecting Human Health and Water Resources

The proposed regulation may bring about changes to urban landscapes that protect water quality by reducing dry-weather and wet-weather runoff.

Protecting water quality

The proposed regulation could reduce dry-weather urban runoff, helping prevent water pollution and protect water resources. Urban runoff is a source of pollutants that include pesticides, nutrients, bacteria, and metals. During dry weather, urban runoff can significantly pollute receiving waters (Pitton et al., 2016). As much as 50 percent of the water used outdoors in the urban sector is lost due to wind, evaporation, and runoff caused by inefficient irrigation methods and systems (EPA WaterSense, 2022). A household with an automatic landscape irrigation system that is not properly maintained and operated can waste up to 25,000 gallons of water annually (EPA WaterSense, 2022). Urban dry weather runoff is a serious problem in California. The Clean Water Act and Municipal Separate Storm Sewer System (MS4) Phase I and II permits either prohibit the discharge of, or require BMPs to control, runoff from sources such as street wash water, over-irrigation water, and residential car wash water. Efficient landscape irrigation reduces urban runoff, curbing the pollutants that would otherwise enter the storm drain system, minimizing their impact on natural streams, lakes, groundwater supplies and coastal areas. Protecting these water sources preserves water quality and local wildlife (Corbett et al., 2006). By setting long-term standards for efficient water use on residential and CII landscapes, the proposed regulation could reduce dry-weather urban runoff, preventing water pollution and protecting water resources.

The proposed regulation could also reduce wet-weather urban runoff. By requiring greater water use efficiency in urban water areas, it could facilitate the transition away from inefficiently irrigated, high water-using landscapes. While the proposed regulation does not require any specific landscape choices, and suppliers have flexibility in how they implement the framework, increased water use efficiency is likely to result in some landscapes being updated to be more climate appropriate, including in their plant palettes, overall design (e.g., swales, mulch, etc.), and irrigation systems. Climate-ready landscapes includes those enriched by compost and mulch and planted with deep-rooted shrubs and trees; they are more effective than turf at slowing, spreading, and sinking stormwater. Applying compost and mulch reduces demand for outdoor irrigation by acting as a barrier against evaporation of soil moisture and increases the soil's water holding capacity and soil permeability (Flint et al., 2018; Bennaton, 2015). Deep-rooted vegetation, such as trees, reduce urban stormwater pollutants by capturing rainfall in the canopy and allowing it to rapidly infiltrate the soil through interconnected pathways formed by large roots and macropores (Center for Watershed Protection, 2017; Berland et al., 2017). Compared to lawns, landscapes planted with trees, shrubs, and ground cover can capture between 30 percent and 50 percent more rain (Kent, 2017). Because the proposed regulation would incentivize changes to urban landscapes, including, in some cases, the transition to climate-ready landscapes, which are more efficiently irrigated and make better use of precipitation, the proposed could regulation reduce wet-weather runoff, preventing water pollution and protecting water resources.

Preserving in-stream flows

By reducing urban water demand, the proposed regulation could help preserve in-stream flows. Water conservation and efficiency have been shown to preserve in-stream flows, accommodating economic and population growth without greatly increasing the need for new or expanded water supplies (Dickinson et al., 2011). *Water Efficiency for In-stream Flow: Making the Link in Practice* describes how increased water efficiency measures contributed to creating a more natural flow regime in the Russian River. Local water agencies implemented several water conservation and efficiency strategies, such as water budgets, public education campaigns, and cash for grass replacement, to restore natural flows and create more natural habitat for coho salmon and steelhead trout in the summer and chinook salmon in the fall (Dickinson et al., 2011). Other examples where urban water conservation has helped preserve in-stream flows include the work of the Sacramento Water Forum on the American River, and groups within the Seattle metropolitan area on the Cedar River (Dickinson et al., 2011). These examples show that water conservation can reduce water consumption and, in turn, those savings can help preserve in-stream flows. By reducing urban water demand, the proposed regulation could also help to preserve in-stream flows.

