2025 Agricultural Water Management Plan Guidebook

A Guidebook to Assist Agricultural Water Suppliers to Prepare a 2025 Agricultural Water Management Plan

Public Review Draft
July 2025

California Department of Water Resources
Water Use Efficiency Branch

This guidebook was prepared by DWR to aid agricultural water suppliers who must comply with the requirements of the California Water Code Section I, Part 2.55 and Part 2.8, and Section 597 of Title 23 California Code of Regulations. Agricultural water suppliers subject to the requirements are solely responsible for compliance with the requirements and may use this guidebook if they choose. DWR has voluntarily opted to provide this guidebook to facilitate compliance with the Water Code and to assist these agricultural water suppliers in creating a useful planning document. The Guidebook's contents are not mandatory and are not intended to be viewed as the only way to comply with the Water Code and Regulations. Agricultural water suppliers are free to use this Guidebook as they see fit.

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Table of Contents

Tables and Figures

Appendices

Abbreviations and Acronyms

AB 1404	Assembly Bill 1404 (2007; Laird), Farm Gate Delivery Report Form
AB 1668	Assembly Bill 1668 (2018; Friedman) Water Management Planning
AF	Acre-foot
AWMP	Agricultural Water Management Plan, per Water Code
AWMC	Agricultural Water Management Council
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act (1992)
23 CCR	Title 23 of the California Code of Regulations
EWMPs	Efficient Water Management Practices
DWR	Department of Water Resources
GC	California Government Code
GSP	Groundwater Sustainability Plan
RRA	Reclamation Reform Act (1982)
SB X7-7	Senate Bill X7-7, Water Conservation (Statue of 2009)
SGMA	Sustainable Groundwater Management Act
SWP	State Water Project
Water Board	State Water Resources Control Board
Section	Code Section
TMDL	Total Maximum Daily Load
USBR	United States Bureau of Reclamation
Water Code	California Water Code
WCP	Water Conservation Plan, per USBR requirements
WMP	Water Management Plan

1.0 Introduction

In recognition that water is a limited resource, and the importance that this resource is managed to achieve long-term sustainability in all use sectors, the Agricultural Water Management Planning Act of 1986 and SB X7-7 Water Conservation (Steinberg, Statute of 2009) were enacted by the California Legislature and approved by the Governor to address the need to evaluate and improve the efficiency of agricultural water management. The 2018 Water Conservation Legislation (AB 1668) updated the Agricultural Water Management Planning Act (Division 6, Part 2.8 of the California Water Code) to more adequately address issues and to improve agricultural water suppliers' system management and evaluation.

Agricultural water suppliers in California have a long history of preparing agricultural water management plans (AWMPs) and implementing efficient water management practices (EWMPs).

However, water management planning is not static; changing conditions and understanding of the system necessitate revisiting, adapting, and improving planning and implementation efforts. The five-year cycle AWMP is an opportunity for individual agricultural water suppliers to closely examine their practices and systems to find areas where operations can be improved and where water can be used more efficiently. An AWMP can also provide information and a record to the public on the agricultural water supplier's stewardship of our limited water resources.

1.1 Using this Guidebook

The 2025 Agricultural Water Management Plan Guidebook (Guidebook) was prepared by DWR to assist agricultural water suppliers in understanding and complying with the requirements of the Agricultural Water Management Planning Act (Division 6, Part 2.8 of the California Water Code), the Agricultural Water Measurement Regulation (Title 23, Division 2, Chapter 5.1, Article 2 of the California Code of Regulations), and AB 1668 Water Management Planning (Friedman, Statute of 2018).

This Guidebook is intended to clearly identify information and elements required by the California Water Code (Water Code), provide guidance on how Agricultural Water Suppliers can address these requirements, and identify potential additional information Agricultural Water Suppliers can include in order to develop plans that are useful for their own operations and management and to improve long-term system reliability.

This Guidebook also describes how Water Conservation Plans (WCPs) submitted to the United States Bureau of Reclamation (USBR), and Urban Water Management Plans (UWMPs) submitted to DWR, can be supplemented to satisfy the Water Code and Agricultural Water Measurement Regulation requirements.

1.2 Guidebook Objectives

Specifically, the objectives of this guidebook are to:

- Support Agricultural Water Suppliers in preparing AWMPs that are useful planning documents.
- Inform agricultural water suppliers of AWMP required elements identified in the California Water Code (Water Code).
- Provide guidance to demonstrate compliance with the Water Code as well as assessment and planning for long-term resilience.
- Describe the relationship between the Water Code and Agricultural Water Measurement Regulation and reporting requirements (Title 23 California Code of Regulations [23 CCR], Section 597 et seq.).
- Describe how to submit a completed 2025 AWMP to DWR.

Use of this Guidebook (including supporting tools such as the AWMP Template) is encouraged but not required.

1.3 Guidebook Organization

This Guidebook is organized into six sections and nine appendices:

1.0 Introduction: includes background information, important dates, and submittal process.

2.0 Agricultural Water Management Plan Checklist: includes a checklist that identifies all requirements of the Water Code and a template that can be used to prepare an AWMP.

3.0 Agricultural Water Management Plan Preparation Guidance: includes specific guidance and suggestions for addressing the Water Code AWMP requirements

4.0 Efficient Water Management Practices: includes information on critical and conditional EWMPs, as well as planning and implementation considerations.

5.0 USBR CVPIA/RRA Process Guidance: includes Water Code compliance guidance for agricultural water suppliers that submit plans to the USBR following the CVPIA/RRA process. The relationship between the Water Code and USBR Standard Criteria is summarized in Appendix A2.

6.0 Water Measurement Documentation: includes Agricultural Water Measurement Regulation reporting documentation required to be included in the AWMP.

