

**Recommendations for Variance for Significant Use of Water
During Major Emergencies, Methods of Calculation, and
Supporting Data Requirements**

WUES-DWR-2021-12

**A Report to the State Water Resources Control Board
Prepared Pursuant to California Water Code
Section 10609.14**

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California Department of Water Resources
Water Use Efficiency Branch

Note: This report is part of the package of reports developed by the California Department of Water Resources to meet the requirements of Senate Bill 606 and Assembly Bill 1668 of 2018 for urban water use efficiency.

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Abbreviations and Acronyms

2018 Legislation	2018 Legislation on Water Conservation and Drought Planning (Senate Bill 606 [Hertzberg] and Assembly Bill 1668 [Friedman], as amended)
CAL FIRE	California Department of Forestry and Fire Protection
CII	commercial, industrial, and institutional
CII-DIM	commercial, industrial, and institutional dedicated irrigation meter
CII-DIMWUS	Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard
DIM	dedicated irrigation meter
DWR	California Department of Water Resources
FRA	Federal Responsibility Area
GC	California Government Code
GIS	geographic information system
IRWUS	Indoor Residential Water Use Efficiency Standard
LRA	Local Responsibility Area
N/A	not applicable
ORWUS	Outdoor Residential Water Use Efficiency Standard
Recommendation Package	Urban Water Use Efficiency Recommendation Package
SB	Senate Bill
SRA	State Responsibility Area
State	State of California
State Water Board	State Water Resources Control Board
UWUO	urban water use objective
UWUO_SB	urban water use objective without any variances
WC	California Water Code
WLS	Water Loss Standard

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Executive Summary

The California State Legislature passed the 2018 Legislation on Water Conservation and Drought Planning (Senate Bill 606 [Hertzberg] and Assembly Bill 1668 [Friedman], as amended; hereinafter referred to as the “2018 Legislation”), which included provisions for advancing urban water use efficiency through developing and implementing various water use efficiency standards, variances, and performance measures. This report provides the purpose and details of review and development, and the recommendations for a variance for “significant use of water to irrigate vegetation for fire protection,” consistent with the directives under California Water Code (WC) Section 10609.14.

WC Section 10609.14 directs the California Department of Water Resources (DWR), in coordination with the State Water Resources Control Board (State Water Board), to conduct necessary studies to recommend appropriate variances for unique uses of water that could have a material effect on an urban retail water supplier’s urban water use objective (UWUO). A variance for “significant use of water to irrigate vegetation for fire protection” is one of the eight potential variances identified in the legislation. For each variance, the recommendations include a threshold of significance and guidelines and methodologies for calculating efficient water use allowable under the variance.

DWR conducted topic-specific research and investigations to answer three critical questions prior to developing recommendations for a variance for significant use of water to irrigate vegetation for fire protection:

1. Is this water use outside of the scope of the UWUO? In other words, is this water for non-urban use or part of the commercial, industrial, and institutional water uses other than irrigating landscape with dedicated irrigation meters? If so, the water use is either not subject to the provisions of urban water use efficiency in the 2018 Legislation or excluded from the UWUO and, thus, there is no need for a variance.
2. Is this water use unique within the context of the UWUO? If no, it is not eligible. If yes, the water use is potentially eligible for a variance, and the following two questions need to be answered “yes” to be determined eligible:
 - a. Is this water use shared by only some urban retail water suppliers or needed in unusual circumstances, but not commonly used enough to be included in one of the standards?
 - b. Is this water use excluded from all urban water use efficiency standards and other variances?

3. Could this unique water use have a material effect on the UWUO of some urban retail water suppliers? If so, the water use is warranted for variance development.

After confirming the above in collaboration with stakeholders and the State Water Board, DWR proceeded with variance development with a clarified scope, whereby significant use of water to irrigate vegetation for fire protection can be appropriately estimated and incorporated in an urban retail water supplier's UWUO.

Consistent with the legislative directive, DWR used a public process involving a diverse group of stakeholders in the review and development of the variance for significant use of water to irrigate vegetation for fire protection. The Water Use Studies Working Group and the Standards, Methods, and Performance Measures Working Group that DWR established to assist in implementing the 2018 Legislation were the primary stakeholders involved in the variance development process. Additional stakeholders included State of California agencies, cities, counties, urban retail water suppliers, environmental organizations, and other interested parties. Working group members and stakeholders were provided with many opportunities to comment on and inform the appropriateness of recommending a variance for significant use of water to irrigate vegetation for fire protection. Additionally, they were able to comment on, and inform the development and refinements for, the applicable scope, specifications, and methodologies for estimating the efficient water use volume for such a purpose. The resource requirements for administering the variance and associated supporting data requirements, accessibility, and quality were considered in the evaluation.

Through investigation of available data and stakeholder input, DWR concluded that "significant use of water to irrigate vegetation for fire protection" would cover only the unique use of water during fire events and would overlook other major emergencies, such as earthquakes. DWR also concluded that vegetative pre-fire protection would be better managed through clearing space around structures and that irrigating to maintain plant health to reduce dry fuel is not different than normal landscape irrigation. As such, to cover all potential unique uses of water during qualified major emergencies, the variance was refined to "significant use of water during major emergencies."

Furthermore, DWR concluded that establishing a variance to accommodate efficient water use for "significant use of water during major emergencies" is appropriate, as that water use is unique, excluded from other standards and variances, and can have a material effect on an urban retail water supplier's UWUO. In this recommended variance, DWR recognized the need to extend time for urban retail water suppliers to reconcile their water use or water loss record in their final reporting. Implementation considerations, including the need for technical assistance, are also included with the recommendations.

The recommendations for a variance for use of water during major emergencies is part of the *Recommendations for Urban Water Use Efficiency Standards, Variances,*

Performance Measures, and Annual Water Use Reporting (WUES-DWR-2021-01A).

The recommendations were prepared per the requirements of the 2018 Legislation and are to be transmitted to the State Water Board for adoption.

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1.0 Introduction

Senate Bill (SB) 606 (Hertzberg) and Assembly Bill 1668 (Friedman) of 2018, as amended (hereinafter referred to as the “2018 Legislation”), established a new foundation for long-term improvements in water conservation and drought planning to adapt to climate change and the resulting longer and more intense droughts in the State of California (State). These two bills provide expanded and new authorities and requirements to enable permanent changes and actions for those purposes, thereby improving the State’s water future for generations to come. Details of these provisions are summarized in *Making Water Conservation a California Way of Life: Primer of 2018 Legislation on Water Conservation and Drought Planning, Senate Bill 606 (Hertzberg) and Assembly Bill 1668 (Friedman)* (DWR and State Water Board, 2018).

1.1 New Approach to Urban Water Use Efficiency

Among other things, the 2018 Legislation contains provisions for advancing urban water use efficiency through developing and implementing various water use efficiency standards, variances, and performance measures per California Water Code (WC) Section 10609. The new water conservation framework is different than SB X7-7, which was established in 2009. The focus of SB X7-7 was to reduce statewide urban water use by 20 percent in 2020 compared to baseline calculated in 2010. The 2018 Legislation requires a bottom-up estimate from urban retail water suppliers of the urban water use objective (UWUO) based on the aggregated efficient water use volume by considering four urban water use efficiency standards and appropriate variances. The four standards are:

- Indoor Residential Water Use Efficiency Standard (IRWUS).
- Outdoor Residential Water Use Efficiency Standard (ORWUS).
- Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard (CII-DIMWUS).
- Water Loss Standard (WLS).

Commercial, industrial, and institutional (CII) water use not associated with dedicated irrigation meters (DIM) (or equivalent technologies) for outdoor irrigation of landscape areas is excluded from the UWUO.

Each of the procedural requirements to formalize these four standards for implementation is different. The 2018 Legislation includes a default progressively reduced IRWUS (WC Section 10609.4(a)). In November 2021, in collaboration with the

State Water Resources Control Board (State Water Board), the California Department of Water Resources (DWR) submitted the joint recommendations for IRWUS to the California State Legislature for further consideration per WC Section 10609.4(b). Separately, the State Water Board is currently conducting a rulemaking process to adopt the proposed WLS, which was originally authorized by SB 555 of 2015. For ORWUS and CII-DIMWUS, the 2018 Legislation requires DWR, in coordination with the State Water Board, to conduct necessary studies and investigations and develop recommendations to the State Water Board by October 1, 2021 (WC Sections 10609.6 and 10609.8).

Another major difference between the SB X7-7 requirements and those of the 2018 Legislation is that the anticipated outcome was measured on a statewide level per SB X7-7 and on an individual urban retail water supplier level per the 2018 Legislation. Recognizing the diversity of water use to support local economic, social, and environmental needs and varying climate conditions in the State, the 2018 Legislation requires DWR, in coordination with the State Water Board, to conduct necessary studies and investigations. It also requires DWR to develop recommendations for adoption by the State Water Board by October 1, 2021, for appropriate variances for unique uses that can have a material effect on an urban retail water supplier's UWUO and the corresponding thresholds of significance (WC Section 10609.14). In this context, DWR interpreted that a material effect means that this unique water use, although used in an efficient manner, could unfairly jeopardize an urban retail water supplier's ability to meet the UWUO when not explicitly addressed and calculated separately from the volume based on the four water use efficiency standards.

As a supporting recommendation, the 2018 Legislation requires DWR to develop accompanying guidelines and methodologies for calculating the UWUO (WC Section 10609.16) and provide the recommendation to the State Water Board for adoption, along with DWR's recommendations on ORWUS, CII-DIMWUS, and appropriate variances by June 30, 2022 (WC Section 10609.2). The 2018 Legislation further requires DWR and the State Water Board to solicit broad public participation throughout the development and adoption processes (WC Section 10609(b)(3)).

1.2 Appropriate Variances

Per the 2018 Legislation, appropriate variances **may include, but are not limited to**, the following eight identified in WC Section 10609.14(b):

1. Significant use of evaporative coolers.
2. Significant populations of horses and other livestock.
3. Significant fluctuations in seasonal populations.

