

Recommendations for Variance for Significant Use of Water to Supplement Ponds and Lakes to Sustain Wildlife, Methods of Calculation, and Supporting Data Requirements

WUES-DWR-2021-11

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

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California Department of Water Resources
Water Use Efficiency Branch

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

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Abbreviations and Acronyms

2018 Legislation	2018 Legislation on Water Conservation and Drought Planning (Senate Bill 606 [Hertzberg] and Assembly Bill 1668 [Friedman], as amended)
CCR	California Code of Regulations
CII	commercial, industrial, and institutional
CII-DIM	commercial, industrial, and institutional dedicated irrigation meter
CII-DIMWUS	Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard
CII-DM	commercial, industrial, and institutional dedicated meter
CIMIS	California Irrigation Management Information System
DIM	dedicated irrigation meter
DWR	California Department of Water Resources
EF	evaporation factor
ETAF	evapotranspiration factor in Model Water Efficient Landscape Ordinance design standard (on parcel level)
ETF	evapotranspiration factor (on urban retail water supplier level)
ET _o	reference evapotranspiration
GIS	geographic information system
HOA	homeowners association
IRWUS	Indoor Residential Water Use Efficiency Standard
LA	landscape area
MAWA	maximum applied water allowance
MWELO	Model Water Efficient Landscape Ordinance
N/A	not applicable
OR_LAM	Outdoor Residential Landscape Area Measurement
ORWUS	Outdoor Residential Water Use Efficiency Standard

Peff	effective precipitation
Recommendation Package	Urban Water Use Efficiency Recommendation Package
SB	Senate Bill
SLA	Special Landscape Area
State	State of California
State Water Board	State Water Resources Control Board
UWUO	urban water use objective
UWUO_SB	urban water use objective without any variances
WC	California Water Code
WELO	Water Efficient Landscape Ordinance
WLS	Water Loss Standard

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Executive Summary

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

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

DWR conducted topic-specific research and investigations to answer three critical questions prior to developing recommendations for a variance for significant use of water to supplement ponds and lakes to sustain wildlife:

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

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

After confirming the above in collaboration with stakeholders and the State Water Board, DWR proceeded with variance development with a clarified scope, whereby significant use of water to supplement ponds and lakes to sustain wildlife can be appropriately estimated and incorporated in an urban retail water supplier's UWUO.

Consistent with the legislative directive, DWR used a public process involving a diverse group of stakeholders in the review and development of the variance for significant use of water to supplement ponds and lakes to sustain wildlife. The Water Use Studies Working Group and the Standards, Methods, and Performance Measures Working Group that DWR established to assist in implementing the 2018 Legislation were the primary stakeholders involved in the variance development process. Additional stakeholders included State of California agencies, cities, counties, urban retail water suppliers, environmental organizations, and other interested parties. Working group members and stakeholders were provided with many opportunities to comment on and inform the appropriateness of recommending a variance for significant use of water to supplement ponds and lakes to sustain wildlife. 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 use of water to supplement ponds and lakes to sustain wildlife" 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 addressing supplemental water for sustaining wildlife required under the existing regulatory framework or local ordinances. DWR also provided additional considerations and guidance for certain community needs for maintaining ponds and lakes for wildlife and other purposes without specific regulatory requirements. Implementation considerations, including the need for technical assistance, are included with the recommendations.

The recommendations for a variance for supplemental water to ponds and lakes to sustain wildlife is part of the *Recommendations for Urban Water Use Efficiency Standards, Variances, Performance Measures, and Annual Water Use Reporting* (WUES-DWR-2021-01A). The recommendations were prepared per the requirements of the 2018 Legislation and are to be transmitted to the State Water Board for adoption.

1.0 Introduction

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

1.1 New Approach to Urban Water Use Efficiency

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

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

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

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

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

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

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

1.2 Appropriate Variances

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

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

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

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

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

1.3 Purpose of the Report

Per legislative requirements, DWR conducted studies and investigations to determine if the legislatively identified potential variances and others suggested by stakeholders should be developed and recommended for adoption. This report is one of the variance-specific reports that focuses on the potential variance for "significant use of water to supplement ponds and lakes to sustain wildlife" identified in the legislation.

Water Use to Supplement Ponds and Lakes to Sustain Wildlife

Ponds and lakes abound in urban communities, including natural water bodies or man-made features for various purposes, including water supply storage, stormwater management, environmental needs, and recreational uses. The size of these ponds and lakes could also vary significantly depending on the setting and are managed under different jurisdictions, including cities, counties, and local self-governing organizations, such as homeowners associations (HOA). However, these water bodies could either sustain wildlife naturally or attract wildlife by providing needed sources of water.

Depending on local conditions and the protective status of existing wildlife, these water bodies may be subject to certain regulatory requirements or local ordinance for species protection or other purposes. Therefore, a properly defined scope for this water use is critically important for the considerations of this potential variance.

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

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

Specifically, this report, *Recommendations for Variance for Significant Use of Water to Supplement Ponds and Lakes to Sustain Wildlife, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-11), provides the detailed documentation for the review and subsequent variance development for specifications, guidelines, and methodologies for the potential variance for significant use of water to supplement ponds and lakes to sustain wildlife only. 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 the supporting data and information requirements.
- **Section 5 – Glossary** provides a list of key terms and their definitions used in this document.
- **Section 6 – References** provides a list of references used in this document.

This report includes 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 to supplement ponds and lakes to sustain wildlife. This template is provided for illustrative purposes and is subject to revision after the State Water Board’s adoption.

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2.0 Scope Definition

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

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

- Confirm whether significant use of water to supplement ponds and lakes to sustain wildlife 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 Sustaining Wildlife Nexus

There are many reasons for ponds and lakes existing in urban communities as previously mentioned in Section 1. The legislative directive emphasizes sustaining wildlife in this variance consideration, providing an important anchor for defining qualifying conditions.

While all water bodies can attract wildlife, not all ponds and lakes are maintained intentionally for wildlife or other similar purposes. There are also certain water bodies that require deterring wildlife due to their functions (e.g., water treatment facilities) or locations (e.g., in the vicinity of an airport). In addition, wildlife may have different status of protection under the existing regulatory framework or local ordinances. It is reasonable to consider a variance to address regulatory requirements or local ordinances requiring the local entities or the nearby property owners and businesses to provide water to a pond or lake to sustain wildlife conditions because this type of use is not conceptually included in any of the four urban water use efficiency standards.

