

# **Recommendations for Variance for Significant Fluctuations in Seasonal Populations, Methods of Calculation, and Supporting Data Requirements**

**WUES-DWR-2021-08**

**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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# Table Of Contents

Executive Summary .....	i
1.0 Introduction .....	1-1
1.1 New Approach to Urban Water Use Efficiency.....	1-1
1.2 Appropriate Variances .....	1-2
1.3 Purpose of the Report.....	1-3
Water Use Associated with Significant Fluctuations in Seasonal Populations .....	1-3
Relationship to California Department of Water Resources' Urban Water Use Efficiency Recommendation Package .....	1-4
Effects on Existing Law and Regulations .....	1-5
1.4 Report Organization .....	1-5
2.0 Scope Definition .....	2-1
2.1 Interpretation of Seasonal Populations Nexus .....	2-1
2.2 Process for Scope Refinement .....	2-2
Unique Use .....	2-2
Potential for Material Effect .....	2-4
2.3 Clarified Scope for Variance Development .....	2-7
3.0 Approach to Variance Design .....	3-1
3.1 Stakeholder Process.....	3-1
3.2 Considerations for Variance Design.....	3-2
3.3 Variance Options .....	3-5
Options for Identifying the Number of Seasonally Occupied Homes.....	3-6
Options for Representative Occupancy Rate .....	3-8
Options for Threshold of Significance .....	3-10
Variance Options.....	3-11
3.4 Summary of Findings .....	3-15
4.0 Recommendations .....	4-1
4.1 Summary of Recommendations.....	4-1

Recommendations for the Variance for Significant Fluctuations in Seasonal Populations .....	4-1
4.2 Specifications.....	4-1
4.3 Guidelines and Methodologies.....	4-3
Methodology for Estimating Service Area Aggregate Seasonal Population Water Use .....	4-4
Data Provided by the California Department of Water Resources .....	4-6
Data Provided or Obtained by Urban Retail Water Supplier.....	4-7
Summary of Guidelines and Methodologies to Calculate the Variance Efficient Water Use Volume .....	4-7
Use of Alternative Data .....	4-11
4.4 Implementation Considerations.....	4-12
4.5 Reporting Requirements .....	4-12
5.0 Glossary.....	5-1
6.0 References.....	6-1

## Figures

Figure 2-1 Percentage of Seasonally Occupied Homes per Census County Division .....	2-5
Figure 2-2 Percentage of Seasonally Occupied Homes per Urban Retail Water Supplier by Hydrologic Region .....	2-6

## Tables

Table 3-1 Summary Comparison of Three Options for Identification of Units with Seasonal Populations and the Variance Efficient Water Use .....	3-13
Table 4-1 Summary of Guidelines and Methodologies for Recommended Standard Calculation Method of Efficient Water Use for Seasonal Populations.....	4-8
Table 4-2 Summary of Guidelines and Methodologies for Recommended Detailed Calculation Method of Efficient Water Use for Seasonal Populations.....	4-9

## Appendices

Appendix A – Urban Water Use Efficiency Recommendation Package Reports Incorporated by Reference .....	A-1
Appendix B – Template for Calculating the Efficient Water Use for Variance for Significant Fluctuations in Seasonal Populations .....	B-1

## Abbreviations and Acronyms

2018 Legislation	2018 Legislation on Water Conservation and Drought Planning (Senate Bill 606 [Hertzberg] and Assembly Bill 1668 [Friedman], as amended)
ACS	American Community Survey
AMI	advanced metering infrastructure
CII	commercial, industrial, and institutional
CII-DIMWUS	Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard
CWEE	University of California, Davis, Center for Water-Energy Efficiency
DIM	dedicated irrigation meter
DOF	California Department of Finance
DWR	California Department of Water Resources
gpcd	gallons per capita per day
IRWUS	Indoor Residential Water Use Efficiency Standard
LAM	landscape area measurement
Legislature	California State Legislature
ORWUS	Outdoor Residential Water Use Efficiency Standard
Recommendation Package	Urban Water Use Efficiency Recommendation Package
SB	Senate Bill
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

# 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 fluctuations in seasonal populations,” consistent with 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 fluctuations in seasonal populations” 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 fluctuations in seasonal populations:

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 that water use due to significant fluctuations in seasonal populations fits the criteria above, in collaboration with stakeholders and the State Water Board, DWR proceeded with variance development with a clarified scope, whereby the water use due to significant fluctuations in seasonal populations 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 fluctuations in seasonal populations. 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 fluctuations in seasonal populations. 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 establishing a variance to accommodate the efficient water use for "significant fluctuations in seasonal populations" 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 focused on different methods, based on data availability and calculation complexity, to identify the number of housing units with seasonal populations for estimating efficient water use. Implementation considerations, including the need for technical assistance, are also included with the recommendations.

The recommendations for a variance for significant fluctuations in seasonal populations is part of the *Recommendations for Urban Water Use Efficiency Standards, Variances, Performance Measures, and Annual Water Use Reporting* (WUES-DWR-2021-01A). These recommendations were prepared per the requirements of the 2018 Legislation and are to be transmitted to the State Water Board for adoption.

# 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 their 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 (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 deliver 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 is measured on a statewide level with SB X7-7 and on an individual urban retail water supplier level with 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 the volume of water for this unique 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 for its use 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 supporting the approval of each variance for individual urban retail water suppliers (WC Section 10609.14(e)).

## 1.3 Purpose of the Report

Per legislative requirements, DWR conducted studies and investigations to determine if the potential variances identified in the 2018 Legislation and 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 fluctuations in seasonal populations" that was identified in the 2018 Legislation.

### Water Use Associated with Significant Fluctuations in Seasonal Populations

The U.S. Census Bureau bases its population estimates on the concept of usual residence. Usual residence, a principle established by the Census Act of 1790, is defined as the place where a person lives and sleeps most (i.e., more than 50 percent) of the time (U.S. Census Bureau, 2020). Usual residents, under this definition are individuals (e.g., permanent residents and long-term renters) who spend most of their time in a single area during the year. California Department of Finance (DOF) data are often used to further extrapolate from the population reported by the U.S. Census

Bureau, especially for years in between census surveys, which is the reference for determining a community population.

Seasonal populations, including short-term and occasional occupants, are residents who are excluded from the U.S. Census Bureau's population estimates for the areas where they reside the minority of the time. Actual water use for an area, however, includes both the water used by usual residents and seasonal populations. Knowing the total population of water users is crucial for urban retail water suppliers, especially when trying to meet the primary needs of the population, including water supply.

Seasonal populations may include tourists, visitors, and short-term workers. Some of these seasonal populations may reside in hotels, in which case the water use is considered a CII water use and, hence, excluded from the UWUO. Many others, however, use available residential housing and rental options that may be more affordable and private. In these situations, the water is supplied from residential meters and, therefore, is included in residential water use.

Based on the population statistics reported by the U.S. Census Bureau, with or without adjustments using DOF data, the efficient water use volume under IRWUS only considers water use by usual residents. Therefore, the estimation of indoor residential water use may not be representative of actual use in the service areas of urban retail water suppliers experiencing significant fluctuations in their seasonal populations. More specifically, the exclusion of seasonal population water use from the indoor water use estimate may result in an urban retail water supplier having an UWUO that could be markedly lower than actual conditions. For such situations, a variance is likely needed to properly accommodate the unique conditions and account for efficient water use by seasonal populations. It is important to properly define a scope for the variance and a method for determining seasonal populations in these service areas to better assess this unique water use.

### **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 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 Fluctuations in Seasonal Populations, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-08), provides the detailed documentation for the review and subsequent variance development for specifications, guidelines, and methodologies for the potential variance for significant fluctuations in seasonal populations. 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 maintaining ponds and lakes to sustain wildlife.

## 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 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 two appendices:

- **Appendix A** provides the list of documents in DWR’s Recommendation Package that are incorporated by reference.
- **Appendix B** provides a template for calculating the efficient water use for seasonal populations based on the recommendations. This template is provided for illustrative purposes and is subject to revision after the State Water Board’s adoption.

## 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 fluctuations in seasonal populations 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 water use due to significant fluctuations in seasonal populations 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 Seasonal Populations Nexus

Weather-related attractions during specific times of year, recreational facilities (e.g., skiing resorts), working opportunities (e.g., seasonal jobs at tourist attractions), or public services (e.g., shopping malls) are factors that could potentially increase the seasonal population in an area.

The population reported by the U.S. Census Bureau, which is the basis for indoor residential water use allowances in the service areas of urban retail water suppliers, only includes usual or permanent residents. However, depending on the magnitude of change in seasonal populations in the service area of an urban retail water supplier, the indoor residential water use could vary significantly. Without properly accounting for the effect of fluctuations in seasonal populations on an urban retail water supplier's UWUO, the resulting estimate of the efficient water use volume based on IRWUS could be significantly inaccurate. As such, it is reasonable to consider a variance to address

fluctuations in seasonal populations, because water use by seasonal populations is not included in any of the four urban water use efficiency standards or other variances.