Appendix A – AWMP Content and Template

Appendix B – Supporting Information: includes additional discussions of content subjects, supporting documents related to preparing the AWMP, Agricultural Water Measurement Regulation compliance and documentation, Aggregated Farm-Gate Delivery Reporting Format for Article 2 (Rev.10-15-2018), and relevant text of the Water Code and regulations.

Appendix C – Possible Approach to Demonstrate Reduced Delta Reliance

Appendix D – UWMP TO AWMP Crosswalk

Appendix E – GSP to AWMP Crosswalk

Appendix F – Drought Plan Checklist

Appendix G – 2025 AWMP Amendment Checklist

Appendix H – Considering Climate Change Impacts

Appendix I – References

1.4 Important Deadlines

Upcoming deadlines specified in the Water Code and the Agricultural Water Measurement Regulation are as follows:

April 1 (Annually): Submit Agricultural Aggregated Farm-Gate Delivery Report (AFGDR) electronically to DWR via the WUEdata Portal at wuedata.water.ca.gov.

April 1, 2026: AWMPs are submitted on 5-year cycles. AWMPs for the 2025 cycle must be adopted by April 1, 2026, and submitted electronically to DWR within 30 days of adoption. All AWMPs must be submitted electronically to DWR via the WUEdata Portal at wuedata.water.ca.gov.

1.5 Agricultural Water Management Planning Overview

1.5.1 Water Code Requirements to Adopt and Submit a Plan

The Agriculture Water Management Planning Act (Division 6, Part 2.8 of the Water Code) states:

> *An agricultural water supplier shall prepare and adopt the AWMP on or before December 31, 2012 and shall update that AWMP on December 31, 2015. The agricultural water management plan shall be updated on or before April 1, 2021, and thereafter on or before April 1 in the years ending in six and one. The plan shall satisfy the requirements of Water Code Section 10826*.

“Agricultural water supplier” is defined as a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding the acreage that receives recycled water. “Agricultural water supplier” includes a supplier or contractor for water regardless of the basis of right that distributes or sells water for ultimate resale to customers.

Every water supplier that becomes an agricultural water supplier after December 31, 2012, shall prepare and adopt the AWMP within one year after the date it has become an agricultural water supplier.

The agricultural water supplier shall make its proposed AWMP available for public review and provide copies of its adopted AWMP to certain entities.

An agricultural water supplier shall implement its AWMP according to the schedule set forth in its AWMP.

An agricultural water supplier that contracts with USBR and submits a WCP to USBR must submit their plan to DWR with applicable addendums.

An agricultural water supplier will not be eligible for a water grant or loan awarded or administered by the State unless the supplier complies with the Water Code (adopts an AWMP and implements EWMPs). An agricultural water supplier that provides water to less than 25,000 irrigated acres, excluding recycled water, is not required to adopt and implement an AWMP unless sufficient funding has specifically been provided to that water supplier for that purpose.

If an agricultural water supplier adopts an urban water management plan pursuant to the Water Code or by participating in area-wide, regional, watershed, or basin-wide water management planning, the supplier may satisfy the requirements of the Agriculture Water Management Planning Act (Division 6, Part 2.8 of the Water Code), as long as all Water Code requirements are met.

In order to be eligible for grants and loans administered by DWR, a Supplier must submit an AWMP that meets Water Code requirements. If a Supplier has not implemented all EWMPs, the Supplier can still be eligible if the following documentation is submitted to DWR:

- Schedule to implement EWMPs (section 4.1 of this Guidebook)
- Documentation justifying EWMPs are not locally cost effective or technically feasible. (section 4.1.3 of this Guidebook).

Hereafter in this Guidebook, agricultural water suppliers will be referred to as Suppliers.

1.5.2 Delta Plan Consistency

All water suppliers that are or anticipate participating in or receiving water from a proposed project that is considered a “covered action” under the Delta Plan, such as a multi-year water transfer, conveyance facility, or new diversion that involves transferring water through, exporting water from, or using water in the Sacramento-San Joaquin Delta (Delta), should consider providing information in their AWMP to demonstrate consistency with the Delta Plan Policy WR-P1, Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance (California Code of Regulations, Title 23,

Section 5003). Guidance on how to demonstrate consistency with the Delta Plan is included in this Guidebook as Appendix C.

1.5.3 New Requirements

There are no new requirements since the 2020 AWMP cycle. However, this guidebook has been updated for clarity and to provide additional guidance and resources.

1.6 Submittal Requirements

Suppliers (defined above) are required by Water Code to submit to DWR an AWMP that addresses the elements listed in Water Code Section 10826. Suppliers who are USBR contractors may meet the water management planning requirements by submitting approved USBR plans.

Water Code Section 10827 describes the submittal of plans developed in accordance with the Agricultural Water Management Council Memorandum of Understanding. Because the Agricultural Management Council dissolved in the spring of 2013, this alternative submittal is no longer an option.

Water Code Section 10826 lists the elements that are required to be discussed and addressed in an AWMP. Suppliers are also required by Water Code to report on EWMPs implemented and planned for implementation, an estimate of efficiency improvements achieved, and efficiency improvements expected in the next five and ten years. If an EWMP is determined to be not locally cost-effective or technically feasible, the water supplier also submits documentation for that determination in the AWMP (see Section 4.1.3 of this Guidebook).

Suppliers must also include any additional documentation necessary to comply with the Agricultural Water Measurement Regulation in the AWMP (see Section 6 and Appendix B of this Guidebook). Per Water Code Section 10821(b), amendments or changes to the AWMP shall be adopted and submitted per Article 3, Section 10840-10844.

Per Water Code Section 10829, two or more water suppliers may participate in area-wide, regional, watershed, or basin-wide agricultural water management planning as a means of sharing the cost of preparing an acceptable AWMP.