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 to supplement ponds and lakes to sustain wildlife against three questions in sequence prior to developing variance recommendations:

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

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

Unique Use

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

In April 2021, DWR conducted a survey regarding potential concerns over significant water use to supplement ponds and lakes to sustain wildlife. The survey was completed by 68 urban retail water suppliers in the State. About 20 percent of the participants

mentioned that supplemental water to maintain ponds and lakes might be a significant use of water for their utilities. However, only three urban retail water suppliers expected that the effect would be more than five percent of their total water use. This result suggests that significant water use for this purpose would be unique because it applies only to some urban retail water suppliers.

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

- Conditions that are categorically excluded from variance considerations due to the water use not being part of the UWUO:
 - Water use, including that for environmental and recreational purposes on lands other than residential or CII parcels, is not within the scope of UWUO or subject to provisions of urban water use efficiency under the 2018 Legislation.
 - Discharge of water from wastewater treatment facilities for environmental flows or environmental buffers (e.g., wetlands or ponds, lake augmentation) is not within the scope of the UWUO or subject to provisions of urban water use efficiency under the 2018 Legislation.
 - Public ponds or lakes receiving water from a CII account or a dedicated CII meter (CII-DM) are not part of the UWUO and, thus, are not eligible for a variance condition, regardless of whether the supplemental water is required under a regulatory framework. Rather, this CII water use is subject to CII water use performance measures as separately recommended by DWR (see *Recommendations for Performance Measures of Commercial, Industrial, and Institutional Water Use* [WUES-DWR-2021-15]).
- Conditions that are categorically excluded from variance considerations due to lack of proper justification:
 - Stormwater retention facilities maintained by local entities for flood management purposes, and possibly, incidental recreational benefits without additional regulatory requirements for maintaining water levels for wildlife species are excluded. In this context, incidental benefits are those benefits resulting from the development of the stated additional project benefits that are not specifically mentioned in the contributed funding agreement and are not included in the allocation of costs. As a result, there is no guarantee the

project would provide such a benefit; instead, “it would happen when it happens.”

- Over-irrigation from residential outdoor use or CII landscape irrigation that contributes to nearby public or private ponds and lakes in a deliberate way is not allowed under the new water conservation framework. Thus, it is not allowed for variance considerations, even for supporting wildlife under a regulatory framework. If this occurs, urban retail water suppliers should serve water through a different account or a separate meter to properly account for that water use.
- Conditions where water use is within the scope of UWUO:
 - Water use to supplement ponds and lakes to sustain wildlife is not relevant to IRWUS or WLS, but could occur in the context of ORWUS and CII-DIMWUS. It is also not relevant to other variances under consideration.
 - Certain water features are allowed under ORWUS (e.g., koi ponds for ornamental and aesthetic functions and swimming pools) (see *Recommendations for Outdoor Residential Water Use Efficiency Standard* [WUES-DWR-2021-02]). However, ponds and lakes within residential parcels that are excluded from ORWUS could be maintained per regulatory requirements. Therefore, the water use is potentially allowable under a variance.
 - Supplemental water for ponds or lakes within CII parcels including, but not limited to, sustaining wildlife, recreation, or other public benefit may receive Special Landscape Area (SLA) provisions under CII-DIMWUS (see *Recommendations for Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard* [WUES-DWR-2021-03]). However, ponds and lakes within CII parcels, that are maintained per regulatory requirements, may need water in addition to what is allowed under CII-DIMWUS. Therefore, the water use is potentially allowable under a variance.

In the above analyses, the unique use of water to supplement ponds and lakes per regulatory requirements to sustain wildlife was confirmed to be excluded from ORWUS and CII-DIMWUS. Therefore, it was reasonable for DWR to proceed the evaluation of potential for a material effect on urban retail water suppliers’ UWUO.

Potential for a Material Effect

The best available data source to assess the extent of this water use throughout the State was the information from DWR’s 2018 Outdoor Residential Landscape Area Measurement (OR_LAM) (see *Technical Report: Outdoor Residential Landscape Area*

Measurement [WUES-DWR-2021-02.T1]). DWR used the OR_LAM data to formulate ORWUS; open water (i.e., ponds and lakes) are excluded from ORWUS. The OR_LAM includes data for a total of 399 urban retail water suppliers (i.e., all the urban retail water suppliers subject to the provisions of urban water use efficiency under the 2018 Legislation).

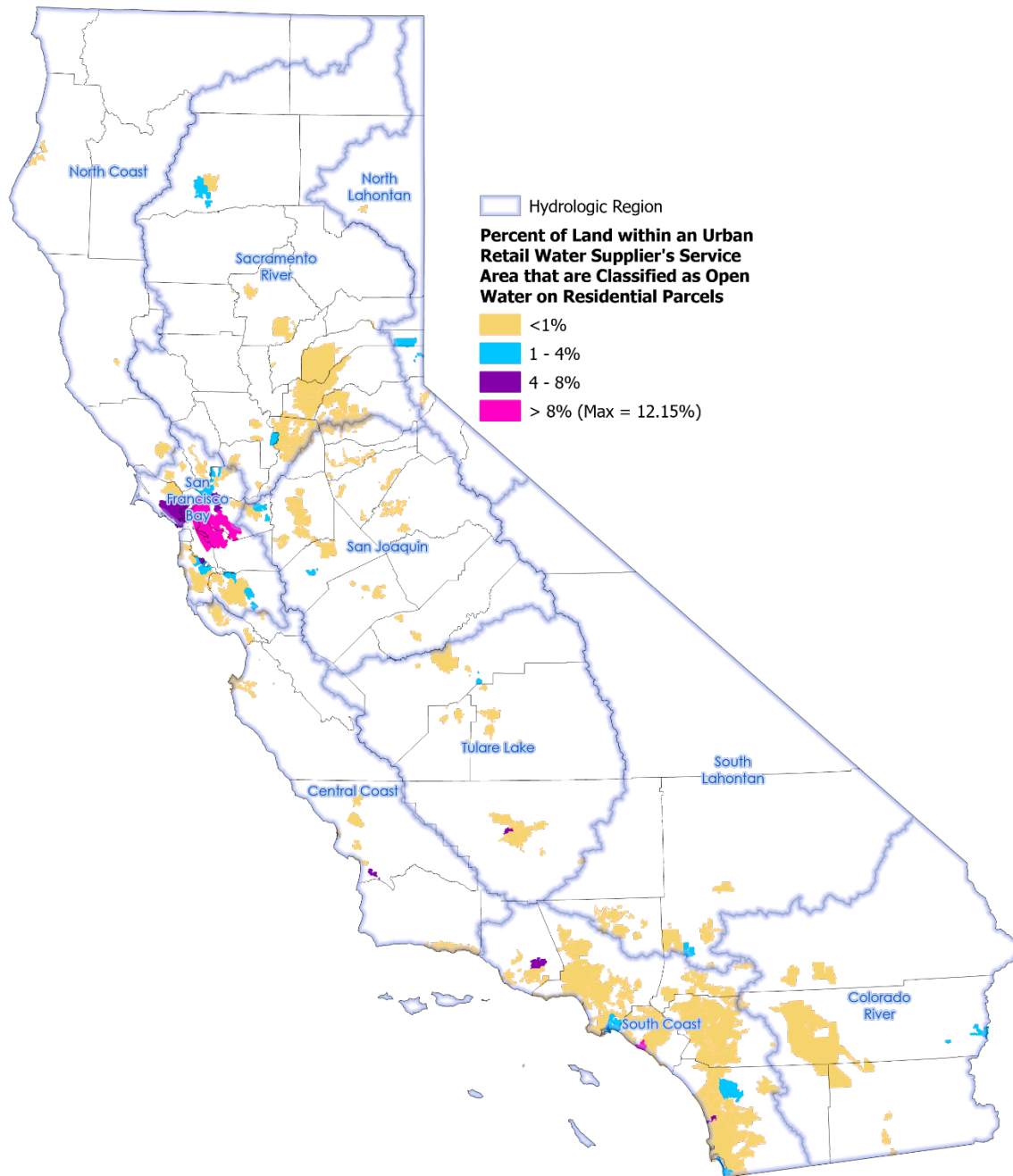
Analysis of the OR_LAM data suggested that 158 out of 399 urban retail water suppliers have open water classified on residential parcels in their corresponding service areas. Figure 2-1 summarizes the percentage of land within an urban retail water supplier's service area classified as open water on residential parcels. The results suggest that this water use could have a material effect on the UWUO for urban retail water suppliers in the San Francisco Hydrologic Region and, to a lesser degree, in the Central Coast, South Coast, and Tulare Lake Hydrologic Regions, especially for some smaller urban retail water suppliers. Figure 2-2 provides additional insights on the distribution of associated percentages in each hydrologic region.