Supporting practices that keep trees healthy

Water Code section 10609, subdivision (c)(3) directs that the "long-term standards and urban water use objectives should acknowledge the shade, air quality, and heat-island reduction benefits provided to communities by trees through the support of water-efficient irrigation practices that keep trees healthy."

The proposed regulation presents suppliers and their customers with an opportunity to make investments in ways that save water and support practices that keep trees healthy. Gains in outdoor water use efficiency can be made by transitioning from turf-dominant landscapes to climate-ready landscapes that prioritize water for existing and new climate-ready trees. Trees require less water than turf and can be irrigated much more efficiently. Researchers in California have shown that turf can use four to ten times as much water as trees (Litvak, 2017). Tree roots reach deeper, and can access groundwater, minimizing or even offsetting potable water needs. Increasing the tree canopy and urban green spaces can provide shade and evaporative cooling and reduce the urban heat island effect (Bloome et al., 2016). This will become even more important in the coming decades as climate change is projected to increase urban heat (Vahmani et al., 2019). As discussed above, trees also help reduce flooding and filter urban stormwater pollutants by capturing rainfall in their canopies and allowing water to rapidly infiltrate the soil through interconnected pathways formed by large roots and macropores (Center for Watershed Protection, 2017; Berland et al., 2017). Climate change is projected to increase the amount of precipitation falling in the form of rain in lower-elevation parts of California, making rainfall capture even more critical (AghaKouchak et al., 2018). The proposed regulation incentivizes efforts to maintain and increase the urban tree canopy in California. It includes a provision for the planting of new, climate-ready trees and an alternative compliance pathway for suppliers that demonstrate their support of water-efficiency irrigation practices that keep trees healthy. By encouraging suppliers to invest in water conservation and tree care, the proposed regulation could not only save water but also support water-efficient irrigation practices that keep trees healthy.

Mitigating and Adapting to Climate Change

Water Code section 10609, subdivision (c)(2) directs that the "long-term standards and urban water use objectives should advance the state's goals to mitigate and adapt to climate change."

Saving energy by saving water

Saving water saves energy, which can reduce the emission of greenhouse gases and other co-emitted air pollutants, improving air quality (EPA WaterSense, 2008, Szinai et al., 2021; West et al., 2013). At a system-wide scale, energy savings come from avoiding the energy use needed for extracting, conveying, treating, distributing, consuming (especially heating) water as well as collecting, treating, and discharging, or reusing wastewater (Szinai et al., 2021). Natural gas water heaters are the single largest GHG emitters at the household scale. Accordingly, reductions in water heating needs resulting from more efficient indoor water use saves energy and reduces these GHG emissions (EPA WaterSense, 2008; Szinai et al., 2021). For example, the U.S. Environmental Protection Agency estimates that a WaterSense home — a home that meets certain water-efficiency criteria and is at least 30 percent more water efficient than typical new construction homes — can save 718 kilowatt-hours (kWh) of electricity per year or 3.67 thousand cubic feet (Mcf) of natural gas per year (EPA Watersense, 2021b). While a water supplier's embedded energy savings will vary throughout the state depending on their circumstances, the California Public Utility Commission's (CPUC) Water-Energy calculator assumes that, indoors, 5.44 kilowatt hours (kWh) are saved per one thousand gallons (kgal) of water saved (CPUC, 2022).

Cold water savings also save energy because of avoided water conveyance, treatment, and distribution. Lower water-using landscapes generally reduce the energy use that otherwise would be needed to extract, treat, and deliver cold water. CPUC's Water-Energy calculator assumes that, outdoors, 3.28 kWh are saved per thousand gallons of water saved (CPUC, 2022). While responses to the proposed regulation are expected to differ from supplier to supplier and even within each supplier's service area, the proposed regulation promotes and should help increase outdoor water use efficiency. This can happen through the installation of more efficient irrigation systems or the transition to climate-ready landscapes, or both. Efficient irrigation systems apply water more slowly and deliberately. Applying water more slowly enables the soil to absorb more of it, and applying it more deliberately reduces the amount of water that is lost to runoff and evaporation. When enriched with mulch and compost and planted with deeply rooted shrubs and trees, landscapes are more effective than turf at retaining moisture. This can result in landscapes requiring less frequent supplemental irrigation. Furthermore, rainwater retained on site, whether in the soil or above-ground in rain barrels, can offset potable water use, saving both potable water and the energy embedded in delivering it to a household (Bloome et al., 2016).