1.6.1 Submittal, Compliance, and Enforcement (Water Code Section 10820)

- The AWMP 5-year update cycle adoption date is April 1 of years ending in 1 and 6. Suppliers must submit their plans to DWR within 30 days after adoption.

- AWMPs must be submitted electronically and include any standardized forms, tables, or displays specified by DWR.
- The AWMP must comply with Water Code Section 10826 (plan contents).
- Compliance Enforcement:
    - If a Supplier is not compliant because they did not submit an AWMP update on time (by May 1, 2026), they have 120 days to submit a completed plan before DWR may take action.
    - If a submitted AWMP update is not complete, the Supplier has 120 days after notice by DWR to submit a completed plan before DWR may take action.
    - In cases of non-compliance, DWR may take the following actions:
        - DWR may contract a third party to write an AWMP for the Supplier. The supplier will be responsible for all costs.
        - DWR can extend the timeline before acting if DWR deems sufficient progress is being made towards completion.

1.6.2 Quantification Settlement Agreement (QSA)

As stated in Water Code 10608.8(d), signatories to the Quantification Settlement Agreement (QSA) that meet the definition of “agricultural water supplier” are exempt from Water Code Section 10608.48, which requires that Suppliers implement efficient water management practices. However, these Suppliers are still required to comply with Water Code Section 10826 and submit an AWMP or other qualifying plan to DWR.

1.6.3 Americans with Disabilities Act Web Accessibility Compliance – WCAG 2.0 AA.

California Government Code (GC) Section 7405(a) requires State entities to comply with accessibility requirements of Section 508 of the federal Rehabilitation Act of 1973, as amended (29 U.S.C. Section 794d), and its implementing regulations set forth in Part 1194 of Title 36 of the Federal Code of Regulations. These regulations adopted Web Content Accessibility Guidelines (WCAG) 2.0 Success Criteria AA as the standard requirements for website content. Those are the minimum standards DWR must meet for all content posted on its website.

In accordance with Water Code Section 10844(a), the Supplier is still required to post their AWMP on their own website. If a Supplier does not have a website, they may submit their plan to DWR to post. This means that:

- AWMPs submitted electronically to DWR for Water Code Section 10820 submittal requirements and DWR's review do not have to be WCAG 2.0 AA compliant *at this time*.

- AWMPs posted on their own website must only meet the Supplier's website content requirements with the website link included in the electronic submittal to DWR. AWMPs submitted for DWR to post on DWR's website must be WCAG 2.0 AA compliant and include a statement of certification that the document is compliant.

1.7 Alternative for Suppliers that Submit Plans to USBR

Suppliers that submit water conservation plans to USBR under the Central Valley Improvement Act of 1992 (CVPIA) or Reclamation Reform Act of 1982 (RRA) may submit these plans and other required documentation to DWR to meet the water management planning requirements of Water Code Section10820 if the following conditions are met:

1. The water management/conservation plan has been adopted by the Supplier and submitted to USBR within the previous four years and,
2. USBR has accepted the water management/conservation plan as adequate. The Water Code does not require these Suppliers to prepare and adopt water management/conservation plans on a schedule different from that required by the USBR.

Suppliers that submit a plan to USBR may meet the requirements of Water Code Section 10608.48(d) and (e) [report of EWMPs implemented or planned for implementation and estimate of efficiency improvements, as well as documentation for not locally cost-effective EWMPs] by submitting the USBR-accepted plan to DWR.

DWR encourages CVPIA/RRA water suppliers to also provide a report on water use efficiency information (see Section 5 of this Guidebook). Additional documentation is also required by the Agricultural Water Measurement Regulation; see Section 6 of this Guidebook for details on requirements and applicability. Preparation, adoption, and submittal of the plan should comply with Water Code Division 6, Part 2.8.

1.8 Aggregated Farm-Gate Delivery Report

The Aggregated Farm-Gate Delivery Report is **not** part of the AWMP process. Information on the Aggregated Farm-Gate Delivery Report has been included in this

Guidebook for informational purposes. Submittal of the Aggregated Farm-Gate Delivery Report to DWR is on a different schedule as discussed below.

All Suppliers providing water (excluding recycled water) to at least 2,000 irrigated acres or supplying 2,000 AF are required to submit an annual aggregated farm-gate delivery report to DWR (see Appendix B.4 and B.7 for requirement details and for Aggregated Farm-Gate Delivery Reporting Format for Article 2 (Rev. 8 28 2013)).

As of April 1, 2019, Aggregated Farm-Gate Delivery Reporting must include deliveries within each groundwater basin (or sub-basin, as applicable) within the Supplier's service area.

Suppliers, as required by AB 1404, must use best professional practices to measure water deliveries to their customers (if locally cost-effective) and report that information on the same form to DWR.

Aggregated farm-gate delivery reports are due annually on April 1 and submitted electronically. See DWR's website at: water.ca.gov/Programs/Water-Use-And-Efficiency/Agricultural-Water-Use-Efficiency.

1.9 DWR's Roles and Responsibilities

1.9.1 DWR's Review of Submittals

DWR will review all submittals to determine if AWMPs and other included documents address the requirements of the Water Code and the Agricultural Water Measurement Regulation. The Water Code requires information on which EWMPs are implemented and which EWMPs are planned for implementation. The Agricultural Water Measurement Regulation also requires that certain schedule information be included in the AWMP if a water measurement device corrective action plan is required. The EWMP implementation and water measurement corrective action plan schedules can be described in Sections VII and VIII of the AWMP, respectively.

Water Code also requires Suppliers to implement their plans in accordance with the schedule presented in their AWMPs. DWR encourages Suppliers to provide a general schedule for implementation of the AWMP.

Pursuant to Water Code Section 10820(b), DWR will review each plan, and if necessary may coordinate its review with the Department of Food and Agriculture and the Water Board.