## 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 due to significant fluctuations in seasonal populations against three questions in sequence prior to developing variance recommendations:

1. Is this water use out of the scope for the UWUO? In other words, is this water for non-urban use or part of the CII water uses other than irrigating landscapes 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 yes, 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.

Seasonal populations in an area can change due to various reasons. As discussed earlier, some seasonal populations use hotels, resorts, and other similar commercial facilities. The associated water use in those cases is CII water use, which is out of scope of the UWUO. This variance will focus only on the seasonal populations residing in residential properties for which the associated water use is part of the indoor residential water use.

Water use by seasonal populations residing in residential properties is accounted for by residential water meters. The allowable indoor residential water use for residential properties in an urban retail water supplier's service area under IRWUS is calculated using U.S. Census Bureau population data, which provides population estimates based on the concept of usual residence. Additional adjustments for population estimates can be made using DOF data.

As noted in Section 1.3, usual residence is the place where a person lives and sleeps more than 50 percent of the time (U.S. Census Bureau, 2020). Individuals included in usual residences of a location could include permanent residents and long-term renters. Occasional occupants in rental residential properties or second homes are not captured in the usual population counts by the U.S. Census Bureau. Therefore, based on IRWUS (DWR, 2021a), these occasional occupants and their associated indoor water use are categorically excluded from the calculation of efficient indoor residential water use on an urban retail water supplier level. This exclusion will persist, even if the U.S. Census Bureau population data are adjusted based on the DOF data, as used in the SB X7-7 reporting guidelines (DWR, 2016). Therefore, without a variance, urban retail water suppliers experiencing significant fluctuations in seasonal populations would not be able to accurately characterize efficient indoor residential water use in their respective service areas.

Among other data and information, the U.S. Census Bureau also includes statistics from the American Community Survey (ACS) on the number of homes that are seasonally occupied (U.S. Census Bureau, 2020). These data are available per Census County Division, which is a subdivision of a county used by the U.S. Census Bureau for the purpose of presenting statistical data that are delineated cooperatively with state and local government authorities.

Figure 2-1 shows that the majority of counties in the State account for less than 20 percent of seasonally occupied homes. Densely populated metropolitan areas tend to have fewer seasonally occupied homes. The data also show that the majority of homes could be seasonally occupied in some popular tourist destinations in rural counties. Figure 2-2 shows the percentage of seasonally occupied homes per urban retail water supplier in each hydrologic region. The data show that urban retail water suppliers in the North Lahontan region have experienced the highest percentage of seasonally occupied homes, with a maximum of 74 percent and an average of 51 percent, followed by the Colorado River and Central Coast regions, but with significant drops in percentage.

These data highlight the importance of addressing the unique challenges in properly estimating efficient indoor water use for seasonal populations in those communities.

In April 2021, DWR conducted a survey regarding potential concerns over significant water use due to fluctuations in seasonal populations to gain additional insight into the potential burden of seasonal populations on urban retail water suppliers UWUO. The survey was responded to by 68 urban retail water suppliers in the State. About 22 percent of the participants mentioned that water use due to fluctuations in seasonal populations might be a significant use of water in their service areas. They all expected that the effect would be far more than 5 percent of their total water use. The results again confirmed that the burden is not commonly shared by most urban retail water suppliers and, thus, it is a potential candidate for a variance.

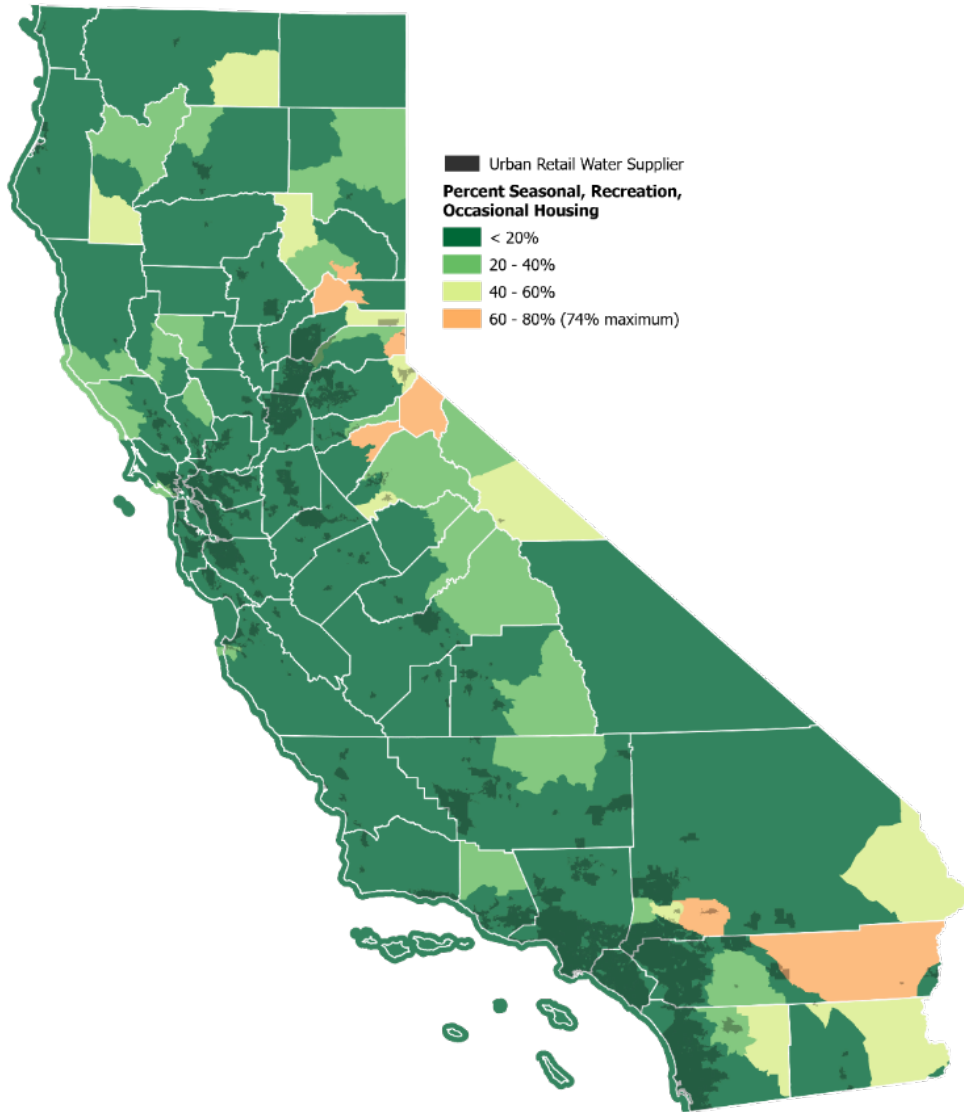
Based on the above analyses, the unique water use due to significant fluctuations in seasonal populations was confirmed against IRWUS. Therefore, DWR proceeded with the evaluation of potential for a material effect on urban retail water suppliers' UWUOs.

### **Potential for Material Effect**

Figure 2-2 shows that, in some regions, the majority of homes within the service area of a urban retail water supplier are seasonally occupied. Therefore, the resulting effects on indoor water use by seasonal populations can be substantial for those urban retail water suppliers.