4. Significant landscaped areas irrigated with recycled water having high levels of total dissolved solids.
5. Significant use of water for soil compaction and dust control.
6. Significant use of water to supplement ponds and lakes to sustain wildlife.
7. Significant use of water to irrigate vegetation for fire protection.
8. Significant use of water for commercial or noncommercial agricultural use.

The eight identified potential variances were subject to further review to affirm the unique use and the likelihood of a material effect on an urban retail water supplier's UWUO before DWR engaged in additional efforts in variance development. Through stakeholder engagement, additional potential variances could also be identified. Additional potential variances may emerge in the future due to changes in water use to meet economic, social, and environmental needs.

When a recommended variance is adopted by the State Water Board, the variance becomes available to urban retail water suppliers. However, before a variance can be included in an urban retail water supplier's UWUO, the urban retail water supplier is required to request, with supporting data, and receive approval from the State Water Board (WC Section 10609.14(d)). This procedural requirement is urban retail water supplier-specific and variance-specific. The State Water Board is required to post on its website a list of approved variances, the specific variances approved for each urban retail water supplier, and the data requirement supporting the approval of each variance for individual urban retail water suppliers (WC Section 10609.14(e)).

Changing Focus of the Variance Development

Based on research and stakeholder input, DWR recognized that development of a variance only for irrigation of vegetation for fire protection does not cover other unique uses that could occur during other major emergencies, such as earthquakes. Additionally, successful management strategies for fire protection purposes include a set of activities that do not require using more water than included under the recommended outdoor standards, as explained further in Section 2.2. Therefore, DWR renamed the variance to "significant use of water during major emergencies" and expanded the scope to encompass all potential unique uses of water during qualified major emergencies with the potential for a material effect on an urban retail water supplier's UWUO.

1.3 Purpose of the Report

Per legislative requirements, DWR conducted studies and investigations to determine if the legislatively identified potential variances and others suggested by stakeholders

should be developed and recommended for adoption. This report is one of the variance-specific reports that focuses on the potential variance for significant use of water during major emergencies identified in the legislation as “significant use of water to irrigate vegetation for fire protection.”

Water Use During Major Emergencies

Emergencies occur infrequently, yet may result in adverse impacts on communities and infrastructure systems. The State faces a continued and growing threat of extreme wildfires, major earthquakes, and potentially all other types of emergencies. In some years, conditions are such that the events can suddenly become acute risks. As such, water use behavior during emergencies can be very different from normal conditions. For example, additional water may be needed during wildfires to protect properties at risk, especially in the wildland-urban interface; earthquakes may result in substantial water losses across a water system. Depending on the extent of the events and their cascading impacts, thousands of gallons of water may be either lost or used specifically to manage the crisis. Therefore, a properly defined scope for this water use is critically important for the assessment of efficient water use in this variance.

Relationship to California Department of Water Resources’ Urban Water Use Efficiency Recommendation Package

DWR has completed a significant body of work to meet the requirements of the 2018 Legislation and provide recommendations on different topics to the State Water Board for adoption. To streamline document development and recognize the inherent interrelationship among different topics and the need for overall consistency, DWR organized the various reports in an Urban Water Use Efficiency Recommendation Package (Recommendation Package) that allows mutual referencing and incorporates content by reference. All reports in this Recommendation Package are given a serial number in the form of “WUES-DWR-2021-xx.” For each report, Appendix A includes the list of documents within the Recommendation Package that are incorporated by reference.

Specifically, this report, *Recommendations for Variance for Significant Use of Water During Major Emergencies, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-12), provides the detailed documentation for the review and subsequent variance development for specifications, guidelines, and methodologies for the potential variance for significant use of water during major emergencies. The recommendations for this variance were summarized in the report, *Summary of Recommendations for Variances* (WUES-DWR-2021-04), and the corresponding guidelines and methodologies for calculating efficient water use for this variance were summarized in *Recommendations for Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B). The additional context, variance development process and approach, evaluation of options, and stakeholder input included in this document are incorporated by reference. Key terms and their definitions

used in this report, along with abbreviations and acronyms, are included in *Urban Water Use Efficiency Recommendation Package: Glossary and Abbreviations and Acronyms* (WUES-DWR-2021-21).

Effects on Existing Law and Regulations

DWR developed this variance per legislative directive. The resulting variance, when adopted, does not set, rescind, or modify existing or future requirements for use of water during major emergencies.

1.4 Report Organization

This report is organized into six sections:

- **Section 1 – Introduction** provides the background and purpose of this document.
- **Section 2 – Scope Definition** provides the process and rationales used in confirming the scope for this potential variance that reflects unique water use with potential material effects on an urban retail water supplier's UWUO.
- **Section 3 – Approach to Variance Design** describes the technical approach and stakeholder engagement that DWR conducted to support the variance development. Options for different coverages and methods for calculating efficient water use for this variance are discussed and evaluated for technical feasibility, reasonableness, and ability to be implemented.
- **Section 4 – Recommendations** provides DWR's recommendations on this variance, including the specifications, guidelines, and methodologies for calculating efficient water use for this variance and the supporting data and information requirements.
- **Section 5 – Glossary** provides a list of key terms and their definitions used in this document.
- **Section 6 – References** provides a list of references used in this document.

This report includes one appendix:

- **Appendix A** provides the list of documents in DWR's Recommendation Package that are incorporated by reference.

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2.0 Scope Definition

In accordance with the legislative directive, DWR conducted studies and investigations to develop the information necessary to determine if a variance for significant use of water during major emergencies was needed and, if so, to support any recommendation made to the State Water Board on the guidelines and methodologies pertaining to the calculation of an urban retail water supplier's UWUO.

The goals of these studies and investigations were to achieve the following:

- Confirm whether significant use of water during major emergencies is a unique use that could have a material effect on the UWUO of urban retail water suppliers.
- Inform the recommendations for variance specifications, including the threshold of significance.
- Provide the basis for developing guidelines and methodologies for urban retail water suppliers to use in calculating the aggregated efficient water use allowable under this variance.

The first study goal provided a clarified scope for variance development, which was to be accomplished by addressing the remaining two study goals. The process and findings for scope definition are provided in Section 2. Section 3 contains additional variance development and option evaluation to inform the recommendations in Section 4.

2.1 Interpretation of Major Emergencies Nexus

There is a high potential for additional water needs during emergencies in urban communities, as previously mentioned in Section 1. The legislative directive emphasizes the use of water for fire protection. However, fire is only one type of major emergency during which significant amounts of water could be used. Therefore, it is important to address all such emergency water use for defining qualifying conditions for this variance.

Water during emergencies may be used or lost before, during, and after a major emergency. California Government Code (GC) Section 8558 establishes three conditions or degrees of emergency:

- (a) *“State of war emergency” means the condition that exists immediately, with or without a proclamation thereof by the Governor, whenever this state or nation is attacked by an enemy of the United States, or upon*

receipt by the state of a warning from the federal government indicating that such an enemy attack is probable or imminent.

(b) *“State of emergency” means the duly proclaimed existence of conditions of disaster or of extreme peril to the safety of persons and property within the state caused by conditions such as air pollution, fire, flood, storm, epidemic, riot, drought, cyberterrorism, sudden and severe energy shortage, plant or animal infestation or disease, the Governor’s warning of an earthquake or volcanic prediction, or an earthquake, or other conditions, other than conditions resulting from a labor controversy or conditions causing a “state of war emergency,” which, by reason of their magnitude, are or are likely to be beyond the control of the services, personnel, equipment, and facilities of any single county, city and county, or city and require the combined forces of a mutual aid region or regions to combat, or with respect to regulated energy utilities, a sudden and severe energy shortage requires extraordinary measures beyond the authority vested in the California Public Utilities Commission.*

(c) *“Local emergency” means the duly proclaimed existence of conditions of disaster or of extreme peril to the safety of persons and property within the territorial limits of a county, city and county, or city, caused by conditions such as air pollution, fire, flood, storm, epidemic, riot, drought, cyberterrorism, sudden and severe energy shortage, plant or animal infestation or disease, the Governor’s warning of an earthquake or volcanic prediction, or an earthquake, or other conditions, other than conditions resulting from a labor controversy, which are or are likely to be beyond the control of the services, personnel, equipment, and facilities of that political subdivision and require the combined forces of other political subdivisions to combat, or with respect to regulated energy utilities, a sudden and severe energy shortage requires extraordinary measures beyond the authority vested in the California Public Utilities Commission.*

In addition, the 2018 Legislation authorizes local water agencies to declare a “water shortage emergency” when needed (WC Section 350):

The governing body of a distributor of a public water supply, whether publicly or privately owned and including a mutual water company, shall declare a water shortage emergency condition to prevail within the area served by such distributor whenever it finds and determines that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the distributor to the extent that there would be insufficient water for human consumption, sanitation, and fire protection.

As described above, there are different events that could be considered “major emergencies.” Some of these events may have a direct connection to water use or water loss within the urban retail water suppliers’ service areas. These water uses and losses cannot be characterized as they would be during normal conditions and, hence, are not included in the current water use efficiency standards or other variances that were developed for normal conditions. Therefore, there is a need to identify and cover these scenarios under a variance to address water use or water loss during major emergencies.

Given the above definitions, and for the purposes of this report and variance consideration, a “qualified major emergency” is based on the conditions or degrees of emergency, defined in GC Section 8558(b), that have a direct connection to water use or water loss, or is declared by local water agencies as a “water shortage emergency” per WC Section 350.

2.2 Process for Scope Refinement

In the context of the 2018 Legislation, the four water use efficiency standards cover types of water use commonly shared by most, if not all, urban retail water suppliers. The variances are effectively the less common uses that may be important for only some urban retail water suppliers due to geographic location, local climate, and other local conditions. In concept, the scopes of standards and those of variances are mutually exclusive. However, local water use, facility connections, and account management can be complex due to years of development and implementation of practices without the structure suggested in the 2018 Legislation. Therefore, DWR needed to examine different scenarios associated with water use during major emergencies against three questions in sequence prior to developing variance recommendations:

1. Is this water use out of the scope of the UWUO? In other words, is this water for non-urban use or part of the CII water uses other than irrigating landscape with DIMs? If so, the water use is either not subject to the provisions of urban water use efficiency in the 2018 Legislation or excluded from the UWUO and, thus, there is no need for a variance.
2. Is this water use unique in the context of the UWUO? If no, it is not eligible. If yes, the water use is potentially eligible for a variance, and the following two questions need to be answered “yes” to be determined eligible:
 - a. Is this water use shared by only some urban retail water suppliers or needed in unusual circumstances, but not commonly used enough to be included in one of the standards?
 - b. Is this water use excluded from all urban water use efficiency standards and other variances?