The department shall review each plan that is due pursuant to paragraph (2) of subdivision (a). The department may coordinate its review with the Department of Food and Agriculture and the board (Water Code Section10820(b)(1)).

The department shall notify an agricultural water supplier that it is not in compliance with this part if the department determines that actions are required to comply with the requirements of this part or if a supplier fails to update a plan as provided in paragraph (2) of subdivision (a). The department shall identify the specific deficiencies, and the supplier shall have 120 days to remedy an identified deficiency. The department may provide additional time to remedy a deficiency if it finds that a supplier is making substantial progress toward remedying the deficiency. An agricultural water supplier that fails to submit corrective actions or a completed plan shall not be in compliance with this part (Water Code Section10820(b)(2)).

If the department has not received a plan or the department has determined that the plan submitted does not comply with the requirements of this part, and a revised plan has not been submitted, the department may undertake the following actions (Water Code Section10820(b)(3)):

(*A) Contract with a state academic institution or qualified entity to prepare or complete an agricultural water management plan on behalf of the supplier. The costs and expenses related to preparation or completion of a plan, including the costs of the contract and contract administration, shall be recoverable by the department from the supplier.*

(B) If a supplier does not provide data necessary for the preparation or completion of a plan to the department or the contracting entity as determined by the department in accordance with subparagraph (A), the department may assess a fine of one thousand dollars ($1,000) per day, not to exceed twenty-five thousand dollars ($25,000), until data is made available.

Pursuant to Water Code Section10820(b)(4):

(A) A plan prepared or completed pursuant to paragraph (3) shall be deemed the adopted plan for the supplier.

(B) Any action to challenge or invalidate the adequacy of the plan prepared or completed pursuant to paragraph (3) shall be brought against the supplier for whom the plan was prepared.

1.9.2 Compliance Scenarios

Water Code describes four potential compliance situations. Suppliers are not eligible for a grant or loan administered by DWR unless they are in compliance with the Agricultural Water Management Planning Act. DWR will inform Suppliers of the results of its review. The four compliance scenarios described in Water Code are described below:

1. **Plan submitted on time and addresses all Water Code Requirements.** Suppliers that submit an AWMP or CVPIA/RRA WMP (Water Management Plan) by May 1, 2026 and that meets all Water Code requirements, as determined by DWR, are in compliance with Water Code. No further action will be required. Please note that non-implementation of Efficient Water Management Practices (EWMPs) because the EWMP is not locally cost- effective or technically feasible must be sufficiently documented (see Section 4 of this Guidebook).

2. **No plan submitted by May 1, 2026.** Suppliers that do not submit an AWMP or CVPIA/RRA WMP to DWR by May 1, 2026 are not in compliance with Water Code. DWR will send letters or emails to these Suppliers to inform them that they are out of compliance with Water Code.

3. **Submitted plan does not meet Water Code requirements.** If DWR determines that a submitted AWMP or CVPIA/RRA WMP does not meet Water Code requirements, DWR will send a letter or email to the Supplier specifying deficiencies that need to be addressed. The Supplier:

    - Must submit a corrective action plan
    - Has 120 days, from receipt of DWR's letter, to remedy the identified deficiencies

    Suppliers that do not submit corrective action plans or remediated AWMPs are not in compliance with the Water Code. Additionally, because DWR can extend the remedy time period if substantial progress is being made, it is in the Supplier's best interest to work with DWR and keep DWR informed of their progress.

4. **Continued non-compliance.** After 120 days, if no corrective action plan or remediated AWMP has been submitted or if insufficient progress is being made toward completing an AWMP that meets Water Code requirements, DWR may implement Water Code Section10820(b)(3). A third party may be contracted to complete the AWMP for the Supplier at the Supplier's expense. The resulting AWMP will be deemed adopted by the supplier and the supplier is responsible for any plan challenges to and inadequacy of the AWMP. If a supplier does not provide data necessary for the preparation or completion of a plan to DWR or the contracting entity, DWR can assess a fine of one thousand dollars ($1,000) per day, not to exceed twenty-five thousand dollars ($25,000), until data is made available. Therefore, it is important that non-compliant Suppliers work with DWR towards remedying any deficiencies.

1.9.3 DWR AWMP Website

Water Code Section 10844 states that:

> "*(a) Not later than 30 days after the date of adopting its plan, the agricultural water supplier shall make the plan available for public review on the agricultural water supplier's Internet Web site."*
>
> *"An agricultural water supplier that does not have an Internet Web site shall submit to the department, not later than 30 days after the date of adopting its plan, a copy of the adopted plan in an electronic format. The department shall make the plan available for public review on the department's Internet Web site."*

GC Section 7405(a) requires State entities to comply with accessibility requirements of Section 508 of the federal Rehabilitation Act of 1973, as amended (29 U.S.C. Section 794(d)), and its implementing regulations set forth in Part 1194 of Title 36 of the Federal Code of Regulations. These regulations adopted Web Content Accessibility Guidelines (WCAG) 2.0 Success Criteria AA as the standard requirements for website content. Those are the minimum standards DWR must meet for all content posted on its Internet Web site.

In accordance with Water Code Section 10844(a), the Supplier is still required to post their AWMP on their own website. AWMPs posted on the Supplier's own website must only meet their own website content requirements. If a Supplier does not have an Internet Web site, they may submit their plan to DWR to post. For compliance with Government Code, AWMPs submitted for DWR to post on DWRs website must be WCAG 2.0 AA compliant with a statement of certification that the document is compliant.

1.9.4 DWR Report to California Legislature

DWR's report to the legislature is not a requirement for the Supplier. This section is included in the Guidebook to inform Suppliers about DWR's reporting requirements regarding the AWMPs and submittal status for each Supplier.