In 2015, as part of California's emergency drought response, urban retail water suppliers were mandated to reduce water use by 25 percent, relative to 2013 levels (EO B-29-15, 2015). Spang et al. (2018) calculated that the resulting water savings of the conservation mandate period

(June 2015 through May 2016) corresponded to 1,830 GWh of electricity saved. This is 11 percent more savings than what the state's largest electricity providers realized over roughly the same period (605 GWh). Continued water savings are expected to continue to save energy. Looking forward and assuming a two percent annual decline in California's per-capita water demand, the Pacific Institute estimated that the associated electricity usage would decline by 19 percent between 2015 and 2035, or by 5,700 GWh; and that the associated natural gas usage would decline by 16 percent between 2015 and 2035, or by 25,000,000 MMBtu (Szinai et al., 2021). While individual responses are hard to predict, the proposed regulation is expected to reduce energy usage across the state. State Water Board staff estimate that, if, as a result of work undertaken by suppliers to meet their objectives, households were to replace inefficient clothes washers with more efficient models, embedded statewide energy savings would reach approximately 1,860 GWh of electricity and 36.5 million MMBtu of natural gas by 2040. This equates to $49 million in direct energy cost savings in 2025 and increased energy cost savings thereafter, reaching approximately $100 million in 2040.[5]

Sequestering carbon by supporting efforts to maintain and expand the urban tree canopy
Many cities throughout California have plans to expand their urban tree canopy. Communities can focus on expanding their tree canopies with the dual benefits of increased water conservation, reduce urban heat island effect, and carbon sequestration. Trees require less water than turf and can be irrigated much more efficiently. Researchers here in California have shown that turf can use four to ten times as much water as trees (Litvak, 2017). Trees also play a role in sequestering carbon. An acre of urban forest has a sequestration rate of 4.04 tons of carbon per year. California's urban areas have tree cover of roughly 11 percent or 736,290 acres, and therefore an annual sequestration rate of 3 MMT of CO_2e per year (The Climate Center, 2022). The proposed regulation incentivizes efforts to maintain and increase the urban tree canopy in California. It includes a provision for the planting of new, climate-ready trees and an alternative compliance pathway for suppliers that demonstrate their support of water-efficiency irrigation practices that keep trees healthy. By encouraging suppliers to invest in water conservation and tree care, the proposed regulation could save water and, by supporting efforts to maintain and expand the urban tree canopy, sequester carbon.

Accelerating Nature-based Solutions, Diverting Organic Waste from Landfills, and Building Healthy Soils

While not the primary goal of the proposed regulation, implementation of the framework is likely to result in suppliers making investments and programmatic changes that encourage individuals, businesses, and local governments to change how they use water. Such changes have the potential to support statewide policies to accelerate nature-based solutions, divert organic waste from landfills, and build healthy soils.

Accelerating nature-based solutions
Not only can replacing high water-using plants such as turf with low water-using plants such as native shrubs and other flowering plants save water, it can also support pollinator populations

[5] The potential interactions with California's Cap-and-Trade Program were not accounted for in the estimated energy cost savings.

(Davis et al., 2017). Research has found that while bee abundance and species richness increase with greater proportions of green space, that relationship disappears where the green space is dominated by turf grass (Tonietto et al., 2011). Well-manicured lawns are maintained in a manner that limits lawn flowers and other weeds that may flower, eliminates bare patches, and compacts soil (Fetridge et al., 2008; Tonietto et al., 2011). Lawns, as such, present fewer foraging resources and soil nesting opportunities for bees. Literature shows that planting lower water-using plants can achieve greater outdoor water use efficiency while also supporting biodiversity by providing habitat for pollinators, insects, and birds (Narango et al., 2018; Tallamy and Shriver, 2021). The proposed regulation will promote the efficient use of water outdoors, which will support the adoption of more efficient irrigation systems and the transition to climate-ready landscapes. It is expected that transitioning to such landscapes will likely increase the prevalence of native and pollinator-friendly plants. In this way, the proposed regulation presents an opportunity to accelerate nature-based solutions and support statewide actions to conserve biodiversity (Executive Order N-82-20, 2020).