3. Could this unique water use have a material effect on the UWUO of some urban retail water suppliers? If so, the water use is warranted for variance development.

The following summarizes the results of the above process of elimination for clarifying the scope of the variance.

Unique Use

The unique use for variance consideration was established by addressing the first two questions listed above.

In April 2021, DWR conducted a survey regarding potential concerns over significant water use to irrigate vegetation for fire protection. The survey was completed by 68 urban retail water suppliers in the State. About 53 percent of the participants expected that vegetation irrigation for fire protection would be more than 5 percent of their total water use. Historical fire perimeters and service areas of urban retail water suppliers are shown in Figure 2-1. The wildfire-referenced data in Figure 2-1 are from the past 20 years of fire perimeters published by the California Department of Forestry and Fire Protection (CAL FIRE). The red spots shown on the map are consistent with where the stakeholders expressed their concern about the significant use of water for irrigation purposes for fire protection. The earthquake damage map from California Department of Conservation (dated 2000) is shown in Figure 2-2, and it shows the number of occurrences of earthquakes across the State greater than a magnitude of 5 on the Richter scale.

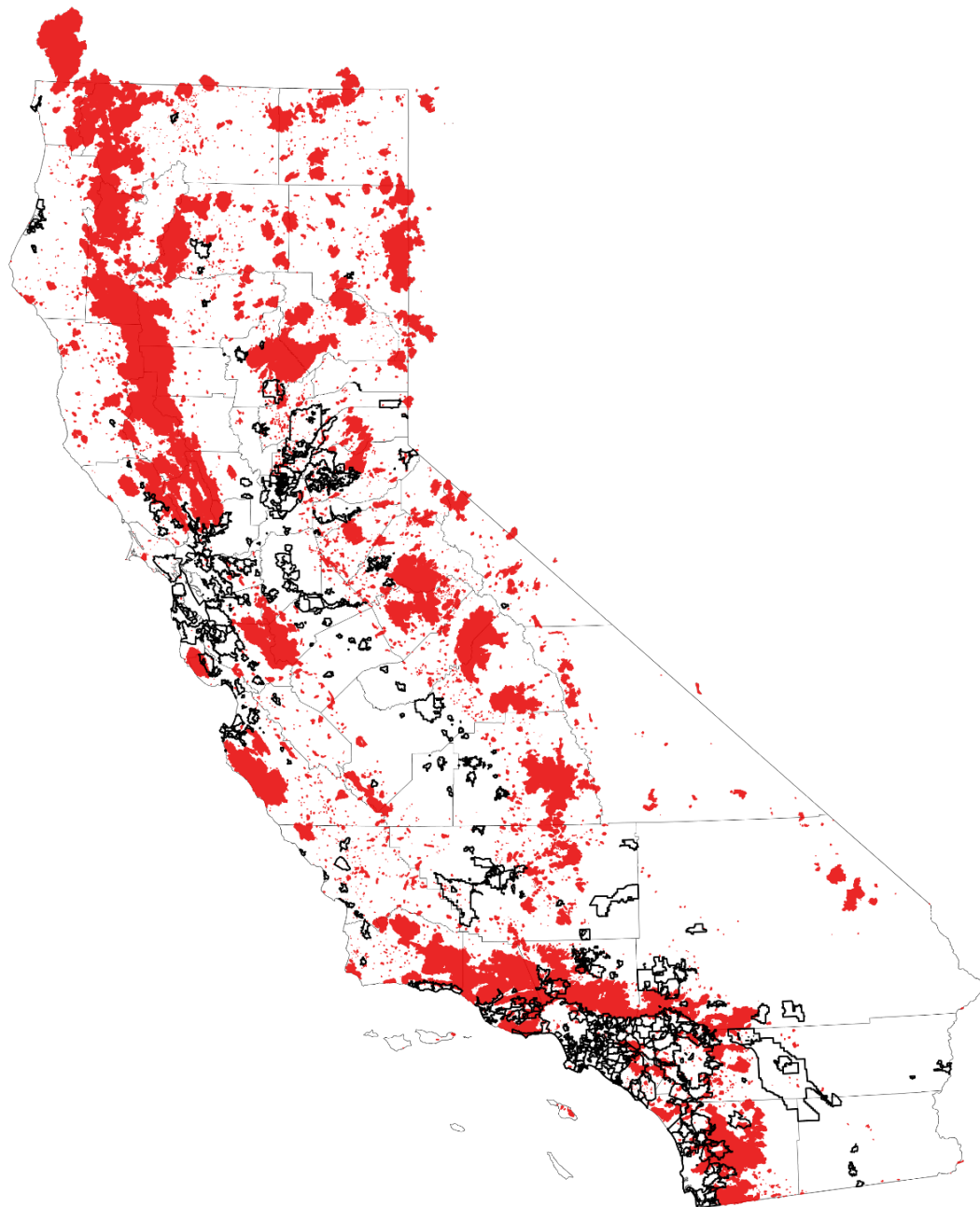
DWR examined multiple scenarios in determining the status of a unique water use, as summarized below. Different water use or water loss scenarios were divided into two main categories: normal conditions and emergency conditions. Note that for the purpose of this variance, residential and CII parcels mean that property parcels have a residential or CII land use designation, respectively, under the governing general plans of counties and cities. Also, the conditions described below illustrate the filtering processing for variance applicability. In practice, an urban retail water supplier would need to assess its actual conditions for variance applicability.

- Normal Conditions:

According to CAL FIRE, the most effective wildfire protection practices for homes during normal conditions focus on management and maintenance of vegetation as the most important potential fuel. CAL FIRE's proposed management activities include removing dead plants, clearing grounds, arranging plants with varied heights, and leaving sufficient spaces among various plants with different heights. These are vital practices that do not require water use.

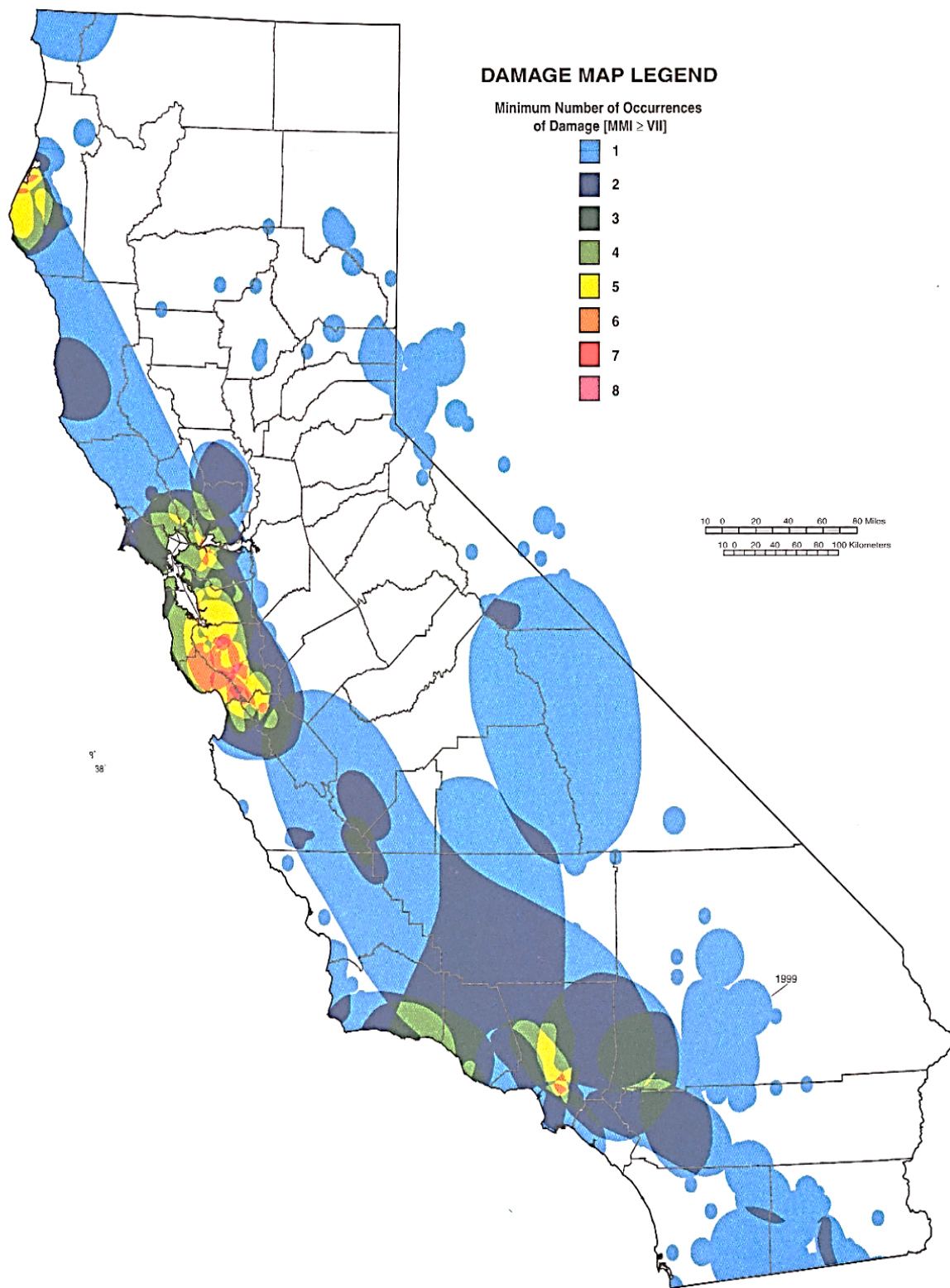
Although it is not the most effective way, fire-resistant landscaping is also one practice to help protect homes and structures from wildfires. However, fire-

resistant plants consume similar amounts of water as other California native plants or drought-resistant plants. Therefore, any type of water use during normal conditions to prepare for fire protection does not qualify for a variance, regardless of the source of water.