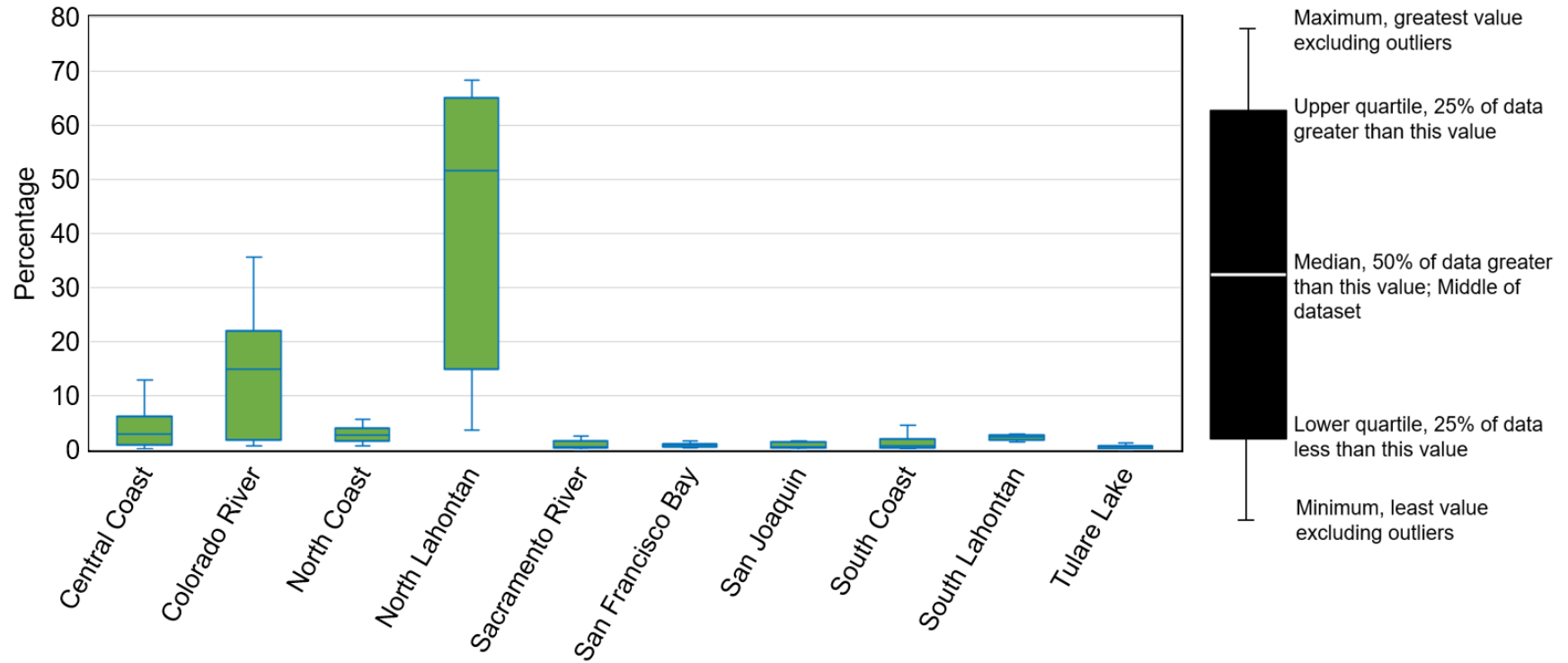
The increasing trend of travel and popularity of destination locations in recent years indicates that the fluctuations in seasonal populations might be more prevalent in the future. The effects of the COVID-19 pandemic and resulting flexible work arrangements could also have temporary and permanent effects on water use, although it is still in an evolving situation.





Source: U.S. Census Bureau. (2019), which contains statistics for “vacant homes for recreational, seasonal, or occasional use” per Census County Division.

**Figure 2-1 Percentage of Seasonally Occupied Homes per Census County Division**



Source: U.S. Census Bureau. (2019), which contains statistics for “vacant homes for recreational, seasonal, or occasional use” per Census County Division.

**Figure 2-2 Percentage of Seasonally Occupied Homes per Urban Retail Water Supplier by Hydrologic Region**

## 2.3 Clarified Scope for Variance Development

Based on the above analyses, the variance for significant fluctuations in seasonal populations is limited to water use by occasional occupants in residential properties that are second homes, vacation rental, or otherwise seasonally occupied. The occasional occupants are excluded from usual residents that are accounted for in the census for population estimates, which are the basis for calculating the efficient indoor water use volume per IRWUS (see *Recommendations for Guidelines and Methodologies for Calculating Urban Water Use Objective* [WUES-DWR-2021-01B, Section 5.1]). Because the indoor water use by these seasonal populations is not accounted for under IRWUS, the resulting variance for significant fluctuations in seasonal populations would be against IRWUS. The seasonal populations are expected to have no meaningful effects on water use under other urban efficient water use standards (i.e., ORWUS, WLS, and CII-DIMWUS).

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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 fluctuations in seasonal populations. 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, certain urban retail water suppliers and energy providers provided data to University of California, Davis, Center for Water-Energy Efficiency (CWEE) under confidential agreements for research purposes and for developing indicators and information to inform the variance design (see the technical report, *Methods for Estimating Seasonal Populations with Water and Energy Data* [WUES-DWR-2021-08.T1]). Separate consultation sessions with these urban retail water suppliers were conducted to review the results of the analyses using their data and to assess the feasibility of technical knowledge transfer.

## 3.2 Considerations for Variance Design

As stated in Section 2.3, the clarified scope for the variance for significant fluctuations in seasonal populations is limited to significant use of indoor residential water by seasonal populations. The resulting variance would be against IRWUS. DWR proceeded with variance development after confirming this clarified scope with stakeholders and working group members.

In variance design, DWR needed to determine how to characterize the fluctuating seasonal populations, how to calculate the aggregated water use under the variance with credible data and supporting information, and what level of estimated water use (i.e., significance threshold) should be considered a significant effect on an urban retail water supplier's UWUO. Many urban retail water suppliers have struggled with these challenges, even under the water conservation reporting framework of SB X7-7, particularly for those with significant seasonal populations (DWR, 2016 and 2021b).

Through stakeholder engagement and additional research, DWR identified multiple challenges. First, the general tourist report information is not reliable or precise enough to incorporate into the variance design analysis and it does not separate the tourists staying in hotels and other commercial establishments from those staying in vacation rentals, second homes, and other seasonal populated homes. Second, tax assessors' information may not be complete or updated using the most recent data, because the updates are usually done only when ownership changes.

It is true that all vacation rentals are required to be registered with their corresponding county or city; however, it is challenging to enforce the requirements and, hence, the records may be questionable for their completeness. Additionally, the vacation rental registration would not include second homes, which are also possibly seasonally occupied. With some exceptions, urban retail water suppliers generally have limited or no access to data from other utilities (e.g., electricity use) to determine which homes are seasonally occupied. In addition, using wastewater volume for backward detection of seasonal populations also imposes significant challenges, because this indirect method

would be subject to many other controlling factors contributing to wastewater flows, including weather conditions. Moreover, the wastewater infrastructure in rural areas, especially in those winter attraction areas, is typically not robust enough to yield reliable data to support this type of analysis.

Stakeholders expressed a wide range of opinions about determining the occupancy rates for seasonally occupied homes and water use behaviors of the occasional occupants. The stakeholders recognized that the number of occupants in a vacation rental home is likely not always its maximum allowable number; it is usually higher. Some stakeholders suggested that the maximum capacity was not always observed by renters, either. Others suggested that seasonal populations may not be as considerate and efficient in their water use, citing their own vacation experiences. Additionally, stakeholders discussed that seasonal populations may be out of the vacation rental homes for most of the time during the day to take advantage of outdoor attractions and, therefore, their resulting water use would be affecting other sectors, including CII, instead of residential. Nonetheless, urban retail water suppliers do not have the authority to use intrusive methods to obtain this specific information on seasonally occupied homes and seasonal populations.

Without reliable, non-intrusive methods for identifying seasonally occupied homes and quantification of associated indoor water use of seasonal populations, urban retail water suppliers experiencing significant fluctuations in seasonal populations may face great uncertainty in adequately reporting their indoor water use. For overall management purposes, some urban retail water suppliers have invested in additional infrastructure and technology that allow them to obtain additional detail and resolution about water use in their service areas. More specifically, these technological advancements may help to identify and quantify indoor water use by seasonal populations. However, varying levels of implementation exist among urban retail water suppliers throughout the State due to affordability, organizational capacity, and other reasons. Therefore, DWR collaborated with CWEE to further explore non-intrusive methods for detection of seasonally occupied homes and quantification of water use by seasonal populations.

Echoed by experiences from stakeholders and urban retail water suppliers, a thorough literature review by CWEE found no previous research focusing on identifying seasonally occupied homes using water and/or electricity data. However, an existing body of research on non-intrusive methods for detecting household occupancy was found, many of which relied on electricity use data that provided higher resolutions of information to inform identification methods (e.g., machine learning). Few of these research studies relied on water use data, and they were typically supported by the use of certain household sensors. Overall, it was concluded that these approaches are not directly applicable in the context of this study due to their complexity and heuristic nature. Therefore, DWR recognized a need to develop methods that can be reasonably implemented by urban retail water suppliers with a certain level of accuracy (see

technical report, *Methods for Estimating Seasonal Populations with Water and Energy Data* [WUES-DWR-2021-08.T1] for a more detailed discussion on the literature review).

Based on the research and stakeholder input, DWR considered the following factors in variance design to account for indoor residential efficient water use.

- This variance should focus on indoor residential water use by seasonal populations on residential properties that is not included in the estimated efficient water use under IRWUS. The residential properties with seasonal, recreational, or occasional occupants includes second homes, vacation homes, and vacation rentals, provided that these properties are still classified as a residence.
- DWR recognized that the methodology and requirements for this variance need to consider the practical challenges that urban retail water suppliers would face to detect and quantify seasonal populations and associated indoor water use in their service areas.
  - Requesting urban retail water suppliers to track each individual rental property or second home for occupancy is neither practical nor reasonable. Therefore, an estimate on the urban retail water supplier level is adequate and consistent with the legislative requirements. In other words, the methodology and reporting requirements are not required to be accurate on an individual home level to allow the application of non-intrusive methods for detection and quantification.
  - The methodology and requirements should accommodate different levels of data accessibility. Water and electricity use data could be the most promising references for detecting seasonal populations and quantifying associated water use. However, DWR recognized that urban retail water suppliers have varying levels of access to water and electricity use data (e.g., hourly, daily, or monthly). Some urban retail water suppliers have invested in advanced technologies, such as the advanced metering infrastructure (AMI), to improve their billing accuracy on a much more refined level to reduce reading errors. At the same time, many urban retail water suppliers only have access to monthly water use data due to affordability and other reasons.
  - The methodology for detecting seasonal populations and quantifying associated indoor water use should accommodate different patterns of seasonal occupancy existing in different regions. The State has a variety of natural resources and seasonal attractions, from mountainous regions to coastal regions, and in deserts and lake areas. As such, patterns of seasonal occupancy may vary greatly across the State.