In accordance with the Water Code (Section 10845), DWR submits a report to the Legislature on or before April 30, 2027, on the status of all submittals, as well as:

- Identify outstanding (exemplary) elements of any submitted AWMPs.
- Include an evaluation of the effectiveness of AWMPs in promoting efficient water management practices.
- Recommend changes to AWMPs, as appropriate.

DWR will not approve, disapprove, or critique individual submittals in its report to the Legislature and will provide a copy to the Suppliers that submitted AWMPs.

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2.0 Agricultural Water Management Plan Checklist

This section identifies Water Code requirements for preparing an AWMP and the Agricultural Water Measurement Regulation AWMP reporting requirements. These requirements are listed in the checklist below and in the AWMP Template (Appendix A1).

Section 3 that follows provides further details about Water Code requirements, identifies what data may be useful in meeting these requirements, provides examples, explanations, and links that may be helpful in preparing an AWMP.

The 2018 Water Conservation Legislation authorizes DWR to create standardized tables and displays that would be required for AWMP submittal (Water Code Section 10820(a)(2)(B)). DWR requires Tables VII.A.1 and VII.A.2 for EWMP reporting in compliance with Water Code Section 10608.48(e). For other tables, DWR requests use of the tables included in the relevant sections and template for completing the WUEdata Portal electronic submittal.

DWR does encourage Suppliers to use other tables that were developed for reporting, which are located in Appendix A1 and on the WUEdata portal at wuedata.water.ca.gov/secure/login_auth.asp. Use of these tables assists DWR in reviewing AWMPs and contributes to clarity and consistency for certain requirements.

The following checklist can be used by Suppliers to track Water Code requirements for plan content and plan preparation and adoption of individual or regional AWMPs. Completion of this checklist and inclusion of it in the AWMP is encouraged for all Suppliers submitting plans to expedite review and to help ensure plans are complete. DWR will use this checklist while reviewing plans. The checklist includes the 2018 updates to the Water Code requirements.

Table 1. AWMP Checklist

AWMP* Location	Guidebook Location	Description	Water Code Section (or as identified)
	1.4	AWMP Required?	10820, 10608.12
	1.4	At least 25,000 irrigated acres	10853
	1.4	10,000 to 25,000 acres and funding provided	10853
	1.4	April 1, 2021 update	10820 (a)
	1.4 A.2	AWMP submitted to DWR no more than 30 days after adoption, AWMP submitted electronically	10820(a)(2)(B)
	1.4 B	5-year cycle update	10820 (a)
	1.4 B	New agricultural water supplier after December 31, 2012 - AWMP prepared and adopted within 1 year	10820 (b)
	1.6, 5	USBR water management/conservation plan:	10828(a)
	1.6, 5.1	Adopted and submitted to USBR within the previous four years, AND	10828(a)(1)
	1.6, 5.1	The USBR has accepted the water management/conservation plan as adequate	10828(a)(2)
	1.4. B	UWMP or participation in area wide, regional, watershed, or basin wide water management planning: does the plan meet requirements of SB X7-7 2.8	10829
	3.1 A	Description of previous water management activities	10826(d)

AWMP* Location	Guidebook Location	Description	Water Code Section (or as identified)
	3.1 B.1	Was each city or county within which supplier provides water supplies notified that the agricultural water supplier will be preparing or amending a plan?	10821(a)
	3.2 B.2	Was the proposed plan available for public inspection prior to plan adoption?	10841
	3.1 B.2	Publicly-owned supplier: Prior to the hearing, was the notice of the time and place of hearing published within the jurisdiction of the publicly owned agricultural water supplier in accordance with Government Code 6066?	10841
	3.1 B.2	14 days notification for public hearing	GC 6066
	3.1 B.2	Two publications in newspaper within those 14 days	GC 6066
	3.1 B.2	At least 5 days between publications? (not including publication date)	GC 6066
	3.1 B.2	Privately-owned supplier: was equivalent notice within its service area and reasonably equivalent opportunity that would otherwise be afforded through a public hearing process provided?	10841
	3.1 C.1	After hearing/equivalent notice, was the plan adopted as prepared or as modified during or after the hearing?	10841

AWMP* Location	Guidebook Location	Description	Water Code Section (or as identified)
	3.1 C.2	Was a copy of the AWMP, amendments, or changes, submitted to the entities below, no later than 30 days after the adoption?	10843(a)
	3.1 C.2	The department.	10843(b)(1)
	3.1 C.2	Any city, county, or city and county within which the agricultural water supplier provides water supplies.	10843(b)(2)
	3.1 C.2	Any groundwater management entity within which jurisdiction the agricultural water supplier extracts or provides water supplies.	10843(b)(3)
	3.1 C.3	Adopted AWMP availability	10844
	3.1 C.3	Was the AWMP available for public review on the agricultural water supplier's website within 30 days of adoption?	10844(a)
	3.1 C.3	If no website, was an electronic copy of the AWMP submitted to DWR within 30 days of adoption?	10844(b)
	3.1 D.1	Implement the AWMP in accordance with the schedule set forth in its plan, as determined by the governing body of the agricultural water supplier.	10842
	3.3	Description of the agricultural water supplier and service area including:	10826(a)
	3.3 A.1	Size of the service area.	10826(a)(1)
	3.3 A.2	Location of the service area and its water management facilities.	10826(a)(2)
	3.3 A.3	Terrain and soils.	10826(a)(3)
	3.3 A.4	Climate.	10826(a)(4)