The data are based on only available data in the service areas of urban retail water suppliers that are required for filing the Annual Water Use Report, including the urban water use objective. For this variance, the wildfire-referenced data comprises the past 20 years of fire perimeters published by California Department of Forestry and Fire Protection.

Figure 2-1 Historical Fire Perimeters and Service Areas of Urban Retail Water Suppliers



Source: California Department of Conservation, 2000

Figure 2-2 Magnitude Greater than 5 Earthquake Damage Map

The water use during normal conditions would fall under one of the following categories, which are already covered in current standards:

- Irrigation of vegetation on residential parcels using residential meters during normal conditions is covered under ORWUS (see *Recommendations for Outdoor Residential Water Use Efficiency Standard* [WUES-DWR-2021-02]). Therefore, a variance does not apply.
- Irrigation of vegetation outside residential parcels using residential meters during normal conditions should be reported under ORWUS or the meter should be reclassified to a commercial, industrial, and institutional dedicated irrigation meter (CII-DIM) to follow CII-DIMWUS considerations for accounting purposes (see *Recommendations for Outdoor Residential Water Use Efficiency Standard* [WUES-DWR-2021-02] and *Recommendations for Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard* [WUES-DWR-2021-03]). Therefore, a variance does not apply.
- Irrigation of vegetation on residential parcels or CII landscape for fire protection during normal conditions using CII-DIMs should be covered under CII-DIMWUS (see *Recommendations for Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard* [WUES-DWR-2021-03]). Therefore, a variance does not apply.
- Emergency Conditions:
 - Any water use on CII landscape, even during major emergencies, that is not provided through a residential or CII-DIM is excluded from UWUO consideration. Therefore, a variance does not apply.
 - Using private firefighter teams for particular residential properties and businesses during emergencies is categorized under CII water use. Therefore, it is not included in the UWUO and a variance does not apply.
 - Water use for drought emergencies is excluded from variance consideration. Water use efficiency is intended for improving drought resiliency. Therefore, preparing to respond to drought emergency is the main consideration in terms of all water use efficiency standards and variance design, but it does not directly qualify for a variance.
 - Irrigation of vegetation on residential parcels for protecting properties and residents during major wildfire emergencies using a residential meter is excluded from ORWUS, which only covers irrigation during normal conditions

(see *Recommendations for Outdoor Residential Water Use Efficiency Standard* [WUES-DWR-2021-02]).

- Irrigation of vegetation on residential parcels or CII landscapes for protecting properties and residents during major wildfire emergencies using a CII-DIM is excluded from CII-DIMWUS, which only covers irrigation during normal conditions (see *Recommendations for Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard* [WUES-DWR-2021-03]).
- Irrigation of vegetation on CII landscape for protecting properties and residents during major emergencies using a residential meter is excluded from CII-DIMWUS (see *Recommendations for Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard* [WUES-DWR-2021-03]). Therefore, the water use is potentially allowable under a variance.
- Major earthquakes may result in considerable water loss, depending on the location and severity of the event, due to damages to infrastructure and water transmission pipelines in an urban retail water supplier’s distribution system. This type of water loss is not included in WLS and, thus, it could be potentially allowable under a variance. DWR recognized that the State Water Board has a currently proposed WLS through its rule-making process (i.e., Water Loss Performance Standards), which includes a variance to cover natural disasters or other unexpected adverse circumstances. Although not specifically identified, the substantial water loss from the distribution system damaged during earthquakes could be covered if the currently proposed variance is adopted. Therefore, to avoid duplicated regulations, system water loss during an emergency is not allowable under this variance unless the final WLS adopted by the State Water Board does not include the currently proposed variance.
- Other emergencies are considered to have a less direct nexus to water use or water loss. However, there is a possibility that in certain combinations of events the variance could become relevant. These situations should be assessed on a case-by-case basis.
- DWR recognized that for emergency response during wildfires, firefighters could use water from local ponds, lakes, and even water features in residential properties to help with firefighting. However, these occurrences may be opportunistic and DWR has not found any formal arrangements for any specific water body used for this purpose. Therefore, this type of water use is not included in this variance.

In the above analyses, the unique uses of water during major emergencies were confirmed against ORWUS, CII-DIMWUS, and WLS. Therefore, it was reasonable for DWR to proceed the evaluation of potential for a material effect on urban retail water suppliers' UWUOs.

Potential for a Material Effect

The number and severity of serious wildfire events requiring significant use of water to control the event appears to be increasing in recent years. Also, the temporary or permanent installation of sprinklers promoted by insurance companies will further increase the use of water supplied from residential meters and CII-DIMs when a wildfire event becomes imminent. In addition, earthquake events may result in significant water loss depending on the magnitude of the quake. Due to inevitable uncertainty associated with these natural disasters, the future impact on water supply cannot be determined. However, historical data shows that earthquakes greater than a magnitude of 5 on the Richter scale with severe impacts have repeatedly occurred in certain areas across the State and may occur again (see Figure 2-2).

Therefore, DWR confirmed that there are reasons to believe that water use during major emergencies could have a material effect on some urban retail water suppliers' UWUOs and, thus, a variance is warranted.

2.3 Clarified Scope for Variance Development

Based on the analysis, the variance for water use during major emergencies is limited to water use during major emergencies on residential and CII parcels when the water is supplied from a residential meter or a CII-DIM. Note that for the purpose of this variance, residential and CII parcels mean that property parcels have a residential or CII land use designation, respectively, under the governing general plans of counties and cities. The variance also applies to water loss due to damages to the water transmission system during major emergencies. As stated in Section 2.1, major emergencies are those in direct connection to water use or water loss that meet the requirements defined in GC Section 8558(b) or WC Section 350. Therefore, the resulting variance for the use of water during major emergencies would be against ORWUS and CII-DIMWUS. If the State Water Board does not adopt the proposed variance for unforeseen circumstances in WLS, this variance could also be against WLS.

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3.0 Approach to Variance Design

DWR's approach to variance design was an iterative process in collaboration with stakeholders and the State Water Board to assist DWR in refining options and associated specifications and data needs. Taking into consideration findings from the studies, research, and input and feedback from the collaborative process, DWR formulated the recommendations.

3.1 Stakeholder Process

Consistent with the legislative directive, DWR used a public process involving diverse stakeholders in the review and development of the variance for significant use of water during major emergencies. The stakeholder process was part of the larger engagement process to implement the provisions of urban water use efficiency in the 2018 Legislation (see *Stakeholder Outreach Summary for Developing Urban Water Use Efficiency Standards, Variances, and Performance Measures* [WUES-DWR-2021-20]). More focused stakeholder engagements specifically for variances started in November 2020, with periodic meetings and workshops held through early 2022.

DWR established two working groups to assist in implementing the 2018 Legislation, and these groups formed the base of the stakeholder involvement process that included State agencies, cities, counties, urban retail water suppliers, environmental organizations, professionals, and other stakeholders and interested parties. The Water Use Studies Working Group was established in July 2019 to inform DWR in developing water use studies for setting up standards, variances, and performance measures. Concurrently, the Standards, Methods, and Performance Measures Working Group was also established to provide input to DWR on developing the structure and specifications of water use efficiency standards, variances, methodologies, and performance measures. However, due to the close relationship between research and variance design, members of both working groups were invited to participate in the same stakeholder meetings and workshops. DWR opened working group meetings and workshops to the public to allow for broader participation in and input from other stakeholders, interested parties, and individuals.

Working group members and other participants had ample opportunities to learn about the variance design process and provide feedback on the appropriateness of this specific variance being developed and the scope, specifications, and methodologies for estimating efficient water use. They provided input on variance implementation, such as resource needs (staff), supporting data requirements, and accessibility considerations.

DWR also conducted and responded to requests for additional meetings and public outreach and engagement activities with both individuals and groups of stakeholders to learn from their experiences, understand their specific concerns, and receive other

feedback. For this variance, there were no specific studies using data from urban retail water suppliers.

3.2 Considerations for Variance Design

As stated in Section 2.3, the clarified scope for the variance for water use during major emergencies is limited to water use on residential and CII parcels during major emergencies that are supplied with residential meters or CII-DIMs. Therefore, this variance would be against ORUWUS and CII-DIMWUS. There could also be major water loss during major emergencies and, therefore, the variance would be against WLS. However, the current proposed regulation for Water Loss Performance Standards already allows for variances in cases of natural disasters or other unexpected adverse circumstances. Urban retail water suppliers can request variances at any time, which would provide them with temporary relief regarding compliance with their real loss standard (GC Section 11346.5(a)(3)(C)). If the State Water Board does not adopt the proposed variance under the Water Loss Performance Standards, then a variance for water use during major emergencies could be allowed against WLS. DWR proceeded with variance development after confirming this clarified scope with stakeholders and working group members.

In variance design, DWR needed to determine what would constitute water use efficiency for water use during major emergencies; what level of estimated water use (i.e., significance threshold) should be achieved before an urban retail water supplier could claim the variance in its UWUO; and how to calculate, with credible data and supporting information, the aggregated water use for significant water use during major emergencies under the variance. Based on the research and stakeholder input, DWR considered the following factors.

- DWR recognized that in order to cause significant water use or water loss due to emergencies, the event has to have a material effect on the urban retail water supplier's UWUO. Small fires and continuous quakes may be reported across the State on a yearly basis. However, only those events that are accepted as "major emergencies" and have significant effect on water use amount and pattern should be the focus of this variance.
 - The variance should focus only on major emergencies that are defined in GC Section 8558(b) and/or declared by the local water agencies (per WC Section 350) and have potential direct and significant effect on water use amount or pattern of residential meters and CII-DIMs.
 - DWR considered that wildfires and earthquakes are two examples for qualified major emergencies in the State and, thus, more detailed information for these types of emergencies should be developed as part of the variance design. Other major emergencies could be potentially applicable if a direct

nexus to significant effects on water use (amounts or patterns) in residential or CII-DIMs could be properly established.