- DWR recognized that urban retail water suppliers may have access to data with varying resolutions and details for detecting seasonal populations and quantifying associated indoor water use. Therefore, different thresholds of significance for claiming the variance are warranted to recognize and incentivize the use of data with higher resolutions to encourage the investment in advanced technologies.
- DWR recognized potential implementation challenges associated with this variance, including that the methods for detecting seasonal populations and quantifying associated indoor water use may require urban retail water suppliers to use additional organizational capacity. Therefore, DWR considered the following to be reasonable in variance design and methodology development.
  - 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 and calculated amount need to be credible, reasonably accessible to urban retail water suppliers, or separately provided by DWR to the extent possible.
  - Technical assistance is especially important for this variance and should be explicitly incorporated into the recommendations. The technical assistance should include tools and required trainings from DWR to facilitate knowledge transfer for using non-intrusive methods for detecting seasonal populations and quantifying the associated indoor water use.

### 3.3 Variance Options

The purposes of using options with various considerations 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 final recommendations (see Section 4). These recommendations retain the merits of certain options and avoid the shortcomings of others and, as such, may not be the same as any of the specific variance options presented to stakeholders for discussion during the development process.

CWEE performed a pilot study and collaborated with three urban retail water suppliers with high levels of seasonal populations and two electricity utilities with service areas overlapping with the participating urban retail water suppliers. The focus of the pilot study was to evaluate effective means for identifying seasonally occupied homes using different available data sets and to estimate potential efficient water use volume by the

seasonal populations. Where applicable, the information is incorporated in the options discussion below.

Three sets of options for different elements of the variance were evaluated before a set of complete variance options were presented for stakeholder input:

1. Options for identifying the number of seasonally occupied homes.
2. Options for calculating representative occupancy rates.
3. Options for the threshold of significance.

The first two options present the key elements for calculating the estimated efficient water use volume under this variance. Specifically, the variance efficient water use volume in an urban retail water supplier's service area can be calculated as follows:

Efficient Indoor Water Use Volume by Seasonal Populations (gallons) = Number of Identified Units with Seasonal Populations x Occupancy Rate x (Indoor Residential Water Use Efficiency Standard [IRWUS; in gallons per capita per day or gpcd])

where,

Occupancy Rate = Average Number of Occupants per Unit When it is Occupied x Average Number of Occupied Days

The referenced IRWUS is to streamline the regulations, because DWR believes that water use by tourists and seasonal populations should be subject to the same standard as for indoor residential water use. Therefore, the resulting variance options are different mainly in terms of using different data resolution, associated methods, and thresholds of significance.

### Options for Identifying the Number of Seasonally Occupied Homes

CWEE developed three different options for identifying the number of seasonally occupied homes with different data: (1) using daily or hourly AMI water use data (2) using hourly electricity data, and (3) using monthly water use data. These methodologies for detecting seasonally occupied units were discussed in working group and stakeholder meetings on March 11 and June 10, 2021. The following summarizes the essence of the methodologies only. Refer to the technical report, *Methods for Estimating Seasonal Populations with Water and Energy Data* (WUES-DWR-2021-08.T1) for more details on step-by-step procedures and validation.

- **Detection Option 1 – Using Daily or Hourly AMI Water Use Data to Determine Daily Occupancy of Homes.** Under this option, the number of units with seasonal populations would be identified using daily or hourly AMI water use

data, which would provide higher resolution water use information and potential patterns of use. The detailed data would allow the separation of outdoor and indoor uses, and would differentiate the indoor use due to occupancy or leaks. Account characteristics maintained by urban retail water suppliers would be used to identify customers who may have a permanent address elsewhere to determine whether a household meets criteria for usual residents, and to gain additional insight, such as workday occupancy. A regression analysis would be used to identify the number of units with seasonal populations and the results would be compared to the reported ratio of seasonally occupied residences in the ACS data for potential further adjustments and calibration.

This option would provide not only the detection of seasonally occupied homes, but also the number of days they are occupied. Based on the results of the analyses by CWEE using data provided by urban retail water suppliers, Detection Option 1 produced the best agreement with the reported distribution of permanent residences and seasonally occupied residences in the ACS data, with limited adjustments needed.

- **Detection Option 2 – Using Hourly Electricity Use Data to Determine Daily Occupancy of Homes.** Under this option, the number of units with seasonal populations would be identified using hourly electricity use data and a regression analysis, similar to that performed for Detection Option 1. This method leveraged the concept that home energy use has a different relationship with outdoor temperature, depending on whether a home is occupied or not. Similar to Detection Option 1, account characteristics would be needed to support the identification process. The results would be compared to the reported ratio of seasonally occupied residences in the ACS data for potential further adjustments and calibration.

Using the results from Detection Option 1 as the benchmark, the results of hourly electricity use data showed 95 percent relative accuracy for identifying units with seasonal populations in areas with a more prominent/single season to 84 percent relative accuracy in areas with less prominent/multiple seasons. Therefore, hourly electricity use data could also be used to produce reasonable results for identifying seasonally occupied homes, although the results of identification would not be as accurate as using Detection Option 1. However, DWR recognized that most urban retail water suppliers would not have access to electricity use data, resulting in fewer opportunities for application of this option. Similar to Detection Option 1, this option provided not only the detection of seasonally occupied homes, but also the number of days they were occupied.

- **Detection Option 3 – Using Monthly Water Use Data to Determine Daily Occupancy of Homes.** In Detection Option 3, the number of units with seasonal populations would be identified using monthly water use data and a regression

model. In this option, account characteristics, such as billing addresses maintained by urban retail water suppliers, also would be needed to identify customers who may have a permanent address elsewhere or customers with duplicate billing addresses – likely indicating a single owner with multiple rental properties. The results could be compared with the reported ratio of seasonally occupied residences in the ACS data for potential further adjustments and calibration.

Using the results from Detection Option 1 as the benchmark, the results of the monthly water use data showed 95 percent relative accuracy for identifying units with seasonal populations in areas with a more prominent/single season to 90 percent relative accuracy in areas with less prominent/multiple seasons. In other words, although Detection Option 3 may not be as precise as Detection Option 1, using monthly water use data could still produce relatively reasonable results, albeit less accurate than other options. Detection Option 3 would determine the number of occupied days on a monthly basis due to the use of monthly water data for detecting home units with seasonal populations; this poses a major difference from the other two options described above.

The working group members and stakeholders agreed that these three options considered a range of accessible data for detection purposes and supported the methods. However, they also pointed out that all three options would require considerable technical skills to perform the necessary analysis for detecting seasonally occupied homes, and that implementation would not be possible without substantial technical assistance from DWR and proper training to perform the regression analyses. As most urban retail water suppliers do not have access to electricity use data, the second option poses a significant challenge, in addition to the technical difficulties. Similarly, requirements for using daily or hourly water use data should not be mandatory for this variance, since many do not have the ability to acquire this technology in the near term or without substantial financial assistance.

### **Options for Representative Occupancy Rate**

The methods presented in the above detection options produce the number of seasonally occupied homes and number of occupancy days for the identified seasonally occupied homes. The number of occupancy days for each seasonally occupied home is accounted for on a daily basis for Detection Options 1 and 2, and on a monthly basis for Detection Option 3. Therefore, the average number of occupancy days could be derived on the urban retail water supplier level for the calculation of occupancy rate.

The detection options, however, provided no insight into how many individuals may be present in any of the identified seasonally occupied homes on any occupancy day. As previously mentioned, although there may be many opinions on this matter, there was no reliable information to use in the calculation of variance efficient water use volume.

Therefore, additional assumptions and data references are required to produce an estimate of the service area aggregate occupancy rate.

The following options for estimating the service area aggregated occupancy rate (or more precisely, the average number of occupants in a seasonally occupied home on an occupancy day) were developed and discussed with working group members and stakeholders in meetings on March 13 and June 10, 2021. Foundationally, these two options represent two different assumptions for performing the calculation of variance efficient water use volume. Neither option could be validated without additional evidence and supporting information that may require developing more intrusive methods. Therefore, the following comparison is based on the implications and inferences of these two heuristic approaches.