AWMP* Location	Guidebook Location	Description	Water Code Section (or as identified)
	3.3 B.1	Operating rules and regulations.	10826(a)(5)
	3.3 B.2	Water delivery measurements or calculations.	10826(a)(6)
	3.3 B.3	Water rate schedules and billing.	10826(a)(7)
	3.3 B.4	Water shortage allocation policies and detailed drought plan	10826(a)(8) 10826.2
	3.4	Water uses within the service area, including all of the following:	10826(b)(5)
	3.4 A	Agricultural.	10826(b)(5)(A)
	3.4 B	Environmental.	10826(b)(5)(B)
	3.4 C	Recreational.	10826(b)(5)(C)
	3.4 D	Municipal and industrial.	10826(b)(5)(D)
	3.4 E	Groundwater recharge, including estimated flows from deep percolation from irrigation and seepage	10826(b)(5)(E)
	3.5 A	Description of the quantity of the agricultural water supplier's water supplies as:	10826(b)
	3.5 A.1	Surface water supply.	10826(b)(1)
	3.5 A.2	Groundwater supply.	10826(b)(2)
	3.5 A.3	Other water supplies, including recycled water	10826(b)(3)
	3.5 B	Description of the quality of the agricultural water supplier’s water supplies as:	10826(b)
	3.5 B.1	Surface water supply.	10826(b)(1)

AWMP* Location	Guidebook Location	Description	Water Code Section (or as identified)
	3.5 B.2	Groundwater supply.	10826(b)(2)
	3.5 B.3	Other water supplies.	10826(b)(3)
	3.5 C	Source water quality monitoring practices.	10826(b)(4)
	3.6	Annual water budget based on the quantification of all inflow and outflow components for the service area.	10826(c)
	3.7 C	Identify water management objectives based on water budget to improve water system efficiency	10826(f)
		Quantify the efficiency of agricultural water use	10826(h)
	3.9	Analysis of climate change effect on future water supplies	10826(d)
	4	Water use efficiency	10826(h)
		Information required pursuant to Section 10608.48.	
	4.1	Implement efficient water management practices (EWMPs)	10608.48(a)
	4.1 A	Implement Critical EWMP: Measure the volume of water delivered to customers with sufficient accuracy to comply with subdivision (a) of Section 531.10 and to implement paragraph (2).	10608.48(b)
	4.1 A	Implement Critical EWMP: Adopt a pricing structure for water customers based at least in part on quantity delivered.	10608.48(b)

AWMP* Location	Guidebook Location	Description	Water Code Section (or as identified)
	4.1 B	Implement additional locally cost-effective and technically feasible EWMPs	10608.48(c)
	4.1 C	If applicable, document (in the report) the determination that EWMPs are not locally cost-effective or technically feasible	10608.48(d)
	4.1 C	Include a report on which EWMPs have been implemented and planned to be implemented	10608.48(d)
	4.1 C	Include (in the report) an estimate of the water use efficiency improvements that have occurred since the last report, and an estimate of the water use efficiency improvements estimated to occur five and 10 years in the future.	10608.48(d)
	5	USBR water management/conservation plan may meet requirements for EWMPs	10608.48(f)
	6 A	Lack of legal access certification (if water measuring not at farm gate or delivery point)	CCR 597.3(b)(2)(A)
	6 B	Lack of technical feasibility (if water measuring not at farm gate or delivery point)	CCR 597.3(b)(1)(B), 597.3(b)(2)(B)
	6 A, 6 B	Delivery apportioning methodology (if water measuring not at farm gate or delivery point)	CCR 597.3.b(2)(C),
	6 C	Description of water measurement BPP	CCR 597.4(e)(2)

AWMP* Location	Guidebook Location	Description	Water Code Section (or as identified)
	6 D	Conversion to measurement to volume	CCR 597.4(e)(3)
	6 E	Existing water measurement device corrective action plan? (if applicable, including schedule, budget and finance plan)	CCR 597.4(e)(4))

* Note in your AWMP where compliance with this requirement is met.

3.0 Agricultural Water Management Plan Preparation Guidance

This section contains detailed information and instructions to assist Suppliers in preparing a useful planning document, completing an AWMP based on the requirements identified in the Water Code, and providing documentation required for water measurement compliance (California Code of Regulations Section 597). It groups the requirements by topic and in an order that a Supplier can follow while preparing their AWMP. Each section includes pertinent legislation and references the AWMP template in Appendix A1. Suppliers can also include other planning and implementation information that is outside of the scope of the Water Code to serve their own planning purposes.

In preparing an AWMP, the Supplier should consider not only what is legally required, but also what may be needed to make it a comprehensive longer-term water supply planning document. While there is certain information that is required by statutes, a Supplier has the discretion to present most of the information in whatever manner they choose. This allows the Supplier to present water management information that highlights their stewardship, conservation, vulnerabilities and risks, and progress towards contributing to long-term sustainability. Additionally, well-prepared AWMPs can serve as a summary document to assist new board members or General Managers in understanding district history, operations, and characteristics.

It is suggested that neighboring Suppliers work together to develop, prepare, and implement regional AWMPs; however, regional AWMPs are not required. If a regional approach to preparing an AWMP is elected, the AWMP should describe mutual agreements/Memorandum of Understanding (MOU) with other signatories or agencies and should meet or exceed the requirements of the Water Code.

Section 3 of this Guidebook includes a discussion of AWMP content and is organized consistent to the AWMP Template outline (Appendix A1).

3.1 AWMP Preparation and Adoption

This section of the AWMP describes information on previous water management activities, how the AWMP was prepared and coordinated with other agencies and the public, how and when it was adopted, and submittal process and availability of the AWMP. Although the Water Code does not require the Supplier to present the following

information in this format, it does require compliance with the elements identified below. See Section I of the AWMP Template (Appendix A).

All Suppliers, regardless of whether they submit plans following the Water Code requirements or the USBR CVPIA/RRA process, must follow the Water Code plan adoption and submittal requirements.

Adoption and submittal requirements for Water Code plans are discussed in Section 3.1.3, below. Refer to Section 5 for additional details about the USBR CVPIA/RRA process.