- Major emergencies, such as wildfires and earthquakes, are unplanned by nature. However, many communities in the State are susceptible to these major emergencies, as established in Section 2, and these events are beyond the control of urban retail water suppliers. The potential amount of additional water use or water loss because of these events highly depends upon the severity and extent of them.
 - DWR considered that urban retail water suppliers should not be penalized by the effect of major emergencies that are beyond their control.
 - Quantification of efficient water use under these major emergencies are likely not fruitful due to the nonvoluntary nature of water loss from facilities damaged by earthquakes or the focus on property protection during wildfires.
- DWR considered procedural and reporting flexibilities would be necessary for the variance.
 - The procedures for allowing the use of this variance should be flexible to accommodate the different levels of risk for urban retail water suppliers that may be more proactive (due to high exposure of risks) or reactive (due to low exposure of risks).
 - The timing of reporting requirements should accommodate that during and immediately after major emergencies, urban retail water suppliers and communities would likely focus on public safety, property protection, and recovery.
- Despite the unplanned nature of major emergencies, a minimum threshold of significance is still required for the urban retail water suppliers to confirm the material effect to use the variance.
- DWR recognized that specific data are needed in order to follow the reporting requirements for this variance. Many urban retail water suppliers expressed concerns over the potential burden and costs to pursue a variance in addition to compliance with many other requirements under the provisions of urban water use efficiency in the 2018 Legislation. Therefore, DWR considered the following to be reasonable:
 - The methodology for calculating aggregated water use under this variance should, to the extent reasonable, stay consistent with existing water use efficiency laws and regulations or build on existing methodologies used by urban retail water suppliers in SB X7-7 compliance.

- The data and information required to support a variance need to be credible, reasonably accessible to urban retail water suppliers or reasonably obtainable by urban retail water suppliers, or separately provided by DWR to the extent possible.
- Necessary technical assistance from DWR related to implementation should be also incorporated into the variance development process.

3.3 Variance Options

The discussed considerations associated with the variance for water use or water loss during major emergencies were examined further through the development of options: an option for starting the administrative process in high-risk areas before major emergencies (pre-approval); an option for following the administrative process after being impacted (emergency petition); and an option for receiving exemption from including the major emergency water use or water loss from residential or CII-DIMs in the Annual Water Use Report filing.

The purposes of these options were to explore pros and cons for different settings and solicit input from stakeholders regarding their corresponding reasonableness and ability to implement those options. Based on the resulting findings and insights, DWR then developed the recommendations (Section 4).

Options for Administrative Process

Three options were developed for considering covered requirements and were discussed with stakeholders in working group meetings on April 8 and June 10, 2021.

- **Option 1 – Pre-Approval Process Prior to Major Emergencies.** This option would give urban retail water suppliers in high-risk areas a choice to obtain a pre-approval status, which would allow them to use the major emergency variance for the Annual Water Use Report filing if a qualified major emergency were to occur in their service areas during the reporting year. Urban retail water suppliers seeking pre-approval would have to submit supporting documentation to confirm their service areas are in high-risk regions. For example, the high-risk location could be confirmed if a significant wildfire event occurred more than once in the past 10 years in their respective service area, or they are located in the seismic hazard zone with a greater than X percent probability of being exceeded in Y years. The “X” and “Y” were used to discuss this approach with the stakeholders and working group members, rather than providing quantitative measures. The pre-approval process would also require historical data to show the potential significant impact on the total volume of water use or water loss from impacted residential accounts or CII-DIMs during major emergencies, as further explained under the Threshold of Significance section below. The urban retail water

suppliers that obtained pre-approval status would be allowed to use provisional data in their Annual Water Use Report, if a major emergency were to occur.

To satisfy Annual Water Use Report filing requirements, a volume of up to 80 percent of the historical water use or water loss during a similar major emergency (wildfire or earthquake) in the service areas of urban retail water suppliers may be used as provisional data in the reporting. The actual water use would still need to be reconciled and reported within six months of the major emergency to finalize the Annual Water Use Report. This procedural allowance would further reduce the burden of prioritizing disaster aftermath and recovery efforts for urban retail water suppliers.

- **Option 2 – Emergency Petition Process Following Major Emergencies.** Urban retail water suppliers who opt not to obtain a pre-approval status or could not obtain a pre-approval status due to resource availability limitations or other factors could apply with an emergency petition to the State Water Board after a qualified major emergency in the reporting year. The decisions on the approval of use of the major emergency variance, schedule for reporting, and status of compliance would be determined by the State Water Board on a case-by-case basis. Urban retail water suppliers would need to provide records of total volume of used or lost water from impacted residential accounts and CII-DIMs during the period of the major emergency. The qualified major emergency period and significance threshold follow a similar approach as in Option 1 and as explained further below. Required documentation to show the water use or water loss in the residential parcels and CII landscape with DIMs during major emergencies and all official emergency declaration announcements would need to be submitted to support the variance application.
- **Option 3 – Receipt of Exemption for Including Water Use or Loss Due to a Major Emergency in the Annual Water Use Report.** Under Option 3, the urban retail water supplier could receive an exemption from including the water use during the major emergency in its Annual Water Use Report. This option also would support the urban retail water suppliers with limited resources and staffing and those that may not often experience major emergencies. Through the rule-making process, the State Water Board would exempt qualified major emergencies from the UWUO calculation and Annual Water Use Report. Under this option, when qualified major emergencies occur and impacted urban retail water suppliers provide supporting evidence in their Annual Water Use Report, the volume of water use or water loss would be exempted from that year's UWUO calculation. Before reporting the annual water use, the urban retail water supplier would need to supplement the application with the quantity for which it is seeking an exemption. Only after the State Water Board has approved the quantity can the urban retail water supplier use it in its Annual Water Use Report. Although the volume of water use or water loss during the qualified major

emergencies period could be exempted from the UWUO calculation, urban retail water suppliers would still need to report the volume of water use or water loss. Similar to Option 1, urban retail water suppliers could use provisional data in their annual reporting. An additional six months would be allowed for urban retail water suppliers to reconcile and finalize the volume reporting requirements.

In summary, the criteria for the qualified major emergency period, required reporting and supporting documentation, and significance threshold for variance use would be the same for Options 1, 2, and 3. The difference between the first two options and Option 3 is the timing of the administrative process.

Qualified Major Emergencies and Period

As discussed in Section 2.1, the qualified major emergency should be determined based on the definition of “state of emergency” as defined in GC Section 8558(b). Local water agencies may also declare a water shortage emergency when needed (per WC Section 350). Wildfires and earthquakes are two main examples of qualified major emergencies in the State. Other major emergencies could be potentially applicable if a direct nexus to a significant effect on water use amount or pattern in residential or CII-DIMs could be properly established.

The period of major emergencies must be determined based on the notification of responsible official agencies. The qualified period for wildfires should include the date from when the mandatory evacuation order is issued by the county’s Sheriff’s Office to the date when the mandatory evacuation order is lifted. The urban retail water suppliers should be able to keep a record of the notifications or obtain them from the County Evacuation Apps by Esri,² InciWeb,³ or a county’s emergency service office’s orders for mandatory evacuation and repopulation. The qualified period for earthquakes may also be obtained from a county’s emergency service office’s notification or delineation of damaged areas.

Documentation for obtaining proof of the qualified major emergency period and impacted areas include, but are not limited to, the following:

- Official mandatory evacuation warning and/or evacuation order for wildfires and when the order is lifted.
- Official reports from CAL FIRE or local agencies on the major emergency events.
- Official documents or maps showing impacted areas.

² <https://www.arcgis.com/apps/dashboards/e5cc0d2bd29f444a87f7589793d55b37>

³ <https://inciweb.nwcg.gov/>

Threshold of Significance

The significance threshold could be defined based on the total impacted residential or CII-DIMs, or total impact on the aggregate water use by the four urban water use efficiency standards (IRWUS, ORWUS, CII-DIMWUS, and WLS). The stakeholders agreed to consider more than a 5 to 10 percent impact on either residential meters or CII-DIMs, or on an aggregate total water use based on the four standards as the threshold of significance for this variance. Regardless of the option, urban retail water suppliers should meet the threshold of significance in order to use the major emergency variance in their Annual Water Use Reports.

A summary of the three options, along with data and reporting requirements, are presented in Table 3-1. This comparison was presented to the stakeholders and working group members during workshops on April 8 and June 10, 2021.

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Table 3-1 Summary of the Three Options for the Administrative Process for Significant Use of Water During Major Emergencies

Items	Option 1	Option 2	Option 3
State Water Board Administrative Approval process	Pre-approval for urban retail water suppliers that opt to obtain a pre-approval status to allow the use of the major emergency variance for the Annual Water Use Report if the emergency occurred in the reporting year.	Emergency petition for urban retail water suppliers that opt not to obtain a pre-approval status, but rely on emergency petition after impacted.	Through rule-making process, State Water Board would exempt qualified major emergencies from UWUO calculation and reporting; however, urban retail water suppliers still would need to provide supporting evidence in annual report to invoke exemption.
Recommended documentation for obtaining pre-approval	<u>Wildfires</u> Occurred more than once in the past 10 years. <u>Earthquakes</u> Located in the seismic hazard zone with a greater than X percent probability of being exceeded in Y years.	N/A	N/A
Reference data for variance pre-approval or emergency petition	<u>Wildfires</u> CAL FIRE Incident Report (SRA) for historic event, or CAL FIRE Fire Siege Report (SRA, some LRA, and FRA events that CAL FIRE cooperated with) for historic event. <u>Earthquakes</u> California Department of Conservation seismic hazard maps, reports, GIS data.	N/A	N/A
Qualified Major Emergency Period	Based on local official information, for example: <ul style="list-style-type: none"> • <u>Wildfires</u>: From the date evacuation order is issued to the date evacuation order is lifted. County Evacuation Apps by Esri,¹ InciWeb,² or a county's emergency service office's orders for mandatory evacuation and repopulation. • <u>Earthquakes</u>: A county's emergency service office's orders or delineation of damaged areas. 	Same as Option 1.	Same as Option 1.
Threshold for variance use	One or combination of the following (note that, with exceptions, most wildfires impact open space near residential areas with some encroachment into residential areas; however, the most dramatic impacts on water systems would be those events with significant damage in residential areas): <ol style="list-style-type: none"> 1. More than 5 to 10 percent of residential or CII-DIM accounts impacted. 2. More than 5 to 10 percent of the aggregated water use by the four water use efficiency standards. 	Same as Option 1.	Same as Option 1.