Supporting statewide goals to divert organics from landfills

One way the proposed regulation may realize water savings is by facilitating the shift from conventional to climate-ready landscapes. The application of compost and mulch is critical to the creation and maintenance of climate-ready landscapes, for several reasons, including that it reduces the demand for outdoor irrigation in two primary ways. First, applying compost and mulch reduces the evaporation of soil moisture, helping to ensure water is used by the plants and not lost to the atmosphere. Second, applying compost and mulch increases soil-water holding capacity and soil permeability (Flint et al., 2018; Bennaton, 2015), helping to keep soils hydrated, whether with rainwater or with highly treated potable water delivered by a supplier. In other words, applying mulch and compost can extend the benefit of winter and spring rains, helping to keep soils hydrated longer and thereby reducing the need to irrigate with supplier-delivered water. According to one study, increasing soil organic matter 1 percent can increase soil available water holding capacity by 3.7 percent (Hudson, 1994).

Regarding statewide goals to reduce-short lived climate pollutants, a benefit of applying mulch and compost is that it would support the production of soil amendments made from recovered organic material. The Short-lived Climate Pollutants: Organic Waste Reductions regulation (CalRecycle, 2020) and the Short-Lived Climate Pollutants (SLCP) Strategy (CARB, 2017) require California to reduce organic waste disposal 75 percent below 2014 levels by 2025. Organic waste in landfills emits 20 percent of the state’s methane, along with other air pollutants such as NO_x, particulate matter (PM) 10, and PM 2.5 (CalRecycle, 2019). As part of SB 1383 implementation, cities and counties across California are required to procure recovered organic waste products, such as compost and mulch, to meet an annual procurement target. By facilitating the shift from conventional to climate-ready landscapes, the proposed regulation can support the recovery of organic products such as compost and mulch and thereby support the implementation of SB 1383 and the SLCP Strategy.

Building healthier soils

Compost and mulch application can lead to outdoor water savings by reducing evaporation and increasing soil water retention; it can also improve soil health and soil’s ability to sequester carbon. Silver at al. (2018) found that the addition of 0.25 inch of compost to a set of rangelands across California resulted in a net increase in soil carbon storage of 2.1 Mg C per hectare relative to untreated rangeland soils over a growing season. Because the proposed regulation incentivizes suppliers to help customers transition from conventional to climate-ready landscapes, a defining feature of which is soils enriched by mulch and compost, the proposed regulation would also complement the on-going statewide initiative to build healthier soils, supporting efforts that save water and sequester carbon.

Advancing Equity

Governor Newsom's California's Water Supply Strategy calls on state agencies to respond to the hydrological challenges posed by climate change in a way that advances equity and supports disadvantaged communities (Water Supply Strategy, 2022). The proposed regulation presents suppliers with an opportunity to make investments that not only save water but also advance equity. Specifically, it may, in the long run, mitigate some future water service cost increases and encourage suppliers to reevaluate rate structures expand low-income rate assistance programs, and invest in programs and partnerships that reduce urban heat.

Mitigating possible rate increases

Water efficiency is often the cheapest source of new water supplies. A study looking at costs of alternative water supplies in California showed that water conservation and efficiency efforts—except for the most expensive programs—are less costly than traditional or alternative sources of water supply; they are therefore some of the more cost-efficient strategies to meet current and future water demands in the state (Cooley and Phurisamban, 2016). The proposed regulation is expected to help mitigate rate increases and keep water affordable by incentivizing urban retail water suppliers to invest in conservation programs. Examples of prior successes:

- In Los Angeles, water conservation efforts over the past several decades saved Los Angeles Department of Water and Power around 11 billion dollars that would have otherwise been required to develop alternative water supply options to meet the needs of its growing service area. These savings translated to a 26.7 percent reduction in customer water bills (Chesnutt et al., 2018).
- In Gilbert, Arizona, conservation programming resulted in established customers paying 5.8 percent less and new customers paying 45 percent less than they would have if Gilbert had instead invested in finding, delivering, and treating a new source of water to meet the needs of a growing population (Mayer, 2017a).
- In Tucson, Arizona, decreases in per capita water use and lower demand translated to water and wastewater bills being 11.7 percent lower than they otherwise would have been (Mayer, 2017b).
- In Westminster, Colorado, per capita water use declined by 21 percent between 1980 and 2010 due to utility sponsored water conservation programs, inclining block and seasonal rate water billing structures, and national plumbing codes, saving 7,925 acre-feet (AF) of water, thereby allowing Westminster to avoid investing $218,850,000 that would have otherwise been required to meet customer demand (Feinglas et al., 2013).

Encouraging suppliers to reevaluate rate structures

By requiring reductions in water use, the proposed regulation encourages affected suppliers to assess how they can further incentivize efficient use while meeting revenue stability and other objectives. One way to do so may be through rate design. An analysis of rate data in California suggests that many suppliers could do more to incentivize efficient water use: State Water Board staff conducted an analysis of 2020 rate data for 312 urban retail water suppliers across

California and found 95 percent of the suppliers analyzed charge less on a per HCF basis as customers consume more water, appearing to provide a bulk discount (State Water Board Public Meeting, April 5, 2022).[6]

Poorly designed water rate structures can negatively impact lower-income households in several ways. First, rate structures that charge customers less as they consume more can fail to disincentivize the inefficient use of the highest water-using customers, particularly their peak summer use; this can lead suppliers to make costly investments to meet that demand. Studies have shown that when agencies must increase supply to meet the demands of the highest water-using customers, who tend to be wealthier customers, rates rise for everyone and low-income households are disproportionately impacted (Mini et al., 2014a and 2014b). Second, water and sewer bills can represent a larger fraction of a lower-income household's annual earnings. According to a recent study, households in Long Beach with a median household income between $25,000 and $34,900 a year spend 2.75 percent of their annual income on their water and sewer bill, compared to less than 0.5 percent spent for those with a household income of $150,000 or more (Burke et al., 2022). Lower-income customers tend to use less water, pay a larger proportion of their income, and pay an equal, but inequitable, share when fixed charges rise to cover the costs associated with developing new supplies.

Rate structure changes (such as those designed so that higher water-using customers pay more per unit) are proven ways, under many circumstances, to save water (Harmon et al., 2021) and increase household welfare (Baerenklau and Pérez-Urdiales, 2019). One such change would be to implement water-budget rates. For example, according to the American Water Works Association (AWWA), "utilities using water-budget rates have reported demand reductions from 10 to 25 percent across customer classes" (AWWA, 2012).[7] The proposed regulation encourages suppliers to establish such rate structures. Specifically, the proposed regulation includes an alternative pathway for suppliers that verify compliance with the AWWA's G-480 Water Conservation Standard, a component of which is the use of a "nonpromotional water rate that provides the financial incentive for customers to reduce water use" (AWWA, 2021). By encouraging suppliers to develop and implement rate structures that disincentivize waste and inefficient use, the proposed regulation could help reduce the water use of higher water-using customers while also keeping water more affordable for lower water-using customers.

[6] Staff analysis found the statewide median cost of a total bill (i.e., including fixed and variable charges) for 6 hundred cubic feet (HCF) of water was $39; for 24 HCF, it was $82.80. This means the average cost per unit at 6 HCF ($6.50 per HCF) is almost double the average cost at 24 HCF ($3.45 per HCF). The data were reported to the State Water Board by suppliers through the electronic Annual Report and included information on fixed and variable charges at varying levels of consumption: 6, 9, 12, and 24 hundred cubic feet (HCF). This was not a full analysis of all the factors that go into rate-making and does not mean that rates do not reflect suppliers balancing goals such as "getting necessary revenue in a stable and predictable manner; Minimizing unexpected changes to customer bills; Discouraging wasteful use and promoting efficient uses; Promoting fairness and equity (i.e., cost-based); Avoiding discrimination; Maintaining simplicity, certainty, convenience, feasibility, and freedom from controversy; and Complying with all applicable laws" (AWWA, 2012).