3.1.2 Coordination Activities

Notification of AWMP Preparation

> *"An agricultural water supplier required to prepare a plan pursuant to this part shall notify each city or county within which* the *supplier provides water supplies that the agricultural water supplier will be preparing the plan or reviewing the plan and considering amendments or changes to the plan. The agricultural water supplier may consult with, and obtain comments from, each city or county that receives notice pursuant to this subdivision."* (Water Code Section 10821(a))

Suppliers are encouraged to provide supporting documentation in the AWMP showing their compliance with notification of AWMP preparation. This could include a list of contacted cities and counties, copies of the notice of preparation, and copies of any other records demonstrating compliance. If the Supplier chooses to also notify other agencies, a list of these agencies could be provided.

Involving relevant interested parties in the planning and plan preparation process can help a Supplier coordinate activities and address potential issues in advance. If the Supplier chooses to consult with and obtain comments from contacted city(s), county(s), or any other agencies, a list of each agency and organization contacted or involved in the preparation, discussion, or coordination of the AWMP can be provided. A description of the coordination process, outreach materials used, any substantial comments that affected development of the AWMP, and if the comments were incorporated in the AWMP may also be useful in documenting the AWMP preparation and notification process.

Public Participation

> *"Prior to adopting a plan, the agricultural water supplier shall make the proposed plan available for public inspection and shall hold a public hearing on the plan. Prior to the hearing, notice of the time and place of hearing shall be published within the*

> *jurisdiction of the publicly owned agricultural water supplier pursuant to Section 6066 of the Government Code. A privately-owned agricultural water supplier shall provide an equivalent notice within its service area and shall provide a reasonably equivalent opportunity that would otherwise be afforded through a public hearing process for interested parties to provide input on the plan"* (Water Code Section 10841).

Government Code Section 6066 states that:

> *"Publication of notice pursuant to this section shall be once a week for two successive weeks. Two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates, are sufficient.*
>
> *The period of notice commences upon the first day of publication and terminates at the end of the fourteenth day, including therein the first day."*

Public Water Suppliers

Publicly owned Suppliers can provide copies of the public notifications on hearing time and place, and copies of the notice of the availability of the AWMP (or amendment to the AWMP) for public review to demonstrate compliance with the above listed requirements. A description of any substantial public comments that influence adoption or amendment of the AWMP would be beneficial.

Private Water Suppliers

Privately-owned Suppliers can provide documentation of the process used to comply with the reasonably equivalent notice within their service area and a reasonably equivalent opportunity for the public otherwise afforded through a public process to provide input on the AWMP to demonstrate public participation and compliance with the above listed requirements. This could include information such as copies of notices in the local newspaper, website postings, copies of flyers/letters sent out, a list of mailings, copies of a public meeting notification, or other mechanisms used to notify the public within their service area and to provide opportunities for their input on the AWMP. A description of any substantial public comments that affect adoption or amendment of the AWMP could be provided.

Local Participation

Copies of a proposed AWMP can also be submitted to local, regional, state, and federal agencies; special districts; land use agencies; and the public (business, environmental, social) to notify interested parties that an AWMP is under preparation and to allow

opportunity for their input into the AWMP prior to notification of a public hearing or similar public review.

Although incorporation of comments from the notification and public participation processes is not mentioned in the statute, because this is a planning document addressing the potential issues in the AWMP could assist in facilitating implementation and provide a stronger basis or rationale for decisions.

3.1.3 AWMP Adoption, Submittal, and Implementation

Specific requirements for AWMP adoption and submittal are contained in the Water Code cited below. DWR encourages the use of the AWMP Template in Appendix A1 to report AWMP adoption, submittal, and availability compliance. Any amendments or changes in the plan must also follow these procedures (Water Code Section 10821 (b)).

AWMP Adoption

> "*After the public hearing, the plan shall be adopted as prepared or as modified during or after the hearing." (Water Code Section 10841).*
>
> *"Amendments to, or changes in the plan shall be adopted and submitted in the manner set forth in Article 3 (commencing with Section 10840)." (Water Code Section 10821(b)). This also applies to CVPIA/RRA plans.*
>
> *"Not later than 30 days after the date of adopting its plan, the agricultural water supplier shall make the plan available for public review on the agricultural water supplier's Internet Web site* (Water Code Section 10844 (a))*. An agricultural water supplier that does not have an Internet Web site shall submit to the department, not later than 30 days after the date of adopting its plan, a copy of the adopted plan in an electronic format. The department shall make the plan available for public review on the department's Internet Web site*." (Water Code Section 10844 (b))

Suppliers are encouraged to report compliance with this requirement in their AWMP by listing the website address and link on their Internet Web site along with the date of posting.

Alternatively, if the Supplier does not have an Internet Web site, they can document compliance by the electronic submittal requirement within 30 days of adoption.

See "Submission to DWR" section below for submittal instructions.

Suppliers are encouraged to include a copy of the Resolution of Plan Adoption in AWMP Section VIII to show compliance with Water Code plan adoption requirements.

AWMP Submittal

> *"An agricultural water supplier shall submit its plan to the department no later than 30 days after adoption of the plan. The plan shall be submitted electronically and shall include any standardized forms, tables, or displays specified by the department."* (Water Code Section 10820(a)(2)(A)).
>
> "*An agricultural water supplier shall submit to the entities identified in subdivision (b) a copy of its plan no later than 30 days after review of the plan pursuant to subdivision of Section 10820* (Water Code Section 10843(a))

Within 30 days of adoption, Suppliers must submit copies of the AWMP, amendments, or changes to the AWMP to the following entities (Water Code Section 10843(b)):

- The department.
- Any city, county, or city and county within which the Supplier provides water supplies.
- Any groundwater management entity within which jurisdiction the Supplier extracts or provides water supplies.
- The California State Library.

Submission to DWR

AWMPs and applicable documentation required by the Water Code and the Agricultural Water Measurement Regulation must be sent electronically to DWR. DWR will no longer accept paper (hard) copies of AWMPs or Federal WMPs.