DWR recognized that the existence of open water in the 2018 OR_LAM data does not necessarily imply there would be significant use of water to maintain those water bodies for wildlife; it only shows potential water bodies that could contribute to water use associated with this variance. However, it is also recognized that the 2018 OR_LAM data set does not include open water in parcels other than residential parcels.

Although there are potential limitations related to the best available data, DWR confirmed that there are reasons to believe that use of water to supplement ponds and lakes to sustain wildlife could have a material effect on the UWUO of some urban retail water suppliers and, as such, a variance is warranted.

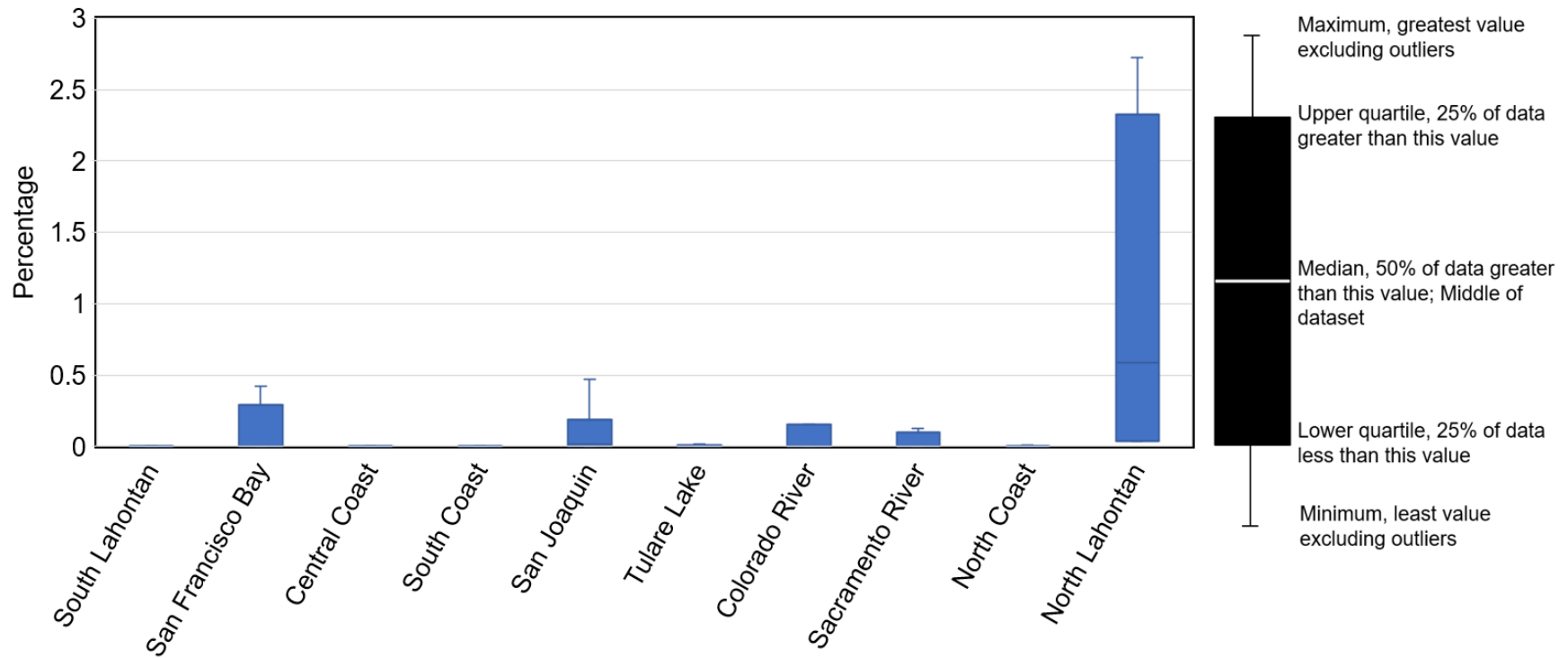
2.3 Clarified Scope for Variance Development

Based on the analysis, the variance for significant use of water to supplement ponds and lakes to sustain wildlife is limited to ponds and lakes on residential and CII parcels with residential and CII land use designations, respectively. The water should be supplied from residential or CII-DIM accounts and the resulting variance would be related to water use against ORWUS and CII-DIMWUS.



Source of Data for 399 urban retail water suppliers: California Department of Water Resources, 2018 Landscape Area Measurements. See Technical Report: Outdoor Residential Landscape Area Measurement (WUES-DWR-2021-02.T1).