[7] It should be noted that similar savings have also been reported by utilities using other rate designs, (e.g., increasing block and seasonal rates).

Allowing suppliers to undertake broad or targeted measures

The proposed regulation allows suppliers to design conservation programs or to change rates in ways that make sense locally. Suppliers could, for example, focus on reducing the water use of customers with the highest levels of water use. Studies have found that the highest water uses can represent a significant majority of a supplier's water use. In Las Vegas, Nevada, for example, the top 10 percent of residential customers consume 40 percent of residential water deliveries (Stern, 2023). Similarly, in Cape Town, South Africa, wealthier residents, representing 14 percent of the population, consume over 51 percent of residential water deliveries (Savelli et al., 2023). Beyond saving water, focusing on reducing the water use of customers with the highest levels of water use could enhance equity because when agencies have had to increase supply to meet the demands of the highest water-using customers, who tend to be wealthier customers, they often have raised rates for everyone and disproportionately impacted low-income households (Mini et al., 2014a and 2014b).

Suppliers could also focus on increasing water use efficiency for customers with low levels of water use. This may make sense because incorporating water conservation and efficiency into assistance programs for customers with low incomes has been shown to enhance the effect of those assistance programs, providing greater relief to customers who are struggling financially (EPA WaterSense, 2021a). Suppliers can support lower-income households by finding and fixing leaks, directly installing efficient fixtures and appliances, or offering point-of-sale coupons to residents who are unable to cover upfront costs of replacements. Examples of conservation lowering water bills for lower-income customers:

- In Long Beach, focusing on efficiency reduced the average cost of water and sewer services by 13 percent (Burke et al., 2022). Long Beach residents who were low-income and participated in their local assistance program had water and sewer bills that were 44.11 percent lower than the citywide average; this was due to both reduced rates and the lower-than-average water use among customers in the program (Burke et al., 2022)
- In Detroit, Michigan, replacing inefficient toilets resulted in low-income homes seeing 7 to 16 percent savings on their water bills, representing an estimated 1,177 million gallons of water per year (Dickinson et al., 2020).
- In Houston, Texas, researchers found water bills to be four percent of a low-income family's total income; this is expected to increase to almost seven percent by 2025. Even though low-income homes use less water than others in Houston, many do not qualify for the city's conservation threshold credit because they use more than 3,000 gallons per month. Researchers found that water conservation and efficiency measures can lower on-going water use and bills, improving affordability for customers; these measures were estimated to achieve an average of 15 percent bills savings, with some measures (i.e., indoor retrofits) reducing the average bill by as much as 34 percent (Hans et al., 2023).

Expanding tree canopy and green spaces in disadvantaged communities

By incentivizing efforts to expand the urban tree canopy in California, the proposed regulation could help communities that are most at risk from climate change. Tree canopy has been found to be denser in communities with higher median household income across the United States (Schwarz et al, 2015). Studies have also found less tree canopy in disadvantaged communities in California cities (Schwarz et al., 2015; Landry & Chakraborty, 2009). Increasing urban tree canopy can help mitigate higher mean temperatures, reducing the heat island effect in historically underserved communities in California. To comply with the proposed regulation, suppliers will design and implement their own conservation strategies, which may or may not include programs aimed at helping disadvantaged communities within their service area transition away from turf-dominant landscapes and to landscapes that prioritize water for existing trees and new climate-ready trees. However, the proposed regulation incentivizes efforts to maintain and increase the urban tree canopy in California. It includes, for example, a provision for the planting of new, climate-ready trees and an alternative compliance pathway. If utilized these options would require suppliers to prioritize funding for low-income households and communities. Furthermore, because the proposed regulation allocates outdoor water budgets based on irrigable irrigated (II) landscape area, a supplier's overall objective would increase as II area measurably increases. If a neighborhood group were to help transform an expanse of desiccated lawns and paved yards into climate-ready gardens, for example, the II area for the supplier serving that area would increase and correspondingly so would its objective. Increasing the urban tree canopy and green spaces in California would help frontline communities adapt to climate change impacts such as increasing urban heat and changing precipitation patterns. By requiring greater water use efficiency in urban areas, by incentivizing suppliers to specifically support low-income customers and communities transition to climate-ready landscapes, and by establishing a framework that accommodates new and additional II area, the proposed regulation could support efforts to expand the tree canopy and green spaces in disadvantaged communities.