- **Occupancy Rate Option 1 – Similar Water Use Efficiency for Seasonal Populations and Permanent Residents (including Long-Term Renters).** As previously mentioned, there were many opinions on potential water use patterns of seasonal populations. It is also possible that in-State visitors may have been indoctrinated with the concept of water conservation more so than out-of-State visitors, because of the State’s continued water conservation efforts in the past decade and the heightened awareness of Californians about water shortages. However, there is no reliable study or research on water use behaviors of seasonal populations compared to permanent residents. Under this option, it was assumed that the amount of water use by individuals in a seasonally occupied home would be the same as that in a permanent home. Therefore, based on this assumption, the occupancy rate for a seasonally occupied home could be determined. This option for determining the occupancy rate was relatively simple and required less data than Occupancy Rate Option 2, discussed below. However, it may potentially overlook different characteristics of seasonally occupied homes (e.g., sizes and numbers of rooms) and different water use behaviors of seasonal populations.
- **Occupancy Rate Option 2 – Similar Occupancy Patterns in Seasonally Occupied Homes when Occupied and Permanent and Long-Term Rental Homes.** U.S. Census Bureau data include the average household size for permanent residents and long-term renters. ACS data further provide the average number of rooms for homes used by permanent residents and long-term renters, and those for seasonally occupied homes. This option assumed that average household size with the adjustment using the ratio of people per room could be utilized to estimate the average number of occupants in seasonally occupied homes. The underlying assumption was that the number of occupants would be proportional to the number of rooms. This assumption was introduced based on the agreement between the results for one urban retail water supplier and ACS data, whereby the distributions of home size and number of rooms were about the same between homes occupied by permanent residents and

long-term renters and those occupied by seasonal populations. From a simplicity viewpoint, this option would have its own merits. Although validated in the example community, there were concerns as to whether the underlying assumption (i.e., the occupancy pattern for seasonally occupied homes is the same as that of permanent and long-term rental homes) could be generally applied to other regions.

Working group members and stakeholders recognized the challenges and the differences between these two options; and though working group members and stakeholders expressed concerns about the overly simplified assumption of Occupancy Rate Option 1, there was no general agreement regarding their preference for Occupancy Rate Option 2.

### **Options for Threshold of Significance**

Many stakeholders raised a twofold concern over using different levels of data accessed by urban retail water suppliers for calculating efficient water use per the standards and variances. The urban retail water suppliers with access to detailed data with high resolution did not want to be penalized by DWR, which considered accommodating those with access to data with lower resolution (i.e., monthly water use data). Similarly, the urban retail water suppliers without access to high resolution data expressed concerns over any requirements that could not be met using lower resolution data. This concern was a topic of discussion for many variances and standards, and was even more divisive in the discussions related to this variance. Given the above, DWR's strategy was to consider recommending different significance thresholds for using data of different resolutions, where applicable, to determine whether an urban retail water supplier qualifies to claim a specific variance.

More specifically, for the variance for significant fluctuations in seasonal populations, the determining factor in the significance threshold is the resolution of data used for the detection of seasonally occupied homes. Based on the relative accuracy established in the study of the three detection options presented above, the significance threshold should be assigned to Detection Options 1, 2, and 3 in an increasing order, whereby Detection Option 1 has the lowest threshold of significance and Detection Option 3 has the highest threshold of significance. Furthermore, the relative difference among Detection Options 1 and 2 should be limited, as they would produce results with similar accuracy.

During the variance development process, hypothetical thresholds reflecting the above strategy were used for discussion purposes while DWR considered a consistent approach to address the significance threshold setting in relationship to data resolution across different variances. Two possible references for significance thresholds were discussed: (1) the volume percentage of the total efficient water use amount based on the four urban water use efficiency standards, or (2) the percentage of impacted

accounts from the total number of accounts in a service area. Working group members and stakeholders appreciated that DWR considered data resolution in threshold setting. Ultimately, they concluded that the volume-based significant threshold would be more relevant and reasonable.

### **Variance Options**

The seasonally occupied homes that were identified using one of the three detection options could use any of occupancy rate options to calculate the variance water use volume. As discussed above, hypothetical thresholds of significance were applied based on the relative accuracy of detection options. Table 3-1 provides a comparison summary of three variance options discussed with working group members and stakeholders in meetings on March 13 and June 10, 2021.

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**Table 3-1 Summary Comparison of Three Options for Identification of Units with Seasonal Populations and the Variance Efficient Water Use**

	<b>Option 1</b>	<b>Option 2</b>	<b>Option 3</b>
Threshold of significance	More than 5 percent of total estimated efficient water use without variances.	More than 10 percent of total estimated efficient water use without variances.	More than 15 percent of total estimated efficient water use without variances.
Referenced data for units' identification	Hourly/daily AMI water use data.	Hourly electricity use data.	Monthly water use data.
Efficient water use volume (gallons)	Efficient water use volume = Number of identified units with seasonal populations x Occupancy Rate x Indoor Residential Water Use Standard (gpcd)  <i>Occupancy Rate can be either of two Occupancy Rate options.</i>	Same as Option 1.	Same as Option 1.
Number of identified units with seasonal populations	Number of units identified with seasonal populations using Detection Option 1. ACS information will be used as a part of Detection Option 1 for validation and reference for adjustments.	Number of units identified with seasonal populations using Detection Option 2. ACS information will be used as a part of Detection Option 2 for validation and reference for adjustments.	Number of units identified with seasonal populations using Detection Option 3. ACS information will be used as a part of Detection Option 3 for validation and reference for adjustments.
Occupancy Rate (Number of occupants x Number of days with occupants)	(Average number of rooms for ACS units with seasonal population / Average number of rooms for ACS units with usual residents) x Household size of usual residents x Average number of days with occupancy  <b>OR,</b> Annual water use for all identified units with seasonal population / Annual water use for all units with usual residents) x U.S. Census Bureau population for usual residents x Average number of days with occupancy	Same as Option 1.	Same as Option 1.

Note:  
The table has been updated from the one shared with stakeholders during the workshop to reflect current terminologies.  
Key:  
ACS = American Community Survey

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Working group members and stakeholders generally agreed with the construct of the three detection options. However, they expressed concerns over Occupancy Rate Option 2 for assuming that water use in seasonally occupied homes would follow the same pattern as in permanent homes. They believed that vacation homes often have higher occupancy than home capacity, which would result in a higher water use than what is estimated based on the home capacity. They were also concerned about using specific data that are required for performing each of the analyses in terms of availability, affordability to access, and difficulties in using water and electricity use data together, since they would likely show different seasonal patterns.

Stakeholders voiced additional concerns over the accuracy of U.S. Census Bureau ACS data, and discussed an alternate approach, which was to use data from local chambers of commerce. However, stakeholders acknowledged that such data likely could not be verified and, therefore, would not be reliable. As discussed in Section 2, the topic of seasonal populations and different aspects of it is complicated and, as such, the overall complexity associated with determination of water use for this variance was expected. Therefore, DWR deemed the most prudent approach should be based on available data and verifiable evidence. Also, it is important to note that both the short-term and long-term effects of the Covid-19 pandemic on the pattern of seasonal populations were unknown at the time of this study.

The working group members and stakeholders discussed the importance of DWR providing adequate training for affected urban retail water suppliers seeking to claim this variance. They suggested conducting early-stage training to improve urban retail water suppliers' understanding of detection methods to inform additional decisions about the selection of the most appropriate next steps. This training also would inform decisions related to expanding organizational capacity and adding supporting resources, such as AMI. The working group members and stakeholders further suggested that, when possible, it was important to keep the required analyses as simple as possible and allow more flexibility for urban retail water suppliers to choose a method that would best fit their respective conditions.

### **3.4 Summary of Findings**

Based on research and input from working group members and stakeholders, DWR concluded that water use for significant fluctuations in seasonal populations in residential properties should be recognized and provided through a variance against IRWUS. Calculation of the variance efficient water use volume requires complex technical analyses. Therefore, providing technical assistance and trainings by DWR are required to assist urban retail water suppliers in meeting their compliance needs.

Based on stakeholder input and considering that urban retail water suppliers have different capacities in obtaining data of different resolutions, DWR concluded that this variance should allow multiple methods for calculating the variance efficient water use

volume based on data availability and urban retail water supplier-specific conditions. As such, compatible thresholds of significance should be imposed to match the anticipated relative accuracy of different methods using data of different resolutions. Consistent with other variances, 5 percent of the total aggregated efficient water use volume based on the four water use efficiency standards should be used for a standard method that can be implemented by all urban retail water suppliers using monthly water use data, and a reduced percentage should be used for a detailed method using data of higher resolution, such as daily or hourly AMI data.

Finally, DWR recognized that some urban retail water suppliers may have developed alternative methods to identify the number of seasonal populations in their service areas. Similar to provisions for alternative data use, urban retail water suppliers need to demonstrate the data is superior to DWR's methods and will result in a better estimate of variance efficient water use volume.

## 4.0 Recommendations

This section provides DWR’s recommendations for the variance for significant fluctuations in seasonal populations, 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 significant use of indoor water due to significant fluctuations in seasonal populations on residential properties.