Figure 2-1 Percent of Land within an Urban Retail Water Supplier's Service Area Classified as Open Water on Residential Parcels



Source of Data for 158 urban retail water suppliers with classified open water: California Department of Water Resources, 2018 Landscape Area Measurements. See Technical Report: Outdoor Residential Landscape Area Measurement (WUES-DWR-2021-02.T1).

Figure 2-2 Open Water on Residential Parcels by Hydrologic Region (by Percentage of Urban Retail Water Supplier’s Service Area)

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3.0 Approach to Variance Design

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

3.1 Stakeholder Process

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

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

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

DWR also conducted and responded to requests for additional meetings and public outreach and engagement activities with both individuals and groups of stakeholders to

learn from their experiences, understand their specific concerns, and receive other feedback. For this variance, there were no specific studies using data from urban retail water suppliers.

3.2 Considerations for Variance Design

As stated in Section 2.3, the clarified scope for the variance for use of water to supplement ponds and lakes to sustain wildlife is limited to ponds and lakes on residential and CII parcels with residential and CII land use designations, respectively. The water should be supplied from residential or CII-DIM accounts and the resulting variance would be against ORWUS or CII-DIMWUS. DWR proceeded with variance development after confirming this clarified scope with stakeholders and working group members.

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

- Under both ORWUS and CII-DIMWUS conditions, it is reasonable to differentiate the conditions where supplemental water needs originated from an existing regulatory framework or if they were based on the preference of a local self-governing organization, such as an HOA or similar business entity.
 - An existing regulatory framework has a strong basis to be recognized in a variance. However, a local self-governing organization presents a weaker nexus to the intent of this variance, even though water use could provide additional social benefits (e.g., local amenity, quality of life) in a secluded neighborhood not accessible by the public.
 - Part of the variance design was to determine the threshold of significance to set the minimum level of use by any urban retail water supplier for claiming the variance. Following the differences between a water body with a regulatory requirement and another with a local preference, the corresponding significance thresholds may need to be different to be consistent with the difference between a “must” condition and a “preferred” condition.
- Regulatory requirements or local preferences on maintaining ponds and lakes likely vary case-by-case with volumetric and seasonal requirements. The ponds and lakes may supply other diversions or consumptive uses in addition to

sustaining wildlife. A fair and reasonable assumption for providing supplemental water under a variance is required.

- To avoid potential complications associated with the subject water body, it is prudent to focus on supplemental water use to offset evaporation loss from the water body. In other words, the purpose of supplemental water use is to neutralize the effect of a natural process, but not to further augment any additional beneficial uses, if any.
- The specification for regulatory requirements may not always be on a year-round basis or about maintaining a certain water level; the subject water body may be low in water storage or even drained during certain times of the year. Therefore, the annual evaporation loss would have to be calculated accordingly.
- Under both ORWUS and CII-DIMWUS conditions, it is also prudent for affected urban retail water suppliers to consider changes to the setting by connecting it to a CII account or by installing a separate CII-DM to be excluded from the UWUO. This measure may seem evasive; however, it may be helpful administratively if an urban retail water supplier has only limited water use for this purpose that cannot reach the threshold of significance. This can also avoid the burden and costs associated with pursuing a variance, which concerned many urban retail water suppliers. The resulting water use would still be under the requirements for CII water use efficiency performance measures.
- Many urban retail water suppliers expressed concerns over the potential burden and costs to pursue a variance in addition to compliance with many other requirements under the provisions of urban water use efficiency in the 2018 Legislation. Therefore, DWR considered the following to be reasonable:
 - The methodology for calculating aggregated water use under this variance should, to the extent reasonable, stay consistent with existing water use efficiency laws and regulations or build on existing methodologies used by urban retail water suppliers in SB X7-7 compliance.
 - The data and information required to support a variance and the calculated amount need to be credible, reasonably accessible to urban retail water suppliers or reasonably obtainable by urban retail water suppliers, or separately provided by DWR to the extent possible.
 - Necessary technical assistance from DWR related to implementation should also be incorporated into the variance development process.

3.3 Variance Options

The two dimensions of consideration associated with the variance to supplement water to ponds and lakes to sustain wildlife were examined further through the development of options for considering covered requirements (regulatory requirements or local preference) and for calculating efficient water use under this variance. The purposes of these options were to explore pros and cons for different settings and solicit input from stakeholders regarding their corresponding reasonableness and ability to implement those options. Based on the resulting findings and insights, DWR then developed the recommendations (see Section 4).

Options for Considering Covered Requirements

Three options were developed for considering covered requirements and discussed with stakeholders in working group meetings on May 13 and July 21, 2021.

- **Option 1 – The variance would be for maintaining ponds and lakes with regulatory requirements only.** Since the scope of consideration was limited to residential and CII parcels, the applicable conditions with regulatory requirements were likely low. As a result, the significance threshold was set at zero because the purpose of this variance was to address regulatory requirements. Using Option 1, necessary documentation for regulatory requirements and supporting data would be required to support the use of this variance.
- **Option 2 – The variance would be for maintaining all service area ponds and lakes with regulatory requirements or local preference.** It was anticipated that the applicable conditions could be much higher than those of Option 1, especially in Southern California where master-planned communities with HOAs are more prevalent. Therefore, the significance threshold was set at 5 percent of the total aggregated efficient water use volume based on the four standards (UWUO_SB). Using Option 2, necessary documentation for regulatory requirements, local preference, and supporting data would be required to support the use of this variance.
- **Option 3 – Converting water use under a CII-DM without setting up a variance.** This option was to streamline the regulatory requirements to reduce the burden and cost for urban retail water suppliers. There was no need for defining a significance threshold without a variance. Along a similar rationale, this option included the possibility of converting water use from CII outdoor irrigation of landscape areas with dedicated irrigation meters (CII-DIM) and recognizing the ponds and lakes with supplemental water needs as an SLA under CII-DIMWUS to account for water use. As DWR is also formulating recommendations for CII-DIMWUS, the treatment would be potentially viable. Note that many communities have DIMs for residential parcels, especially for irrigation using recycled water.

These residential DIMs are functionally the same as a CII-DIM, providing an opportunity to convert them to CII-DIMs for UWUO accounting purposes with the assurance of no double counting. From the viewpoint of an urban retail water supplier, the choice between converting to a CII-DM or a CII-DIM may depend on how significant this water use would be compared to its total water use.