Alternatives Information

The State Water Board considered two alternatives to the proposed regulation, based on stakeholder comments and internal staff discussions. The two alternatives are evaluated for costs and benefits, economic impacts, and cost effectiveness, relative to the proposed regulation. The two alternatives reflect different parameters. These parameters include the proposed outdoor standards Landscape Efficiency Factors, known as LEFs, as well as the irrigation status of the landscapes that the proposed standards would be applied to.

Under the proposed regulation, the standard would apply to Irrigable Irrigated area and, through 2027, up to 20 percent of the area categorized by Department as INI, for those suppliers that would otherwise struggle to meet their urban water use objective. In evaluating the impacts of the proposed regulation, as well as the two alternatives, staff assumed no changes to the indoor residential standard. Under all three scenarios, it was assumed that suppliers would claim the recycled water bonus they would be eligible for. Data from Annual Volumetric Reports (AVR), Electronic Annual Report (eAR), and Urban Water Management Plans (UWMPs) were used to estimate supplier-specific potable recycled water production.

For the performance measures associated with the outdoor landscapes of CII properties, State Water Board staff evaluated the number of affected properties in the suppliers' service areas. The proposed regulation would require suppliers to install a dedicated irrigation meter or implement "in-lieu" technologies on CII landscapes estimated to consume 500,000 or more gallons per year.

Alternative 1

The first alternative closely reflects the recommendations that were provided to the State Water Board by the Department in Fall 2022. Under the first alternative, the outdoor residential water use standard would be a LEF of 0.80 until 2030, when it would decline to and remain a LEF of 0.63. Under the second alternative, the standard for CII landscapes with DIMs would be a LEF of 0.80 until 2030, when it would decline to and remain a LEF of 0.63. Under the first alternative, the standard would apply to Irrigable Irrigated area and up to 20 percent of the area categorized by the Department as INI.

Under the first alternative, suppliers would have to install a dedicated irrigation meter or implement "in-lieu" technologies on CII landscapes estimated to consume 1,000,000 or more gallons per year.

Cost and Benefits

Alternative 1, which is less stringent than the proposed regulation, would save approximately 4.1 million acre-feet of water in the entire 2025-2040 period, about 65 percent of the water saved under the proposed regulation. Benefits during that period are estimated to outweigh costs, with present discounted values of $10.5 billion and $9.9 billion, respectively. The estimated cost-effectiveness of Alternative 1 is approximately $2,406/ac-ft.

Economic Impacts

Economy-wide impacts for each of the alternatives were also estimated, and, like the economy-wide impacts for the proposed regulation, are negligible compared to California's economy.

Reason for Rejection

Although Alternative 1 would be less costly than the proposed regulation, it would yield fewer benefits and is not as cost effective. Furthermore, it insufficiently meets the statutory directive that the long-term standards and urban water use objectives advance the state's goals to mitigate and adapt to climate change.

Alternative 2

Under the second alternative, the outdoor residential water use standard would be a LEF of 80 percent until 2030, when it would decline to and remain a LEF of 0.55. Under the second alternative, the standard for CII landscapes with DIMs would be a LEF of 0.80 until 2030, when it would decline to and remain a LEF of 0.45. Under the second alternative, the standard would apply to Irrigable Irrigated area and up to 20 percent of the area categorized by the Department as INI provided a supplier could demonstrate that previously unirrigated areas have come under irrigation.