### 4.1 Summary of Recommendations

Based on the analysis and stakeholder input, DWR’s recommendations to State Water Board on the variance for significant fluctuations in seasonal populations are included below.

#### **Recommendations for the Variance for Significant Fluctuations in Seasonal Populations**

DWR recommends that a variance should be established for significant fluctuations in seasonal populations on residential properties. In this context, residential properties mean that property parcels have a residential land use designation under the governing general plans of counties and cities. The recommended variance against IRWUS should have the specifications detailed in Section 4.2. The calculation of aggregated efficient water use under the variance (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.

DWR also recommends that technical assistance is made available, including calculation tools, additional guidance, and training sessions to identify seasonally occupied homes using the recommended methodologies.

### 4.2 Specifications

DWR recommends that a variance be established for “significant fluctuations in seasonal populations” with the following specifications.

- Only indoor water use of seasonal populations on residential properties is allowed under this variance against IRWUS. Seasonal populations refer to residents who are not considered “usual” or “permanent,” as defined by the U.S. Census Bureau.
- Water use is determined by allowing a standard indoor water use per occupant following IRWUS recommendations. Therefore, the Variance Efficient Water Use

Volume should be expressed using total number of identified units with seasonal occupation, total number of occupants, and total number of days with occupancy per identified units in relationship to allowable indoor water use per occupant (55 gpcd, or otherwise adopted by the Legislature).

$$\begin{aligned} \text{Variance Efficient Water Use Volume (gallons)} = & \\ & \text{Number of Identified Units with Seasonal Population} \times \\ & \text{Occupancy Rate (person days per year)} \times \\ & \text{Indoor Residential Water Use Standard (gpcd)} \end{aligned}$$

- The efficient water use for significant fluctuations in seasonal populations can be calculated using two methods: Standard Method or Detailed Method.
  - **Standard Method.** The Variance Efficient Water Use Volume should be calculated based on the number of seasonally occupied homes identified using monthly water bill data. The number of occupants and number of identified days with occupants are determined based on U.S. Census Bureau ACS data and average number of rooms per unit.
  - **Detailed Method.** The Variance Efficient Water Use Volume should be calculated based on the number of seasonally occupied homes identified using hourly/daily AMI data. The number of occupants and number of identified days with occupants are determined based on U.S. Census Bureau ACS data and average number of rooms per unit.
  - Two options for calculating occupancy rates are allowed in both the Standard and Detailed Methods, depending on the details available to urban retail water suppliers and local conditions in their service areas.
- In order to be included in the UWUO, the estimated efficient water use for significant fluctuations in seasonal populations should be greater than the different significance thresholds established for the two methods.
  - The threshold of significance for the estimated indoor water use in the Standard Method should be 5 percent of the sum of the aggregated estimates of efficient water use based on four established standards, namely IRWUS, ORWUS, CII-DIMWUS, and WLS.
  - The threshold of significant for the estimated water use in the Detailed Method should be 1 percent of the sum of the aggregated estimates of efficient water use based on four established standards, namely IRWUS, ORWUS, CII-DIMWUS, and WLS.
  - To encourage the use of AMI technology, urban retail water suppliers planning on moving to using daily or hourly AMI data in two years after the

adoption of this variance are allowed to use a significance threshold of 3 percent. Commitment to converting to daily or hourly AMI data must be certified by the urban retail water supplier's board or equivalent governing body, and evidence of AMI implementation should be submitted as supplemental information following implementation.

- The determination of estimated water use 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 fluctuations in seasonal populations.”

- An urban retail water supplier will be allowed to include the variance for significant fluctuations in seasonal populations in calculating its UWUO when all the following conditions are satisfied.
  - 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 a quantity, which varies every year.)
  - The Variance Efficient Water Use Volume for indoor water use by seasonal populations using the Standard Method or the Detailed Method is greater than 5 and 1 percent, respectively, of the sum of the aggregated estimates of efficient water use based on four established standards, namely IRWUS, ORWUS, CII-DIMWUS, and WLS. A 3 percent threshold will be allowed when an urban retail water supplier plans to deploy AMI technology within two years after the variance is adopted by the State Water Board. The threshold condition should be verified by the urban retail water supplier every year before using the variance to calculate the annual UWUO.
    - The Variance Efficient Water Use Volume in the Standard Method will be calculated based on the number of seasonally occupied units identified using monthly water bill data. The number of occupants and number of identified days with occupants are determined based on U.S. Census Bureau ACS data and average number of rooms per unit.
    - The Variance Efficient Water Use Volume in the Detailed Method will be calculated based on the number of seasonally occupied units identified using hourly/daily AMI data. The number of occupants and number of identified days with occupants are determined based on U.S. Census Bureau ACS data and average number of rooms per unit.

- The Variance Efficient Water Use Volume should be calculated based on data applicable to the conditions of the previous year.
- DWR, in coordination with the State Water Board, may recommend revisions of the guidelines and methodologies in the future, as needed.
- Use of alternative data is allowed if the urban retail water supplier can provide evidence that the alternative data is equal or superior to DWR-provided data or DWR-suggested referenced data. Refer to “Use of Alternative Data” later in this section.
- Urban retail water suppliers should provide all necessary data and information to support the use of this variance and the associated calculated amount of water use to be included in 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 to calculate 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 Service Area Aggregate Seasonal Population Water Use**

The recommendations for this variance allow for two methods to calculate the indoor water use by seasonal populations: Standard Method and Detailed Method. Each method has its unique threshold of significance, as described in the above guidelines and data requirements. These two methods provide urban retail water suppliers with sufficient flexibility for determining their variance eligibility, depending on data availability. The specific steps for identification using the Standard or the Detailed Methods are provided to urban retail water suppliers by DWR as discussed below.

Appendix B provides a template for calculating the efficient water use due to significant fluctuations in seasonal populations. This template answers the eligibility question about whether the urban retail water supplier may claim the variance and calculates the total amount of water use by seasonal populations. The complicated analysis to determine the number of units identified in a service area with seasonal populations should be performed using other tools that will be made available through technical assistance and training provided by DWR. This template is provided for illustrative purposes and is subject to revision after the State Water Board’s adoption.

An urban retail water supplier with a significant water use that is within the scope of this variance must follow the explained development steps to apply for the variance using one of the two calculation options, provided they meet the requirements and threshold.



Additionally, the urban retail water supplier must report to DWR all the data and supporting documentation used to estimate the water use.

### ***Data Needed for Calculation***

Data needed for both methods are essentially the same, except for the time interval of water use data.

- Number of identified units with seasonal populations.
- Monthly water use data for the Standard Method and hourly water use data for the Detailed Method to determine:
  - Number of occupants.
  - Number of days with occupants.
- IRWUS (gpcd).
- The water use billing data/mailling addresses that are maintained by the urban retail water supplier.
- Other specific data needs per identification method (all in public domain or urban retail water supplier data).

### ***Variance Efficient Water Use Volume***

The Variance Efficient Water Use Volume for seasonal populations will be estimated using the following equation:

$$\begin{aligned} \text{Variance Efficient Water Use Volume (gallons)} = & \\ & \text{Number of Identified Units with Seasonal Population} \times \\ & \text{Occupancy Rate (person days per year)} \times \\ & \text{Indoor Residential Water Use Standard (gpcd)} \end{aligned}$$

- Standard Method:
  - Step 1. Identify the number of units with seasonal populations using monthly water use data (see technical report, *Methods for Estimating Seasonal Populations with Water and Energy Data* [WUES-DWR-2021-08.T1]).
  - Step 2. Estimate occupancy rates using either *Occupancy Rate\_M1* or *Occupancy Rate\_M2*, depending on the result that better describes their local conditions.
- Detailed Method:

- Step 1. Identify the number of units with seasonal populations using hourly AMI water use data (see technical report, *Methods for Estimating Seasonal Populations with Water and Energy Data* [WUES-DWR-2021-08.T1]).
- Step 2. Estimate occupancy rates using either *Occupancy Rate\_M1* or *Occupancy Rate\_M2*, depending on the result that better describes their local conditions.

### **Estimation of Seasonal Population Occupancy Rates**

Calculate the Occupancy Rate for seasonally occupied units. The Occupancy Rate is the product of the average number of occupants per unit when occupied and the number of occupied days. This is approximated using either *Occupancy Rate\_M1* or *Occupancy Rate\_M2*.

$$\begin{aligned} \text{Occupancy Rate}_{M1} &= [\text{Water Use for Seasonally Occupied Homes} \\ &\times \text{Population of Usual Residents (Census population)}] \\ &/ (\text{Water Use for All Units With Usual Residents}) \\ &\times \text{Average Number of Days with Occupancy} \end{aligned}$$

$$\begin{aligned} \text{Occupancy Rate}_{M2} &= \frac{\text{Average Number of Rooms Per Seasonally Occupied Unit (from ACS)}}{\text{Average Number of Rooms for Usual Residents Units (from ACS)}} \\ &\times \text{People per Household of Usual Residents' Units} \\ &\times \text{Average Number of Days with Occupancy} \end{aligned}$$

### **Significance Test**

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

$$\text{Standard Method Minimum Variance Volume (gallons)} = 5\% \times \text{UWUO\_SB}$$

$$\text{Detailed Method Minimum Variance Volume (gallons)} = 1\% \times \text{UWUO\_SB}$$

Urban retail water suppliers with a formal governing body commitment to convert to daily or hourly AMI data in two years may use a significance threshold of 3 percent of the UWUO\_SB.