The feedback from working group members and stakeholders was that they preferred Option 2, as it could provide greater allowable water use and accommodate local conditions better than Option 1. However, they do recognize the difference DWR drew between regulatory requirements and local preference. For Option 3, the stakeholders needed more time and details to digest its potential implication, but highly appreciated the intent to streamline regulations and felt that it was worthy of further consideration. In terms of the proposed different treatment on the significance thresholds in Options 1 and 2, the stakeholders felt it was adequate and the associated values were conceptually fair, but hard to assess without actual data. As a result, some suggested the variance include recommendations to reassess the significance threshold after the first year of implementation.

Options for Calculating the Variance Efficient Water Use

DWR considered that the Model Water Efficient Landscape Ordinance (MWELO) has provided a good basis for calculating efficient water use under this variance. The reference of an existing regulation helps streamline communication, understanding, and future compliance.

MWELO is a State regulation (California Code of Regulations [CCR], Title 23, Sections 490 through 495) that was last updated in 2015. The regulation requires a permit for water-efficient landscapes in new developments that are equal to or greater than 500 square feet and rehabilitated landscapes that are equal to or greater than 2,500 square feet. MWELO is also referenced by Title 24, Part 11, CalGreen Building Code. All local agencies must adopt, implement, and enforce MWELO or a local Water Efficient Landscape Ordinance (WELO) that is at least as effective as MWELO. Usually, local agencies adopt WELOs to create a more stringent ordinance than MWELO.

MWELO relies on a quantitative approach to determine efficient water use by setting a maximum applied water allowance (MAWA) as an upper limit of water that can be applied annually for an irrigated landscape (CCR, Title 23, Section 491(tt)).

$$MAWA = ETo \times 0.62 \times ETAF \times LA$$

where,

- *ETo* is the reference evapotranspiration in inches.
- 0.62 is a unit conversion factor in gallons per square feet.

- *ETAF* is the evapotranspiration factor in MWELo design standard (on parcel level) based on the plant factors and irrigation methods selected for individual landscapes.
- *LA* is total landscape area in square feet.

If a local agency requires consideration of effective precipitation in its adopted WELo, the MAWA calculation should be adjusted accordingly below.

$$MAWA = (ETo - Peff) \times 0.62 \times ETAF \times LA$$

where,

- *Peff* is the effective precipitation in inches, which is 25 percent of the annual precipitation (CCR, Title 23, Section 494).

Landscape areas dedicated solely to edible plants, recreational areas, areas irrigated with recycled water, or water features using recycled water are defined as SLAs in MWELo (CCR, Title 23, Section 491(ttt)). Furthermore, a water feature means a design element in which open water performs an aesthetic or recreational function. Water features include ponds, lakes, waterfalls, fountains, artificial streams, spas, and swimming pools (where water is artificially supplied) (CCR, Title 23, Section 491(cccc)). These SLAs are allowed to use an *ETAF* of 1.0 in the MAWA calculation (CCR, Title 23, Section 491(s)).

DWR consider MWELo specifications as a solid building block for the methodology to calculate efficient water use under this variance. As previously mentioned, water use considered under this variance to supplement ponds and lakes on residential and CII parcels is similar to that included in the water features under MWELo; although, the source of water may not be limited by using recycled water. Regardless of sources of water, the physics governing the evaporation from open water remains the same. The challenge is how to translate *ETo* to actual evaporation from the surface of open water.

Therefore, DWR developed three options building on MWELo principles for calculating efficient water use under this variance and discussed with stakeholders in working group meetings on May 13 and July 21, 2021.

- **Option 1** – Using the MWELo reference evapotranspiration adjusted for local conditions; in other words, use the local *ETo* provided in Appendix A of MWELo. This is a measurement that urban retail water suppliers are already using and, thus, eliminates the need for a new approach for this variance use only.
- **Option 2** – Using an evaporation factor (*EF*) of 1.1 to adjust *ETo* in the MWELo SLA MAWA calculation, where *ETo* is the reference evapotranspiration as defined in Appendix A of MWELo or otherwise provided by DWR. The *EF* of 1.1

is a statewide average for converting *ET_o* to evaporation from the surface of open water recommended by University of California, Cooperative Extension Service.²

The use of *EF* is to recognize increased water evaporation from free water surfaces. Since MWELO is a design standard, the *ETAF* is applied on a parcel or landscape level. Additional treatments are required for variance design to use an evapotranspiration factor on an urban retail water supplier level to be consistent with the legislative directive for implementing the provisions of urban water use efficiency in the 2018 Legislation. In addition, the water use under this variance is not for irrigation and, therefore, *EF* is used in the calculations instead of *ETAF*.

- **Option 3** – Using the local monthly pan evaporation coefficient measured at a location within 50 miles with an appropriate factor to calculate evaporation from open water.

A summary of different options and sources of data for each option are provided in Table 3-1. Each option along with important characteristics, including data requirements, data source, and threshold of significance, are shown in the table. This comparison was presented to the stakeholders and working group members during the workshop held on July 21, 2021, and the feedback received is explained below.

² University of California, Cooperative Extension Service, Division of Agriculture and Natural Resources. n.d. "Using Reference Evapotranspiration (*ET_o*) and Crop Coefficients to Estimate Crop Evapotranspiration (*ET_c*) for Agronomic Crops, Grasses, and Vegetable Crops." Leaflet 21427.

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Table 3-1 Summary of the Three Options for Variance for Significant Use of Water to Supplement Ponds and Lakes to Sustain Wildlife

Items	Option 1	Option 2	Option 3
Qualifying Criterion	Legal or regulatory requirements only.	Everything in Option 1, plus: <ul style="list-style-type: none"> Certain management-desired conditions established by local governments (not hard requirements). Requirements of a private association or entity for property value and amenity (quality of life). 	Do not establish a variance but require this use to be on a dedicated meter (under CII-DM). Further, it is possible to characterize this as an SLA under CII-DIMWUS for proper accounting and attribution.
Significance Threshold	All, as required.	More than 5 percent of the total aggregated efficient water use volume based on the four standards (UWUO_SB).	N/A
Equation	$Water\ Use = ETo \times 0.62 \times EF \times Total\ Open\ Water\ Area$	Same as Option 1.	N/A
Evaporation Factor	DWR was considering one of the following three options for this application: <ul style="list-style-type: none"> Use reference <i>ETo</i> adjusted for local conditions provided in Appendix A of MWELO. Use <i>ETo</i> per climate region, with a factor of adjustment at 1.1, which was suggested as a statewide average number for evaporation from open water surfaces by University of California, Cooperative Extension Service (<i>ETo</i> is provided by DWR or available at CIMIS.¹) Use local monthly pan evaporation within 50 miles with an adjustment factor. 	Same as Option 1.	N/A
Total Qualified Open Water Surface area	Urban retail water suppliers should provide local knowledge to determine which open waters are qualified for the variance.	Same as Option 1.	N/A
Reporting Requirements	Regulatory requirements for the applicable water bodies, including the purposes and specific terms and conditions that require supplemental water.	Regulatory requirements or local ordinances for the applicable water bodies, including the purposes and specific terms and conditions that require supplemental water. Resolutions of the private association or entity for maintaining the water body and associated terms and conditions, including the responsibility for payment.	N/A