Under the second alternative, suppliers would have to install a dedicated irrigation meter or implement "in-lieu" technologies on CII landscapes estimated to consume 250,000 or more gallons per year (the threshold under the proposed regulation). Far more landscapes would be affected.

Cost and Benefits

Alternative 2, which is more stringent than the proposed regulation, would save approximately 7.1 million acre-feet of water in the entire 2025-2040 period, about 113 percent of the water saved under the proposed regulation. Benefits during that period are estimated to outweigh costs, with present discounted values of $18.4 billion and $14.9 billion, respectively. The estimated cost-effectiveness of Alternative 2 is approximately $2,075/ac-ft.

Economic Impacts

Economy-wide impacts for each of the alternatives were also estimated, and, like the economy-wide impacts for the proposed regulation, are negligible compared to California's economy.

Reason for Rejection

Although Alternative 2 would yield greater benefits and is more cost-effective (2.5 percent more cost-effective), it is significantly more expensive in absolute terms (10.5 percent more expensive). Even though the long-run benefits are relatively higher than the proposed regulation (about 113 percent of the water saved under the proposed regulation), the higher initial costs would impose a larger burden, both in terms of upfront costs and 2025-2040 average annual costs, on the suppliers.

Mandates for the Specific Use of Technologies or Equipment

The regulation does not mandate the use of any specific technologies and equipment.

Efforts to Avoid Duplication or Conflict with the Code of Federal Regulations

The State Water Board has determined that there are no conflicts with the Code of Federal Regulations, as there are no similar, equivalent or overlapping Federal regulations. Thus, the proposed regulation will not duplicate any parts of the Code of Federal Regulations.

Overview of Standardized Regulatory Impact Assessment (SRIA)

A Standardized Regulatory Impact Analysis (SRIA) was developed for the proposed regulation and submitted to the Department of Finance (DOF) on March 13, 2023. DOF provided comments to the State Water Board on April 12, 2023. The SRIA was updated in response to DOF's comments and included in Appendix A of this document. This section summarizes the main economic impacts of the proposed regulation as presented in the updated SRIA.

The State Water Board estimated that the proposed regulation would save approximately 235,000 acre-feet of water in 2025 (compared to the assumed 2025 baseline water use) and increased amounts in subsequent years, reaching almost 440,000 acre-feet of water saved in 2040 (compared to the assumed 2040 baseline water use). The total cumulative amount of water savings in the 2025-2040 period would be approximately 6.3 million acre-feet. Most of the estimated water savings (approximately 80 percent) would come from the assumed residential water use efficiency measures, and the remainder (approximately 20 percent) from CII performance measures.

In the 2025-2040 period, quantified benefits of the proposed regulation are estimated to exceed the quantified costs. The State Water Board estimates present discounted values of $16.0 billion for the quantified benefits and $13.5 billion for the quantified costs.

Suppliers would incur aggregate costs of almost $9.9 billion and accrue benefits of approximately $10.6 billion from 2025 to 2040. Local wastewater management agencies would incur costs of $2.5 billion; benefits for these agencies could not be quantified. Residential customers would incur costs of $1.0 billion and accrue benefits of almost $5.5 billion. Urban forestry and landscape management agencies would incur costs of approximately $100 million; benefits for these agencies could not be quantified.

Most of the estimated benefits originate from reduced water purchases or reduced water production (compared to the assumed future baseline) by the affected suppliers. The estimated benefits also originate from reduced water use (compared to the assumed future baseline) by residential customers (reduced water use by CII customers, although also a benefit, could not be quantified). A smaller fraction of the estimated benefits originates from savings associated with smaller residential energy bills and from suppliers having to do less stormwater-related work. Some potentially important benefits are assumed but their economic impact cannot be quantified with sufficient detail.

Most of the estimated costs originate from the implementation of residential water use efficiency measures, approximately $5.8 billion from 2025 to 2040 or 43 percent of total estimated costs, and revenues that would be lost by suppliers (and, to a lesser extent, no wastewater management agencies), approximately $4.7 billion or 35 percent. The estimated cost of wastewater infrastructure improvements and other related infrastructure projects during that period is approximately $1.6 billion or 12 percent of total estimated costs.

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