### **Data Provided by the California Department of Water Resources**

DWR will provide technical assistance to urban retail water suppliers in using the identification methods to determine the number of seasonally occupied units in the

service area (see technical report, *Methods for Estimating Seasonal Populations with Water and Energy Data* [WUES-DWR-2021-08.T1]).

### **Data Provided or Obtained by Urban Retail Water Supplier**

- ACS data (U.S. Census Bureau).
- IRWUS (gpcd).
- Water use data for the previous year:
  - Monthly water use data for the Standard Method.
  - Hourly water use data for the Detailed Method.
- Water use billing data or mailing addresses that are maintained by the urban retail water supplier.
- Other specific data needs per identification method (all in public domain or urban retail water supplier records).

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

A summary of data requirements and calculation methodologies for the Standard and Detailed Methods are presented below in Tables 4-1 and 4-2.

**Table 4-1 Summary of Guidelines and Methodologies for Recommended Standard Calculation Method of Efficient Water Use for Seasonal Populations**

Guidelines and Methodologies	Standard Calculation for 5 Percent Threshold
Data needed for calculation	<ul style="list-style-type: none"> <li>• Number of identified units with seasonal populations.</li> <li>• Monthly water use data to determine:                             <ul style="list-style-type: none"> <li>– Number of occupants.</li> <li>– Number of days with occupants.</li> </ul> </li> <li>• IRWUS (gpcd).</li> <li>• The water use billing data/mailling addresses that are maintained by urban retail water suppliers.</li> <li>• Other specific data needs per identification method (all in public domain or urban retail water supplier data).</li> </ul>
Equation of the volume for seasonal populations	$\text{Variance Efficient Water Use Volume (gallons)} = \text{Number of Identified Units with Seasonal Population} \times \text{Occupancy Rate (person days per year)} \times \text{Indoor Residential Water Use Standard (gpcd)}$
Number of units with seasonal population	<ul style="list-style-type: none"> <li>• Number of units identified with seasonal population using monthly water use data (refer to technical report, <i>Methods for Estimating Seasonal Populations with Water and Energy Data</i> [WUES-DWR-2021-08.T1]).</li> <li>• ACS information will be used for validation and as a reference for adjustments to the unit detection method.</li> </ul>
Occupancy rate	$\text{Occupancy Rate}_{M1} = \frac{[\text{Water Use for Seasonally Occupied Homes} \times \text{Population of Usual Residents (Census population)}]}{(\text{Water Use for All Units With Usual Residents}) \times \text{Average Number of Days with Occupancy}}$ <p>OR,</p> $\text{Occupancy Rate}_{M2} = \frac{\text{Average Number of Rooms Per Seasonally Occupied Unit (from ACS)}}{\text{Average Number of Rooms for Usual Residents Units (from ACS)}} \times \text{People per Household of Usual Residents' Units} \times \text{Average Number of Days with Occupancy}$

**Table 4-1 Summary of Guidelines and Methodologies for Recommended Standard Calculation Method of Efficient Water Use for Seasonal Populations (contd.)**

Guidelines and Methodologies	Standard Calculation for 5 Percent Threshold
Source(s) of data	<p><b>To be provided by DWR:</b></p> <ul style="list-style-type: none"> <li>• Technical assistance to urban retail water suppliers in using the identification methods to determine the number of seasonally occupied units in the service area (see WUES-DWR-2021-08.T1).</li> </ul> <p><b>To be obtained/developed by urban retail water supplier:</b></p> <ul style="list-style-type: none"> <li>• ACS data.</li> <li>• Monthly water use data.</li> <li>• IRWUS (gpcd).</li> <li>• The water use billing data/mailling addresses that are maintained by urban retail water suppliers.</li> <li>• Other specific data needs per identification method (all in public domain or urban retail water supplier data).</li> </ul>

Key:  
 ACS = American Community Survey  
 DWR = California Department of Water Resources  
 gpcd = gallons per capital per day  
 IRWUS = Indoor Residential Water Use Efficiency Standard

**Table 4-2 Summary of Guidelines and Methodologies for Recommended Detailed Calculation Method of Efficient Water Use for Seasonal Populations**

Guidelines and Methodologies	Detailed Calculation for 1 Percent Threshold
Data needed for calculation	<ul style="list-style-type: none"> <li>• Number of identified units with seasonal populations.</li> <li>• Hourly AMI water use data to determine:                             <ul style="list-style-type: none"> <li>– Number of occupants.</li> <li>– Number of days with occupants.</li> </ul> </li> <li>• IRWUS (gpcd).</li> <li>• The water use billing data/mailling addresses that are maintained by urban retail water suppliers.</li> <li>• Specific data needs per identification method (all in public domain or urban retail water supplier data).</li> </ul>
Equation of the volume for seasonal populations	$\text{Variance Efficient Water Use Volume (gallons)} = \text{Number of Identified Units with Seasonal Population} \times \text{Occupancy Rate (person days per year)} \times \text{Indoor Residential Water Use Standard (gpcd)}$

**Table 4-2 Summary of Guidelines and Methodologies for Recommended Detailed Calculation Method of Efficient Water Use for Seasonal Populations (contd.)**

Guidelines and Methodologies	Detailed Calculation for 1 Percent Threshold
Number of units with seasonal population	<ul style="list-style-type: none"> <li>• Number of units identified with seasonal population using monthly water use data (refer to technical report, <i>Methods for Estimating Seasonal Populations with Water and Energy Data</i> [WUES-DWR-2021-08.T1]).</li> <li>• ACS information will be used for validation and as a reference for adjustments to the unit detection method.</li> </ul>
Occupancy rate	$\text{Occupancy Rate}_{M1} = \frac{[\text{Water Use for Seasonally Occupied Homes} \times \text{Population of Usual Residents (Census population)}]}{(\text{Water Use for All Units With Usual Residents}) \times \text{Average Number of Days with Occupancy}}$ <p>OR,</p> $\text{Occupancy Rate}_{M2} = \frac{\text{Average Number of Rooms Per Seasonally Occupied Unit (from ACS)}}{\text{Average Number of Rooms for Usual Residents Units (from ACS)}} \times \text{People per Household of Usual Residents' Units} \times \text{Average Number of Days with Occupancy}$
Source(s) of data	<p><b>To be provided by DWR:</b></p> <ul style="list-style-type: none"> <li>• Technical assistance to urban retail water suppliers in using the identification methods to determine the number of seasonally occupied units in the service area (see WUES-DWR-2021-08.T1).</li> </ul> <p><b>To be obtained/developed by urban retail water supplier:</b></p> <ul style="list-style-type: none"> <li>• ACS data.</li> <li>• The hourly data may be obtained internally or from vendor.</li> <li>• IRWUS (gpcd).</li> <li>• The water use billing data/mailling addresses that are maintained by urban retail water suppliers.</li> <li>• Other specific data needs per identification method (all in public domain or urban retail water supplier data).</li> </ul>

**Key:**

- ACS = American Community Survey
- AMI = advanced metering infrastructure
- DWR = California Department of Water Resources
- gpcd = gallons per capital per day
- IRWUS = Indoor Residential Water Use Efficiency Standard

**Data Accuracy**

The urban retail water supplier must report all data and supporting documentation used to estimate water use, and this data must be confirmed by DWR that it is correctly used in the calculation. Urban retail water suppliers must include in their application:

- ACS data from the U.S. Census Bureau.
  - Table B25003 for a summary of the total number of owner-occupied and renter-occupied homes.
  - Table B25004 for the number of homes for seasonal, recreational, or occasional use.
- IRWUS (gpcd) from the WC, including subsequent amendments, if any.
- Account-level water use billing data, service addresses, and mailing addresses that are maintained by the urban retail water suppliers.
  - Monthly water use data for the Standard Method.
  - Hourly or daily water use data for the Detailed Method.
  - Accounts should be geocoded based on service address to the extent feasible.
  - Records with extreme data points and water consumption exceeding the 99<sup>th</sup> percentile should be removed from analysis.
- Residential parcel classifications from DWR-provided residential landscape area measurement (LAM) (see *Technical Report: Outdoor Residential Landscape Area Measurement* [WUES-DWR-2021-02.T1] and *Recommendations for Outdoor Residential Water Use Efficiency Standard* [WUES-DWR-2021-02]).
- Other specific data needs per identification method (all in public domain or urban retail water supplier data), if needed.
  - Home size and other information from accessor parcel databases.
  - Landscape area from DWR-provided residential LAM (see *Technical Report: Outdoor Residential Landscape Area Measurement* [WUES-DWR-2021-02.T1] and *Recommendations for Outdoor Residential Water Use Efficiency Standard* [WUES-DWR-2021-02]).