Note:

¹ <https://cimis.water.ca.gov/>

Key:

CII-DM = commercial, industrial, and institutional dedicated meters

CII-DIMWUS = Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard

CIMIS = California Irrigation Management Information System

EF = evaporation factor

ETo = reference evapotranspiration

MWELo = Model Water Efficient Landscape Ordinance

N/A = not applicable

SLA = Special Landscape Area

UWUO SB = urban water use objective without any variances

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The working group members and stakeholders considered that using Options 1 or 2 would be easier because in both cases, the required information would be provided by DWR. However, Option 1 may not be sufficient for the intent of the variance to cover the evaporation loss from open water. The stakeholders expressed their concerns over using pan evaporation coefficients, which are neither readily available to urban retail water suppliers in general, nor easy for them to acquire. They were also uncertain about the 50-mile range as microclimates may have significant effects on evaporation from open water. For example, a 50-mile range from Santa Monica (a coastal area) could include San Bernardino County (an inland area), where climate conditions are drastically different. The stakeholders agreed that if Option 3 of calculating the variance efficient water use did not include other provisions to ensure fair and adequate access to pan evaporation coefficients and adjustment factors to reflect local conditions, it should be removed from further consideration.

3.4 Summary of Findings

Based on research and input from working group members and stakeholders, DWR concluded that water use to supplement ponds and lakes to sustain wildlife with requirements from an existing regulatory framework should be recognized and provided through a variance. The allowable water use should be for offsetting the evaporation loss using the MWELo principle with an EF of 1.1 to translate ET_o to evaporation from the surface of open water. Due to the regulatory requirements, the threshold of significance should be set at zero. As the regulatory requirements are site specific, urban retail water suppliers should have the best knowledge for developing the corresponding aggregated area for volume calculation needs.

In addition, DWR recognized that local preferences imposed by self-governing organizations, such as HOAs, may also require water use to maintain ponds and lakes for various purposes. DWR considered it would be reasonable to include a designation of SLA under CII-DIMWUS to account for most of the water use, if urban retail water suppliers convert this portion of water use to be under a CII-DIM separate from the original mixed-use meter (see *Recommendations for Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard* [WUES-DWR-2021-03]). However, this type of water use will not be allowed in the variance.

DWR further recognized that for potential localized and administrative considerations, urban retail water suppliers may reclassify occasional water use to supplement ponds and lakes to sustain wildlife by using a CII-DM (not a CII-DIM) and excluding this water use from UWUO reporting purposes. The resulting water use would be subject to CII performance measures. However, in any case, over-irrigation to provide supplemental water to ponds and lakes is not considered a reasonable use of water and, therefore, is strictly prohibited.

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4.0 Recommendations

This section provides DWR's recommendations for the variance for significant use of water to supplement ponds and lakes to sustain wildlife, 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 maintaining ponds and lakes for sustaining wildlife or other purposes.

4.1 Summary of Recommendations

Based on the analysis and stakeholder input, DWR's recommendations include two parts. **These recommendations are contingent upon DWR's recommended ORWUS and CII-DIMWUS and their adoption by the State Water Board.**

Recommendations for the Variance for Significant Use of Water to Supplement Ponds and Lakes to Sustain Wildlife

DWR recommends that a variance should be established for ponds and lakes on residential and CII parcels that are required to maintain certain water level elevations per requirements under the existing regulatory framework. In this context, residential and CII parcels are property parcels with a residential or CII land use designation under the governing general plans of counties and cities, respectively. The recommended variance against ORWUS and CII-DIMWUS should have the specifications detailed in Section 4.2. The calculation of aggregated efficient water use for significant use of water to supplement ponds and lakes to sustain wildlife (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.

Coordinated Recommendations for Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard

DWR includes in CII-DIMWUS a recommendation for an SLA specification for ponds and lakes on residential and CII parcels that are maintained using supplemental water, and those on residential parcels per local preference (e.g., the requirements from a self-governing organization) without explicit regulatory requirements. In this context, residential and CII parcels are property parcels with a residential and CII land use designation under the governing general plans of counties and cities, respectively. This recommendation provides a reasonable accommodation for urban retail water suppliers to account for the water use if it is converted to a CII-DIM for UWUO reporting purposes (see *Recommendations for Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard*

[WUES-DWR-2021-03]). There would be no additional accommodation for other conditions. The corresponding water use is not allowed under the variance for significant use of water to supplement ponds and lakes to sustain wildlife.

4.2 Specifications

DWR recommends that a variance be established for “significant use of water to supplement ponds and lakes to sustain wildlife” with the following specifications.

- Only water use required by existing regulations or local ordinances to maintain ponds and lakes on residential and CII parcels is allowed.
- Only water used to offset the annual evaporation loss from ponds and lakes is allowed, although the applicable regulations may have different specifications in quality or season.
- Consistent with MWEL0, the variance water use is expressed using an *EF* to adjust *ETo* in relation to the total qualified open water (ponds and lakes) surface area.
 - The Variance Efficient Water Use Volume is calculated using an *EF* of 1.1.
- The variance significance threshold is 0 percent of the UWUO_SB because maintaining this function is a regulatory requirement.
- The calculation of the Variance Efficient Water Use Volume should follow the guidelines and methodologies provided by DWR (see later section).

4.3 Guidelines and Methodologies

DWR recommends the following guidelines and methodologies for variance for “significant use of water to supplement ponds and lakes to sustain wildlife.”

- An urban retail water supplier will be allowed to include the variance for maintaining ponds and lakes to sustain wildlife in calculating its UWUO when all of the following conditions are satisfied.
 1. The use of this variance by the urban retail water supplier is previously approved by State Water Board. (Reminder: The State Water Board’s approval is for using the variance, but not for the quantity, which may vary every year.)
 2. The urban retail water supplier should verify the regulatory requirements are in place every year before using the variance to calculate the UWUO.

- 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 to or superior to DWR-provided data or DWR-suggested referenced data. Refer to “Use of Alternative Data” in the following sections.
- Urban retail water suppliers should provide all necessary data and information to support the use of this variance and associated calculated amount of estimate 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 for calculating UWUO, refer to *Recommendations for Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B, Section 6.2).