Table 3-1 Summary of the Three Options for the Administrative Process for Significant Use of Water During Major Emergencies (contd.)

Items	Option 1	Option 2	Option 3
Compliance approach and schedule	<ul style="list-style-type: none"> Allow use of provisional data in Annual Water Use Report. Allow additional six months to reconcile and finalize volume reporting. 	<ul style="list-style-type: none"> Schedule for compliance and approach subject to State Water Board’s case-by-case determination. Status of compliance with the requirement for Annual Water Use Report also subject to State Water Board’s case-by-case determination. 	<ul style="list-style-type: none"> Allow use of provisional data in Annual Water Use Report. Allow additional six months to reconcile and finalize volume reporting.
Pre-approved provisional data for initial reporting purpose	<ul style="list-style-type: none"> Urban retail water suppliers may rely on historical records of impacted water use to propose a volume of up to 80 percent of the maximum volume that occurred historically due to qualified wildfire emergency and qualified earthquake emergency. These two types of events may have very different impacts on water systems and, thus, different referenced historical volumes. When approved, the historical records would be used as the provisional data in the reporting and would further reduce the burden of prioritizing disaster aftermath and recovery efforts for urban retail water suppliers. 	N/A	N/A
Supporting data for reporting	<ul style="list-style-type: none"> Proof of the qualified major emergency period allowed for this variance (see above), including, but not limited by, the following: <ul style="list-style-type: none"> Date of official evacuation order and date when order is lifted. Official incident report from CAL FIRE or local agencies. Document or map showing impacted residential parcels. Records of total volume of water from impacted residential account and CII-DIMs during the length of the major emergency. 	<ul style="list-style-type: none"> Same as Option 1. Additional requirements by the State Water Board per its case-by-case determination. 	<ul style="list-style-type: none"> Proof of the qualified major emergency period allowed for this exemption (see above), including, but not limited by, the following: <ul style="list-style-type: none"> Date of official evacuation order and date when order is lifted. Official incident report from CAL FIRE or local agencies. Document or map showing impacted residential parcels. Records of total volume of water from impacted residential account and CII-DIMs during the length of the major emergency.

Notes:

¹ <https://www.arcgis.com/apps/dashboards/e5cc0d2bd29f444a87f7589793d55b37>

² <https://inciweb.nwccg.gov/>

Key:

- CAL FIRE = California Department of Forestry and Fire Protection
- CII-DIM = commercial, industrial, and institutional dedicated irrigation meter
- FRA = Federal Responsibility Area
- GIS = geographic information system
- LRA = Local Responsibility Area
- N/A = not applicable
- SRA = State Responsibility Area

Stakeholders and working group members discussed that using frequency and probability of occurrence in Option 1 is too speculative and complicated. The participants also argued that proposed documentation to obtain pre-approval status following Option 1 is not easily accessible by the majority of urban retail water suppliers. However, they appreciated including a consideration for additional time to finalize annual reporting after a major emergency occurred.

They suggested that the majority of water use or water loss would occur during the period in which an area is at risk. As such, it is reasonable to assume this period would likely coincide with mandatory evacuation and repopulation notifications announced by responsible official agencies.

Finally, the group discussed how to account for water losses during a major emergency, especially for an earthquake, and the conclusion was that the impacted area should be clearly defined. Setting the threshold of significance at 5 percent of total aggregated water use for the four urban water use efficiency standards was supported by all participants because it follows a strategy similar to other variances and is more straightforward than counting the number of impacted accounts. During the workshop, it was suggested that instead of Option 3, the variance should allow for taking the volume of water loss from major emergencies out of the volume required for compliance with the UWUO.

3.4 Summary of Findings

Based on research and input from working group members and stakeholders, DWR concluded that water use during major emergencies should be recognized and provided through a variance. Different options to accommodate the unplanned nature associated with major emergencies were designed for the urban retail water suppliers to receive State Water Board approval for using this variance. All proposed options focused on the administrative procedure only, with consistent criteria across all options for qualified major emergencies and the significance threshold proposed.

DWR concluded that only major emergencies that would potentially have a material effect on the amount or pattern of water use, as well as a direct nexus to water use and water loss, should be allowed for consideration in using this variance. Therefore, a clear and consistent definition of qualified major emergencies should be provided and used by all urban retail water suppliers. To show the material effect, the significance threshold set at 5 percent of total aggregated estimated water use based on IRWUS, ORWUS, CII-DIMWUS and WLS was considered reasonable, regardless of the recommended option. It was concluded that seeking a pre-approval status would provide an opportunity for urban retail water suppliers to focus on crisis management during emergencies. However, this option would require having access to historical data of events that may be only available to the urban retail water suppliers that are in high-risk areas and have experienced major emergencies in recent years. Using an

exemption may be preferred by the urban retail water suppliers that may experience unexpected major emergencies or would prefer to use their resources for higher priority tasks until the major emergency occurs.

Note that DWR recognized that water may be used for irrigation of vegetation to protect an area from the potential risks of fire during normal conditions. This type of water use must follow the related water use efficiency standards and may be reported under ORWUS or CII-DIMWUS. Therefore, it is not allowed under this variance.

4.0 Recommendations

This section provides DWR’s recommendations for the variance for significant use of water during major emergencies, including guidelines and methodologies, reporting requirements, and implementation considerations.

These recommendations and the resulting variance adopted by the State Water Board do not set, rescind, or modify existing or future requirements for use of water during major emergencies.

4.1 Summary of Recommendations

Based on the analysis and stakeholder input, DWR’s recommendations are as follows. **These recommendations are contingent upon DWR’s recommended ORWUS, CII-DIMWUS, and WLS and their adoption by the State Water Board.**

Recommendations for the Variance for Significant Use of Water During Major Emergencies

DWR recommends that a variance should be established for water use during major emergencies on residential or CII parcels that are supplied with residential meters or CII-DIMs. In this context, residential and CII parcels mean that property parcels have a residential and CII land use designation under the governing general plans of counties and cities, respectively. The recommended variance would be against ORWUS and CII-DIMWUS. In the current draft, WLS regulations proposed by the State Water Board include a variance similar to DWR’s recommendations under the variance for “significant use of water during major emergencies.” DWR recommends that the State Water Board consider the recommendations for a variance for water loss during major emergencies against WLS as part of the covered scope for the proposed variance. Should the State Water Board make a different determination, DWR recommends a variance for significant use of water during major emergencies against WLS. The recommended variance against ORWUS, CII-DIMWUS, and potentially WLS should have the specifications detailed in Section 4.2. The determination of aggregated efficient water use under the variance (the Variance Efficient Water Use Volume), as part of an urban retail water supplier’s UWUO, should be subject to the guidelines and methodologies detailed in Section 4.3.

4.2 Specifications

DWR recommends that a variance be established for “significant use of water during major emergencies” with the following specifications.

- Only water use or water loss during qualified major emergencies on residential parcels or CII landscapes that are supplied with residential meters or CII-DIMs are allowed under this variance.
 - A qualified major emergency needs to satisfy all the following:
 - It meets the requirements for emergency in GC Section 8558(b) or the “water shortage emergency” declared by local water agencies (per WC Section 350).
 - It is not a drought emergency.
 - It meets the event-specific requirements.
 - For wildfire events, the mandatory evacuation has been issued by the county’s Sheriff’s Office for communities within the service area of the urban retail water suppliers. Therefore, the attributable period for this variance should be limited by the mandatory evacuation orders and subsequent repopulation orders declared by government officials.
 - For earthquakes, orders to shut down the water transmission system by a county’s emergency service office or delineation of damaged areas should be used to determine the qualified period and qualified zone of the major emergency.
- These conditions should be verified for each event by the urban retail water supplier before using the variance in calculating the UWUO.
- The Variance Efficient Water Use Volume should be calculated based on the sum of actual water use in all service area qualified major emergency zones for the duration of the qualified major emergency time period, less the standards-based UWUO during qualified major emergency period(s) for the qualified major emergency zone(s) (UWUO_EP).
- The variance application is focused on the administrative process to receive approval from the State Water Board to either exclude the water use or water loss during major emergencies from the calculation of the UWUO or include the amount “as is” in the UWUO to neutralize the effect.
- The administrative process to receive the approval for the variance can be through one of two processes: Pre-Approval Process or Exemption Process, with supporting materials outlined in guidelines and methodologies provided by DWR (see Section 4.3).

- Pre-Approval Process. Urban retail water suppliers with known high-risk factors for major emergencies may apply for a variance for significant use of water during major emergencies under a Pre-Approval Process.
- Exemption Process. Urban retail water suppliers with known high-risk factors, that have not applied for Pre-Approval Process, or those experiencing unexpected major emergencies may apply for a variance for significant use of water during major emergencies under an Exemption Process.
- The Variance Efficient Water Use Volume attributable to major emergencies should be greater than 5 percent of the sum of the aggregated estimates of efficient water uses based on four established standards: IRWUS, ORWUS, CII-DIMWUS, and WLS (UWUO_SB).
- The determination of volume of water use or water loss under this variance should follow the guidelines and methodologies provided by DWR (see Section 4.3).

4.3 Guidelines and Methodologies

DWR recommends the following guidelines and methodologies for the variance for “significant use of water during major emergencies.”

- An urban retail water supplier can include the variance for major emergencies in calculating its UWUO when all the following conditions are satisfied.
 1. The use of this variance by the urban retail water supplier has been previously approved by the State Water Board. (Reminder: The State Water Board's approval is for using the variance, but not for the quantity, which varies per event.)
 2. Only water use or water loss during qualified major emergencies on residential parcels or CII landscapes that are supplied with residential meters or CII-DIMs are allowed under this variance.
 3. The Variance Efficient Water Use Volume attributable to major emergencies is greater than 5 percent of the sum of the aggregated estimates of efficient water uses based on four established standards: IRWUS, ORWUS, CII-DIMWUS, and WLS (UWUO_SB).
 4. A major emergency should satisfy the specifications for “qualified major emergency” discussed in Section 4.2.
- DWR, in coordination with the State Water Board, may recommend revisions of the guidelines and methodologies in the future, as needed.