### Use of Alternative Data

If an urban retail water supplier chooses to use alternative data or methodologies, they must receive approval from DWR and demonstrate that their data meet or exceed the quality and accuracy of data and methodologies provided by DWR. To request the use of alternative data or methodologies, the urban retail water supplier must demonstrate that the alternative data or methodologies meet or exceed the quality and accuracy of

the data and methodologies DWR provides by submitting a package containing the following:

1. Description of why the alternative data or methodologies meet or exceed the quality and accuracy of the DWR data.
2. Description of the methodologies used for quantifying the seasonal population water use, including data sources and any locally applicable research and literature.
3. Credentials (such as licenses, certifications, education, training, or professional background of staff) for the entity/party that conducted the research or analysis and verification.
4. Affidavit or certification of the alternative data by a qualified urban retail water supplier staff member responsible for data quality.
  - a. Certification of the alternative data by the entity/party that produced it if not produced by the urban retail water supplier's staff.
  - b. Referenced, published research reports do not require certification but must be cited.
5. A public process to provide the public an opportunity to review the alternative data or methodologies and understand the purpose of the request to use alternative data.
6. Submission of a request signed by the General Manager of the urban retail water supplier to DWR.

## 4.4 Implementation Considerations

The estimate of seasonal populations described in this variance will not be applicable to estimating permanent resident populations that will be used with IRWUS. Calculating IRWUS efficient water use should follow the standard and its associated guidelines and methodologies described in Section 5.1 of *Recommendations for Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B).

## 4.5 Reporting Requirements

Urban retail water suppliers must provide all necessary data and information to support the use of this variance and the 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. Reporting requirements include the following:



- ACS data.
- IRWUS (gpcd).
- Monthly water use data for the Standard Method.
- Hourly water use data for the Detailed Method.
- Water use billing data or mailing addresses that are maintained by the urban retail water supplier.
- Other specific data needs per identification method (all in public domain or urban retail water supplier records).
- If an urban retail water supplier uses a threshold of significance of 3 percent with the Standard Method, it should provide its plan for implementing AMI technology with certification by its governing body and provide supplemental information within two years to verify the implementation.

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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.

**Census County Division.** A subdivision of a county used by the U.S. Census Bureau for the purpose of presenting statistical data that are delineated cooperatively with state and local government authorities.

**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.

**seasonally occupied home.** Homes occupied for part of the year, seasonally or for recreation, that include second homes, vacation homes, and vacation rentals, provided that the home is still categorized as a residence. It is not necessary for a seasonally occupied home to have any particular seasonal pattern of occupancy – only that it is not the usual residence for any individual. For the purposes of variance development, all residential homes with seasonal, recreational, or occasional occupants were counted as seasonally occupied.

**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).

**usual residence.** The concept created by the Census Act of 1790 for the place where a person lives and sleeps most of the time. This place is not necessarily the same as the person's voting residence or legal residence.

**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.

## 6.0 References

- U.S. Census Bureau. (2019). American Community Survey 2015-2019 5-Year Data Release, Table B25004. Accessed at: <https://data.census.gov/cedsci/table?q=B25004&t=Vacancy%3AVacancy%20Characteristics%3AVacancy%20Rates&g=0400000US06&y=2019&tid=ACSDT5Y2019.B25004>
- DWR (California Department of Water Resources). 2016. Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use. Accessed at: <https://data.cnra.ca.gov/dataset/2015-urban-water-management-plans-uwmpps-historic-information/resource/683fee5e-fc96-484e-a07b-c592107718c9>
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- \_\_\_\_\_. 2021b. Urban Water Management Plan Guidebook 2020. Accessed at: <https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Water-Use-And-Efficiency/Urban-Water-Use-Efficiency/Urban-Water-Management-Plans/Final-2020-UWMP-Guidebook/UWMP-Guidebook-2020---Final-032921.pdf>
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- U.S. Census Bureau. 2020. Residence Criteria and Residence Situations for the 2020 Census of the United States. Accessed at: <https://www.census.gov/content/dam/Census/programs-surveys/decennial/2020-census/2020-Census-Residence-Criteria.pdf>

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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.
- California Department of Water Resources (DWR). September 2022. Recommendations for Outdoor Residential Water Use Efficiency Standard. DWR Report Number: WUES-DWR-2021-02.
- California Department of Water Resources (DWR). September 2022. Technical Report: Outdoor Residential Landscape Area Measurement. DWR Report Number: WUES-DWR-2021-02.T1.
- California Department of Water Resources (DWR). September 2022. Summary of Recommendations for Variances. DWR Report Number: WUES-DWR-2021-04.
- California Department of Water Resources (DWR). September 2022. Methods for Estimating Seasonal Populations with Water and Energy Data. DWR Report Number: WUES-DWR-2021-08.T1.
- 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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# **Appendix B – Template for Calculating the Efficient Water Use for Variance for Significant Fluctuations in Seasonal Populations**

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## **Instructions**

**Note that before using this spreadsheet, "number of identified units with seasonal population" must be determined using of the two methods described in WUE-DWR-2021-08.T1, including:**

1. Using monthly water use data (Standard Method)
2. Using hourly AMI water use data (Detailed Method)

**Urban retail water suppliers should decide based on local conditions in their service areas and available information to use one of the recommended methods to determine occupancy rates, including:**

1. Occupancy Rate\_M1
2. Occupancy Rate\_M2

**Do not change anything in the "Lookup" sheet.**

## Variance: Significant Fluctuations in Seasonal Populations

\* This sheet determines the Variance Water Use Volume based on Occupancy Rate\_M1.

\*\* Fill in the grey rows to determine: 1. water use under this variance, and 2. whether you (urban retail water supplier) are qualified to apply for this variance.

Parameter	Value
<b>Water Use for Seasonally Occupied Units</b> (gallons)	
<b>Population of Usual Residents</b> (Census Population)	
<b>Water Use for All Units With Usual Residents</b> (gallons)	
<b>Number of Units with Seasonal Population</b> (from Standard Method or Detailed Method)	
<b>Indoor Residential Water Use Standard</b> (GPCD) <sup>a</sup>	
<b>Variance Efficient Water Use Volume</b> (gallons)	#DIV/0!
<b>Which Identification Method You used to determine the number of seasonall occupied units in Cell B9?</b> Select one option from the drop-down menu in Cell B13.	Standard Method
<b>What is your aggregated estimates of efficient water use based on four established standards?</b> (gallons)	
<b>Significance Threshold</b>	0
<b>Are you (urban retail water supplier) qualified for this variance?</b>	#DIV/0!

**Occupancy Rate\_M1**= (Water Use For Seasonally Occupied Units×Population of Usual Residents (Census population))/(Water Use for All Units With Usual Residents)

**Variance Efficient Water Use Volume (gallons)**= Number of Units with Seasonal Population×Occupancy Rate (person days per year)×Indoor Residential Water Use Standard (GPCD)

a. GPCD is Gallons Per Capita per Day

## Variance: Significant Fluctuations in Seasonal Populations

\* This sheet determines the Variance Water Use Volume based on Occupancy Rate\_M2.

\*\* Fill in the grey rows to determine: 1. water use under this variance, and 2. whether you (urban retail water supplier) are qualified to apply for this variance.

Parameter	Value
<b>Average Number of Rooms Per Seasonally Occupied Units</b> (from ACS)	
<b>(Average Number of Rooms for Usual Residents' Units</b> (from ACS)	
<b>People per Household of Usual Residents' Units</b>	
<b>Number of Units with Seasonal Population</b> (from Standard Method or Detailed Method)	
<b>Indoor Residential Water Use Standard</b> (GPCD) <sup>a</sup>	
<b>Variance Efficient Water Use Volume</b> (gallons)	#DIV/0!
<b>Which Identification Method You used to determine the number of seasonall occupied units in Cell B9?</b> Select one option from the drop-down menu in Cell B13.	Standard Method
<b>What is your aggregated estimates of efficient water use based on four established standards?</b> (gallons)	
<b>Significance Threshold</b>	0
<b>Are you (urban retail water supplier) qualified for this variance?</b>	#DIV/0!

**Occupancy Rate\_M2**= (Average Number of Rooms Per Seasonally Occupied Units (from ACS)/Average Number of Rooms for Usual Residents Units (from ACS))×People per Household of Usual Residents' Units

**Variance Efficient Water Use Volume (gallons)**= Number of Units with Seasonal Population×Occupancy Rate (person days per year)×Indoor Residential Water Use Standard (GPCD)

a. GPCD is Gallons Per Capita per Day

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