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

The existence of open water in any data set or mapping product does not imply the need for supplemental water for maintenance. Data on the size of ponds and lakes and supporting documentation of specific regulatory requirements to supplement water to those ponds and lakes for sustaining wildlife are required for using this variance.

Appendix B provides a template for calculating the Variance Efficient Water Use Volume to supplement ponds and lakes to sustain wildlife. This template is provided for illustrative purposes and is subject to revision after the State Water Board’s adoption.

It is up to the urban retail water supplier to ensure that the claimed usage rates are not in violation of any existing regulations or policies and are appropriate for the service area climate conditions and accounting.

Data Needed for Calculation

- Total open water area, in square feet, required to be maintained per regulatory requirements.
- *ET_o* in inches.
- *EF* as statewide average of 1.1, unitless.

Variance Efficient Water Use Volume

The Variance Efficient Water Use Volume, in gallons, is the product of ET_o in (inches), Total Open Water Area (square feet), 1.1 (unitless EF value), and a unit conversion factor (0.62).

Variance Efficient Water Use Volume (gallons) = ET_o (inches) x 1.1 x Total Open Water Area (square feet) x 0.62

Significance Test

There is no significance test for this variance because water use is required per regulatory requirements and the threshold of significance is, therefore, 0 percent of the UWUO_SB.

Data Provided or Obtained by Urban Retail Water Supplier

- Total open water area, in square feet, required to be maintained per regulatory requirements.
- Documentation of regulatory requirement, including specific terms and conditions requiring supplemental water.

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

A summary of guidelines and methodologies to calculate the Variance Efficient Water Use Volume for commercial or noncommercial agricultural use on residential parcels is provided in Table 4-1.

Table 4-1 Summary of Guidelines and Methodologies for Calculation of the Variance Efficient Water Use Volume for Significant Use of Water to Supplement Ponds and Lakes to Sustain Wildlife

Guidelines and Methodologies	Calculation of Variance Efficient Water Use Volume
Data needed for calculation	<ul style="list-style-type: none"> • <i>ET_o</i>. • <i>EF</i> (statewide average = 1.1). • Total open water area required to be maintained per regulatory requirements.
Equation	$\text{Variance Efficient Water Use Volume (gallons)} = ET_o \text{ (inches)} \times 1.1 \times \text{Total Open Water Area (square feet)} \times 0.62$
Source(s) of data	<p>Provided by DWR:</p> <ul style="list-style-type: none"> • <i>ET_o</i> (CIMIS). • <i>EF</i> (statewide average = 1.1). <p>To be obtained/developed by urban retail water supplier:</p> <ul style="list-style-type: none"> • Total open water area required to be maintained per regulatory requirements. • Urban retail water suppliers can use local information as alternative data to determine <i>EF</i>.
Reporting requirements (provided to DWR by urban retail water supplier)	<ul style="list-style-type: none"> • Regulatory requirements for the applicable water bodies, including the purposes and the specific terms and conditions that require supplemental water. • Total open water area required to be maintained per regulatory requirements and associated documentation.

Key:

CIMIS = California Irrigation Management Information System

DWR = California Department of Water Resources

EF = evaporation factor

ET_o = reference evapotranspiration

Data Accuracy

Urban retail water suppliers must estimate the open water surface area. There are two main methods for this determination:

- **On-the-ground measurement** – This approach involves physical measurement of open water surface area perimeter. It may provide the accurate results, but it is time consuming and resource intensive, and adjustments may need to be made where access to the shoreline is restricted and where geometry of the area is irregular. This also involves coordinating with the adjacent property owners for permission to access the property and conduct measurements.

- **Using remote sensing or Geographic Information System (GIS) mapping methods** – The accuracy of results from remote sensing methods depends on qualifications of the entity that performs the analysis and quality of the remotely sensed or GIS data. If done correctly, this method can produce reasonably accurate results, but requires technical resources (GIS mapping systems and trained personnel) or financial resources (contracting).

Regardless of the method chosen, urban retail water suppliers must include in their application:

- Description of the methodology and data used, including data sources and any locally applicable research and literature.
- Credentials (such as licenses, certifications, education, training, or professional background of staff) for the entity/party that conducted the research or analysis and verification.
- Affidavit or certification of the data by a qualified urban retail water supplier staff member responsible for data quality.
 - Certification of the alternative data by the entity/party that produced it if not produced by the urban retail water supplier’s staff.
 - Referenced, published research reports do not require certification but must be cited.

Map(s), satellite image(s), or aerial image(s) showing the location of ponds and lakes, associated measurements, and other documentation must be retained by the urban retail water supplier and be available upon request for the duration of data use plus three years.

Data Provided by California Department of Water Resources

- *ETo* (California Irrigation Management Information System).
- *EF* of 1.1 (statewide average).

Alternative *ETo* and *EF* data are allowed provided they meet or exceed the accuracy of DWR-provided data, as described in the section below.

Use of Alternative Data

If an urban retail water supplier chooses to use alternative data, it must receive approval from DWR and demonstrate that its data meets or exceeds the quality and accuracy of data provided by DWR.

Alternative *ETo* Data

To demonstrate that alternative *ETo* (and/or total precipitation) data meet or exceed the quality and accuracy of the *ETo* (and/or total precipitation) data that DWR provides, an urban retail water supplier must submit a package containing the following:

1. Description of why the alternative data meets or exceeds the quality and accuracy of the DWR data.
2. Description of the methodology used to estimate *ETo* (and/or precipitation).
3. Indication of the source of data used to estimate *ETo* (and/or precipitation) (e.g., whether it is from a weather station or remote sensing).
4. If *ETo* (and/or precipitation) is calculated using station data:
 - a. Description of the siting condition of the weather station.
 - b. List of all sensors used.
 - c. Description of maintenance procedures and schedules.
 - d. Description of the quality assurance/quality control procedures.
 - e. Detailed description of the equation used to estimate *ETo* and *Peff*.
5. If *ETo* is estimated using remote sensing data:
 - a. The specific input data source (satellite, airborne, etc.) and image resolution.
 - b. Detailed description of the methodology for deriving *ETo* from remotely sensed data.
 - c. Description of how the method and data were validated and documentation of validation.
6. Description of why the alternative *ETo* (and/or precipitation) data quality and accuracy are equivalent to or better than that of DWR.
7. Certification of the alternative data by the entity that produced it.
8. A public process to provide the public an opportunity to review the alternative data and understand the purpose of the request to use alternative data.
9. A request signed by the General Manager of the urban retail water supplier to DWR.