- Urban retail water suppliers should provide all necessary data and information to support the use of this variance and associated calculated amount of estimated water use to be included in the UWUO. The data and information should be made publicly available. Where applicable, DWR will specify validation and certification requirements for certain data use.

For general guidelines and methodologies for using variances for calculating the UWUO, refer to *Recommendations for Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B, Section 6.2).

Methodology for Estimating Variance Efficient Water Use Volume on Urban Retail Water Supplier Level

The Variance Efficient Water Use Volume and significance threshold in both administrative processes are determined based on the following. Urban retail water suppliers must obtain approval from the State Water Board prior to claiming this allowable variance volume water use, even if a delay in reporting has been approved.

Variance Efficient Water Use Volume

The Variance Efficient Water Use Volume, in gallons, is the sum of actual water use in all service area qualified major emergency zones for the duration of the qualified major emergency time period, less the standards-based UWUO during qualified major emergency period(s) for the qualified major emergency zone(s) (UWUO_EP).

$$\begin{aligned} & \text{Variance Efficient Water Use Volume (gallons)} \\ &= \sum_{\text{Qualified Major Emergency Zones}} \sum_{\text{Qualified Major Emergency Period}} (\text{Total Residential Water Use} \\ &+ \text{CIIDIM Water use} + \text{Water Losses}) - \text{UWUO_EP} \end{aligned}$$

Significance Test

For this variance, the Variance Efficient Water Use Volume must be equal to or greater than the minimum volume established below.

$$\text{Minimum Variance Water Use Volume} = 5\% \times \text{UWUO_SB}$$

Administrative Processes

Urban retail water suppliers can follow either of the following two administrative processes for this variance depending on the potential exposure within their service areas (in full or in part) for potential qualified major emergencies.

- **Pre-Approval Process.** Urban retail water suppliers with known high-risk factors for qualified major emergencies may preemptively apply for this variance for significant use of water during emergencies. The pre-approved status will grant

the urban retail water supplier up to six months for deferring its Annual Water Use Report when the urban retail water supplier provides a notification to the State Water Board regarding the occurrence of a qualified major emergency.

- **Exemption Process.** Urban retail water suppliers that have not received a pre-approved status through the Pre-Approval Process but experience unexpected major emergencies may apply for this variance for significant use of water during major emergencies during or after the event(s). The State Water Board will need to review the application for approval of the use of this variance and may defer up to six months the submittal of the urban retail water suppliers' Annual Water Use Report.

Data Required for Pre-Approval Process

- Proof of high-risk area (application).
- Notification of major emergency occurrence.
- Request for variance volume of water for which the urban retail water supplier is seeking pre-approval; include for each evacuation area in the service area:
 - Evacuation time period or the time from shutting down the valves in the water transmission system for maintenance purposes until the valves are reopened for normal operation (earthquake).
 - Total volume of residential meter and CII-DIM water use for the evacuation area during the evacuation time period, or the volume of water loss due to damage to the water transmission system.

Data Required for Exemption Process

- Application for delay, if seeking permission to submit the Annual Water Use Report with an up to six-month delay.
- Request for variance volume of water for which the urban retail water supplier is seeking an exemption; include for each evacuation area in the service area:
 - Evacuation time period or the time from shutting down the valves in the water transmission system for maintenance purposes until the valves are reopened for normal operation (earthquake).
 - Total volume of residential meter and CII-DIM water use for the evacuation area during the evacuation time period, or the volume of water loss due to damage to the water transmission system.

Data Provided or Obtained by Urban Retail Water Supplier

Estimated Qualified Major Emergency Zones and Periods Per Applicable Authority

- Major emergency defined by Government Code 8558(b).
- Water shortage emergency declared by local official water agencies.
- Period of major emergency based on local official information, for example:
 - Wildfires: From the date evacuation order is issued to the date evacuation order is lifted. Sources of information: County Evacuation Apps by Esri, InciWeb, or a county's emergency service office's orders for mandatory evacuation and repopulation.
 - Earthquakes: A county's emergency service office's orders or delineation of damaged areas. Qualified period may cover the time from shutting down the valves in the water transmission system for maintenance purposes until the valves are reopened for normal operation.

Service Area Data

- Description or map of applicable evacuation areas and associated evacuation and return dates.
- Residential and CII-DIM water use associated with evacuation areas.

Data Accuracy

Major emergency and evacuation orders must be from an authorized entity and include the location and time of the evacuation order or determination of the affected area.

Urban retail water suppliers should use billing data for residential and CII-DIM water accounts within the evacuation areas, where available, to calculate the Variance Efficient Water Use Volume.

- When daily or more frequent water use data is available, total water use for the qualified major emergency time period will be used.
- When daily water use data is not available, urban retail water suppliers will estimate major emergency water use by:
 - Determining water use during the same billing period(s) as the major emergency using historical records to determine 'normal' average billing-cycle or meter read dates. Urban retail water suppliers can use the previous year records or an average of historical water use.

- Emergency water use will be the difference between 'normal' water use calculated with the 'normal' average daily water use rate and actual total water use, including the timeframe of the major emergency.
- Urban retail water suppliers may use other data to determine the water use when meter data is not available, such as unaccounted for water loss in excess of the previous year's unaccounted for water loss.

Urban retail water suppliers must describe the methodology used for quantifying the major emergency water use, including data sources and any locally applicable research and literature.

- Include credentials (such as licenses, certifications, education, training, or professional background of staff) for the entity/party that conducted the analysis.
- Include an affidavit or certification of the data and sources by a qualified urban retail water supplier staff member responsible for data quality.

Summary of Guidelines and Methodologies to Calculate the Variance Efficient Water Use Volume

A summary of guidelines and methodologies for the two reporting methods are presented below in Tables 4-1 and 4-2.

Table 4-1 Guidelines and Methodologies for Calculating Aggregated Estimate of Water Use for Significant Use of Water During Major Emergencies, Pre-Approval Process

Guidelines and Methodologies	Pre-Approval Process
Reference data for receiving pre-approval	<p>Wildfires: CAL FIRE Incident Report (SRA) for historic event, or CAL FIRE Fire Siege Report (SRA, some LRA, and FRA events in which CAL FIRE cooperated) for historic event. In addition, information from InciWeb can be helpful.</p> <p>Earthquakes: California Department of Conservation seismic hazard maps, reports, GIS data.</p> <p>Other supporting documents.</p>
Qualified major emergency	<ol style="list-style-type: none"> 1. Major emergencies are as defined in GC Section 8558(b). 2. Water shortage emergencies are declared by local official water agencies (per WC Section 350). 3. Based on local official information, for example: <p>Wildfires: From the date evacuation order is issued to the date evacuation order is lifted. Sources of information: County Evacuation Apps by Esri, InciWeb, or a county’s emergency service office’s orders for mandatory evacuation and repopulation.</p> <p>Earthquakes: A county’s emergency service office’s orders or delineation of damaged areas.</p>
Information required for application	<ul style="list-style-type: none"> • Proof of the service area (in part or in full) of the urban retail water supplier being in a high-risk area. • Notification of major emergency occurrence. • Application for delay, if seeking a delay in the submission of the Annual Water Use Report. This application must contain volume of water for which the urban retail water supplier is seeking the pre-approved status.
Reporting requirements (provided to DWR by urban retail water supplier)	<p>Proof of the qualified major emergency period allowed for this variance (see above), including, but not limited to, the following:</p> <ol style="list-style-type: none"> 1. Official evacuation order and when order is lifted (wildfire), or the time from shutting down the valves in water transmission system for maintenance purposes until the valves are reopened for normal operation (earthquake). 2. Official incident report from CAL FIRE or local agencies. 3. Document or map showing impacted residential parcels. 4. Records of total volume of water from impacted residential account and CII-DIMs during the length of the major emergency.

Key:

- CAL FIRE = California Department of Forestry and Fire Protection
- CII-DIM = commercial, industrial, and institutional dedicated irrigation meter
- DWR = California Department of Water Resources
- FRA = Federal Responsibility Area
- GC = California Government Code
- GIS = geographic information system
- LRA = Local Responsibility Area
- SRA = State Responsibility Area

Table 4-2 Guidelines and Methodologies for Calculating Aggregated Estimate of Water Use for Significant Use of Water During Major Emergencies, Exemption Process

Guidelines and Methodologies	Exemption Process
Reference data for receiving pre-approval	N/A
Qualified major emergency	<ol style="list-style-type: none"> 1. Major emergencies are defined in GC Section 8558(b). 2. Major emergencies are declared by local official water agencies (per WC Section 350). 3. Based on local official information, for example: <ul style="list-style-type: none"> Wildfires: From the date evacuation order is issued to the date evacuation order is lifted. Sources of information: County Evacuation Apps by Esri, InciWeb, or a county’s emergency service office’s orders for mandatory evacuation and repopulation. Earthquakes: A county’s emergency service office’s orders or delineation of damaged areas.
Information required for application	<ul style="list-style-type: none"> • Notification of major emergency occurrence. • Application for delay, if seeking a delay in the submission of the Annual Water Use Report; this application must contain volume of water for which the urban retail water supplier is seeking exemption.
Reporting requirements (provided to DWR by urban retail water supplier)	<p>Proof of the qualified major emergency period allowed for this variance (see above), including, but not limited to, the following:</p> <ol style="list-style-type: none"> 1. Official evacuation order and when order is lifted (wildfire), or the time from shutting down the valves in water transmission system for maintenance purposes until the valves are reopened for normal operation (earthquake). 2. Official incident report from CAL FIRE or local agencies. 3. Document or map showing impacted residential parcels. 4. Records of total volume of water from impacted residential account and CII-DIMs during the length of the major emergency.