Alternative EF Data

To request the use of alternative data for *EF*, the urban retail water supplier must demonstrate that the alternative data or method meet or exceed the quality and accuracy of the data DWR provides or references by submitting a package containing the following:

1. Description of why the alternative data or method meets or exceeds the quality and accuracy of the DWR data or referenced data.
2. Description of the methodology and data used, 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 request signed by the General Manager of the urban retail water supplier to DWR.

A public process implemented by DWR provides the public an opportunity to review the alternative data or methodology and understand the purpose of the request to use alternative data.

4.4 Implementation Considerations

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

- DWR recommends that a variance should be established for significant use of water to supplement ponds and lakes to sustain wildlife under ORWUS and CII-DIMWUS. However, the purpose of this water use is not irrigation related. When possible, DWR recommends having a dedicated meter for this purpose to ensure adequate use and fairness for payment.

- The CII-DIMWUS recommended SLA for “supplemental water for ponds or lakes including, but not limited to sustaining wildlife, recreation, or other public benefit” is intended for non-regulatory ponds and open water surfaces.
- It is up to the urban retail water suppliers to ensure that the claimed usage rates are not in violation of any existing regulations or policies and are appropriate for the service climate conditions and accounting setups.
- Local knowledge on the size of open water bodies that are required to be maintained and supporting documentation for specific regulatory requirements to supplement water for sustaining wildlife are required for using this variance.

4.5 Reporting Requirements

The following list must be submitted if the urban retail water supplier uses this variance:

1. Total qualified open water area, in square feet, required to be maintained per regulatory requirements.
2. *ET_o* in inches.
3. *ET* (unitless), if approved alternative data is used.
4. Supporting documentation to verify the continued regulatory requirements to maintain ponds, lakes, and other open water areas.
5. Documentation of data accuracy requirements.
6. Documentation of alternative data approval, if applicable.

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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.

California Irrigation Management Information System. A network of automated weather stations that are owned and operated cooperatively between the California Department of Water Resources and local agencies. The stations are installed in most of the agricultural and urban areas in the State of California and provide farm and large landscape irrigation managers and researchers with “real time” weather data to estimate reference evapotranspiration use to estimate crop and landscape evapotranspiration rates and make irrigation management decisions.

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

commercial, institutional, and industrial water use. Water used by commercial water users, industrial water users, institutional water users, and large landscape water users, as defined in California Water Code Section 10608.12(d).

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

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

dedicated meter. A meter used for outdoor water use purposes.

evapotranspiration. The amount of water transpired by plants, retained in plant tissues, and evaporated from plant tissues and surrounding soil surfaces.

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

institutional water user. A water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches,

hospitals, government facilities, and nonprofit research institutions, as defined in California Water Code Section 10608.12(j).

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

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

reference evapotranspiration. The evapotranspiration rate from an extended surface of 3- to 6-inch-tall (8- to 15-centimeter-tall) green grass cover of uniform height, actively growing, completely shading the ground, and not short on water (the reference evapotranspiration rate reported by the California Irrigation Management Information System).

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

Special Landscape Area. An area of the landscape dedicated solely to edible plants, areas irrigated with recycled water, water features using recycled water and areas dedicated to active play such as parks, sports fields, golf courses, and where turf provides a playing surface, as defined in California Code of Regulations, Title 23, Section 491(iii).

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

urban retail water supplier. A water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes, as defined in California Water Code Section 10608.12(t).

urban water use efficiency standards. The standards effective through California Water Code Section 10609.4 (indoor residential use) or adopted by the State Water Resources Control Board (outdoor residential, water loss, and commercial, industrial,

and institutional outdoor irrigation of landscape areas with dedicated meters) pursuant to California Water Code Section 10609.2.

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

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

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6.0 References

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

University of California, Cooperative Extension Service, Division of Agriculture and Natural Resources. n.d. "Using Reference Evapotranspiration (ET_o) and Crop Coefficients to Estimate Crop Evapotranspiration (ET_c) for Agronomic Crops, Grasses, and Vegetable Crops." Leaflet 21427.

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

- DWR (California Department of Water Resources). September 2022. Recommendations for Urban Water Use Efficiency Standards, Variances, Performance Measures, and Annual Water Use Reporting. DWR Report Number: WUES-DWR-2021-01A.
- DWR (California Department of Water Resources). September 2022. Recommendations for Guidelines and Methodologies for Calculating Urban Water Use Objective. DWR Report Number: WUES-DWR-2021-01B.
- DWR (California Department of Water Resources). September 2022. Recommendations for Outdoor Residential Water Use Efficiency Standard. DWR Report Number: WUES-DWR-2021-02.
- DWR (California Department of Water Resources). September 2022. Technical Report: Outdoor Residential Landscape Area Measurement. DWR Report Number: WUES-DWR-2021-02.T1.
- DWR (California Department of Water Resources). September 2022. Recommendations for Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard. DWR Report Number: WUES-DWR-2021-03.
- DWR (California Department of Water Resources). September 2022. Summary of Recommendations for Variances. DWR Report Number: WUES-DWR-2021-04.
- DWR (California Department of Water Resources). September 2022. Recommendations for Performance Measures for Commercial, Industrial, and Institutional Water Use. DWR Report Number: WUES-DWR-2021-15.
- 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. 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 Use of Water to Supplement Ponds and Lakes to Sustain Wildlife

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Variance: Significant Use of Water to Supplement Ponds and Lakes to Sustain Wildlife

*Fill in the grey rows to determine: 1. water use under this variance, and 2. whether your agency is qualified to apply for this variance.

Parameter	Value
Reference Evapotranspiration (<i>ETo</i>) ^a	
Evaporation Factor (<i>EF</i>) ^b	1.1
Total qualified open water surface area (square feet)	
Variance Efficient Water Use Volume (gallons) ^c	0
What is your Total Annual Water Use Objective? (gallons)	
Are you qualified to apply for this variance?	NO

For this option, only areas that are maintained following regulatory requirements are qualified.

- a. Reference evapotranspiration (*ETo*) in your service area is available at ref
- b. Evaporation factor (*EF*) used to adjust the *ETo* is 1.1
- c. Variance Efficient Water Use Volume (gallons) = $0.62 \times 1.1 \times ETo \times (\text{Total qualified open water surface area})$
 where
 - 0.62 is a conversion factor that converts acre-inches per acre per year to gallons per square foot per year
 - 1.1 is the evaporation factor (*EF*)
 - ETo* is reference evapotranspiration

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