Key:

CAL FIRE = California Department of Forestry and Fire Protection

CII-DIM = commercial, industrial, and institutional dedicated irrigation meter

DWR = California Department of Water Resources

GC = California Government Code

N/A = Not Applicable

WC = California Water Code

4.4 Implementation Considerations

Specific considerations to prepare for this variance application are as follows:

- Major emergencies could occur in areas with known high-risk factors or unexpectedly in areas that have never experienced them before. Therefore, these major emergencies may have very different impacts on the water systems.

To account for these uncertainties, two administrative processes were recommended for this variance. The only difference between the two processes is the timing of the application. The urban retail water suppliers can follow any of the recommended administrative processes that works best for their conditions. Note that all urban retail water suppliers, regardless of being located in high-risk areas, can always use the Exemption Process. The consideration of the Pre-Approval Process is to alleviate the stress and uncertainties that urban retail water suppliers may experience during major emergencies and the associated crisis management.

- Although the volume of water use or water loss during the qualified major emergency period can be exempted from the UWUO calculation, urban retail water suppliers still need to report the duration and volume of water use or water loss in their Annual Water Use Reports.
- For wildfire events, note that County Evacuation Apps by Esri maintains real-time evacuation and other related information. It does not provide options for downloading information or changes that occurred previously. Other referenced data (such as a county's emergency service office's orders) are available post event. If urban retail water suppliers rely on geographic information system information for water use reporting and variance application, periodic downloads of information from County Evacuation Apps are advised.

4.5 Reporting Requirements

Information required for the Annual Water Use Report by urban retail water suppliers must follow the reporting requirements explained in Section 4.3 based on the application type.

Pre-Approval Process Reporting

- Documentation of State Water Board notification.
- Documentation of major emergency and type of emergency.
- Evacuation or water transmission system maintenance time period (start date, end date).
- Total volume of residential meter and CII-DIM water use for the evacuation area during the evacuation time period.
 - Description of the method used to estimate major emergency water use.
 - Data certification or affidavit of data accuracy.

- Confirmation of Variance Efficient Water Use Volume greater than 5 percent of the UWUO_SB.

Exemption Process Reporting

- Documentation of State Water Board application and approval.
- Documentation of qualified major emergency and type of emergency.
- Evacuation time period or water transmission system maintenance (start date, end date).
- Total volume of residential meter and CII-DIM water use for the evacuation area during the evacuation time period.
 - Description of the method used to estimate major emergency water use.
 - Data certification or affidavit of data accuracy.
- Confirmation of Variance Efficient Water Use Volume greater than 5 percent of the UWUO_SB.

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5.0 Glossary

The following key terms are listed below for easy reference. Where applicable, existing definitions from statutes and regulations are provided.

commercial, industrial, and institutional parcels. For the purposes of variance development, commercial, industrial, and institutional parcels are property parcels with a commercial, industrial, and institutional land use designation under the governing general plans of counties and cities.

commercial water user. A water user that provides or distributes a product or service, as defined in California Water Code Section 10608.12(e).

dedicated irrigation meter. A meter used only for irrigation of outdoor landscape areas. However, a mixed-use meter with no more than five percent of total delivered water serving non-landscape irrigation purposes can also be considered a dedicated irrigation meter for the purpose of the urban water use objective and actual water use calculations and reporting.

industrial water user. 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, as defined in California Water Code Section 10608.12(i).

institutional water user. 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, as defined in California Water Code Section 10608.12(j).

local emergency. Local emergency is as established in California Government Code Section 8558(c). A “local emergency” means the duly proclaimed existence of conditions of disaster or of extreme peril to the safety of persons and property within the territorial limits of a county, city and county, or city, caused by conditions such as air pollution, fire, flood, storm, epidemic, riot, drought, cyberterrorism, sudden and severe energy shortage, plant or animal infestation or disease, the Governor’s warning of an earthquake or volcanic prediction, or an earthquake, or other conditions, other than conditions resulting from a labor controversy, which are or are likely to be beyond the control of the services, personnel, equipment, and facilities of that political subdivision and require the combined forces of other political subdivisions to combat, or with respect to regulated energy utilities, a sudden and severe energy shortage requires extraordinary measures beyond the authority vested in the California Public Utilities Commission. California Government Code Section 8558 also defines two other conditions or degrees of emergency (state of emergency and state of war emergency).

major emergency. See “qualified major emergency.”

material effect. Having real importance or great consequences. In the context of California Department of Water Resources’ recommendations regarding the urban water use objective and variances, a material effect is an effect on the urban water use objective that could influence the compliance status of an urban retail water supplier.

performance measures. Actions to be taken by urban retail water suppliers that will result in increased water use efficiency by commercial, industrial, and institutional water users. Performance measures may include, but are not limited to, educating commercial, industrial, and institutional water users on best management practices, conducting water use audits, and preparing water management plans. Performance measures do not apply to process water, as defined in California Water Code Section 10608.12(n).

qualified major emergency. Based on the conditions or degrees of emergency, defined in California Government Code Section 8558(b), that have a direct connection to water use or water loss, or is declared by local water agencies as a “water shortage emergency” per California Water Code Section 350.

residential parcels. For the purposes of variance development, residential parcels are property parcels with a residential land use designation under the governing general plans of counties and cities.

state of emergency. State of emergency is as established in California Government Code Section 8558(b). “State of emergency” means the duly proclaimed existence of conditions of disaster or of extreme peril to the safety of persons and property within the state caused by conditions such as air pollution, fire, flood, storm, epidemic, riot, drought, cyberterrorism, sudden and severe energy shortage, plant or animal infestation or disease, the Governor’s warning of an earthquake or volcanic prediction, or an earthquake, or other conditions, other than conditions resulting from a labor controversy or conditions causing a “state of war emergency,” which, by reason of their magnitude, are or are likely to be beyond the control of the services, personnel, equipment, and facilities of any single county, city and county, or city and require the combined forces of a mutual aid region or regions to combat, or with respect to regulated energy utilities, a sudden and severe energy shortage requires extraordinary measures beyond the authority vested in the California Public Utilities Commission. California Government Code Section 8558 also defines two other conditions or degrees of emergency (state of war emergency and local emergency).

state of war emergency. State of war emergency is as established in California Government Code Section 8558(a). “State of war emergency” is the condition that exists immediately, with or without a proclamation thereof by the Governor, whenever this state or nation is attacked by an enemy of the United States, or upon receipt by the

state of a warning from the federal government indicating that such an enemy attack is probable or imminent. California Government Code Section 8558 also defines two other conditions or degrees of emergency (state of emergency and local emergency).

threshold of significance. A minimum volume of unique water use in an urban retail water supplier's service area that could have a material effect on that urban retail water supplier's urban water use objective.

urban retail water supplier. 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, as defined in California Water Code Section 10608.12(t).

urban water use efficiency standards. The standards effective through California Water Code Section 10609.4 (indoor residential use) or adopted by the State Water Resources Control Board (outdoor residential, water loss, and commercial, industrial, and institutional outdoor irrigation of landscape areas with dedicated meters) pursuant to California Water Code Section 10609.2.

urban water use objective. An estimate of aggregate efficient water use for the previous year based on adopted water use efficiency standards and local service area characteristics for that year, as described in California Water Code Section 10609.20, as defined in California Water Code Section 10608.12(u).

water loss. The total of apparent loss and real loss (California Code of Regulations, Title 23, Section 638.1(a) and Section 638.1(k), respectively) in an urban retail water supplier's system. Apparent loss means loss due to unauthorized consumption and/or nonphysical (paper) loss attributed to inaccuracies associated with customer metering or systematic handling errors. Real loss means the physical water loss from the pressurized potable water system and the urban retail water supplier's potable water storage tanks, up to the point of customer consumption.

water shortage emergency. Water shortage emergency is as established in California Water Code Section 350: "The governing body of a distributor of a public water supply, whether publicly or privately owned and including a mutual water company, shall declare a water shortage emergency condition to prevail within the area served by such distributor whenever it finds and determines that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the distributor to the extent that there would be insufficient water for human consumption, sanitation, and fire protection."

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6.0 References

California Department of Conservation, Division of Mines and Geology. 2000. Map Sheet 49: Epicenters of and Areas Damaged by M \geq 5 California Earthquakes, 1800-1999. Accessed at:

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DWR and State Water Board (California Department of Water Resources and State Water Resources Control Board). 2018. Making Water Conservation a California Way of Life. Primer of 2018 Legislation on Water Conservation and Drought Planning Senate Bill 606 (Hertzberg) and Assembly Bill 1668 (Friedman). Accessed at: <https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Water-Use-And-Efficiency/Make-Water-Conservation-A-California-Way-of-Life/Files/PDFs/Final-WCL-Primer.pdf?la=en&hash=B442FD7A34349FA91DA5CDEFC47134EA38ABF209>

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Appendix A – Urban Water Use Efficiency Recommendation Package Reports Incorporated by Reference

- DWR (California Department of Water Resources). September 2022. Recommendations for Urban Water Use Efficiency Standards, Variances, Performance Measures, and Annual Water Use Reporting. DWR Report Number: WUES-DWR-2021-01A.
- DWR (California Department of Water Resources). September 2022. Recommendations for Guidelines and Methodologies for Calculating Urban Water Use Objective. DWR Report Number: WUES-DWR-2021-01B.
- DWR (California Department of Water Resources). September 2022. Recommendations for Outdoor Residential Water Use Efficiency Standard. DWR Report Number: WUES-DWR-2021-02.
- DWR (California Department of Water Resources). September 2022. Recommendations for Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard. DWR Report Number: WUES-DWR-2021-03.
- DWR (California Department of Water Resources). September 2022. Summary of Recommendations for Variances. DWR Report Number: WUES-DWR-2021-04.
- DWR (California Department of Water Resources). September 2022. Stakeholder Outreach Summary for Developing Urban Water Use Efficiency Standards, Variances, and Performance Measures. DWR Report Number: WUES-DWR-2021-20.
- DWR (California Department of Water Resources). September 2022. Urban Water Use Efficiency Recommendation Package: Glossary and Abbreviations and Acronyms. DWR Report Number: WUES-DWR-2021-21.

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