If submitting the AWMP for compliance and DWR review only, the plan does not need to be WCAG 2.0 AA (Web Accessible format) compliant at this time.

AWMPs may be sent via email to agwue@water.ca.gov (attachment size not to exceed 20 MB), submitted to DWR on a CD or thumb drive, or directly uploaded to the WUEdata Portal (wuedata.water.ca.gov).

CDs or thumb drives should be mailed to:

Department of Water Resources
Agricultural Water Use Efficiency
Division of Regional Assistance
Water Use Efficiency Branch
PO Box 942836
Sacramento, CA 94236-0001

Or, dropped off in person at:

Agricultural Water Use Efficiency
Department of Water Resources
Division of Regional Assistance
Water Use Efficiency Branch
715 P St.
Sacramento, CA 95814

CVPIA/RRA Water Suppliers

CVPIA/RRA water Suppliers whose plans have been accepted as adequate by the USBR are responsible for the timely submittal of their AWMP to DWR. These Suppliers must submit their plan and accompanying documentation directly to DWR. USBR will not forward plans to DWR.

Submission to the California State Library

Complete AWMPs must also be submitted to the California State Library. Complete AWMPs include the plan and any applicable required supporting documentation, attachments, or additional documentation.

Hardcopies or CDs should be mailed to:

California State Library Government Publications Section
ATTN: Water Management Plan Coordinator
P.O. Box 942837
Sacramento, CA 94237-0001

Electronic copies (preferably Adobe .pdf files) should be emailed to: cslgps@library.ca.gov. Include “Agricultural Water Management Plan submission” in the subject line.

AWMP Implementation

Per Water Code Section 10842, a Supplier shall implement the plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan, as determined by the governing body of the Supplier.

3.2 Service Area Background

3.2.1 Description of Previous Water Management Activities (Water Code Section 10826(e)).

*"Describe previous water management activities." (*Water Code Section 10826(e)*)*.

The Water Code does not specify which management activities need to be included. Useful information could include previous water management plans and program(s) under which the previous plan was developed, adoption date by the water Supplier, approval or acceptance date (by the AWMC or USBR, respectively), management agency and representative, and other pertinent information, including any amendments and/or revision dates. Suppliers could also evaluate existing plans, such as UWMPs and GSPs, to determine if any additional water management activities apply to their service area.

Suppliers may also choose to describe previous implementation of EWMPs in this section instead of in Section VII.

3.2.2. Description of the Agricultural Water Supplier and Service Area

Water Code Section 10826 (a) requires a description of the Supplier and the service area:

(a) Describe the agricultural water supplier and the service area, including all of the following:

(1) Size of the service area.

(2) Location of the service area and its water management facilities.

(3) Terrain and soils.

(4) Climate.

(5) Operating rules and regulations.

(6) Water delivery measurements or calculations.

(7) Water rate schedules and billing.

(8) Water shortage allocation policies.

The Water Code requires a description of these elements in the AWMP, but details on how to describe elements are not specified. In this section, a reasonable level of detail should be included to assist the Supplier in preparing an AWMP that can be used for water management planning and for providing information to address Water Code Section 10826(b) requirements. This section groups descriptions into Physical Characteristics – elements (a)(1) to (a)(4), and Operational Characteristics – elements (a)(5) to (a)(8). See Section II of the AWMP Template (Appendix A1).

Information in this section can provide a basis for evaluating structural or operational improvements that may affect water management.

This section is also an opportunity to provide some background information, such as the Supplier's date of formation, source(s) of water supply (such as Central Valley Project (CVP), State Water Project (SWP), local surface or groundwater), or any other pertinent information useful for new district management or Board members.

3.2.2.1 Physical Characteristics

Size of the service area (Water Code Section 10826 (a)(1))

While the Supplier is required by the Water Code to describe the size of the service area in the AWMP, details regarding how to describe the size are not specified in the Water Code. To facilitate planning and analysis, it is suggested that the Supplier include a calculation of:

- **Gross acreage within the service area boundary.** Expected changes to the service area size or boundaries can also be identified. If there are special management or usage areas, reporting the size of these areas could assist the Supplier in water use efficiency determination, management, and planning. For instance, special management or usage areas might be identified if water supplies are typically distributed on a rotational basis. Reporting the acreage of each sub-area within the service area could assist in water use calculations and efficient water management.

- **Irrigated acres per year.** The Supplier is encouraged to report average irrigated acres in the service area, as well as the method used to calculate/determine irrigated acreage. If irrigated acreage varies widely from year to year, it may be useful to report each of the past five years (plan cycle years) separately because variability may need to be factored into management decisions. If there are special management or usage areas, reporting irrigated acres within each area could also be useful in decision making, water budgets, and efficiency analysis.

Location of the service area and water management facilities (Water Code Section 10826 (a)(2))

A description of the location of the service area and water management facilities is required by the Water Code. However, how this is described is at the discretion of the Supplier.

Useful information could include descriptions of the type of facility, infrastructure size or capacity, age, improvements made, known issues, and other characteristics of the facilities that would aid the Supplier in planning, management, and operations.

It is suggested that the Supplier include maps, along with any text describing the location of the service area and water management features and facilities that the Supplier chooses to include such as:

- Boundary Map(s) of the service area delineating boundaries of the county, underlying groundwater basin/sub-basin(s), irrigated acres, other pertinent areas, such as existing water diversion(s) (if located within a reasonable distance), and planned water diversions, if applicable.
- Facilities Map(s) showing the water storage, conveyance, controls, and delivery system components within the service area such as: canals, pipelines, drains, water measurements locations, pumping stations, reservoirs, and others.
- Special Management Areas Map(s) showing any special management or usage areas within the service area and groundwater recharge facilities, if applicable. This could include any environmental use areas served by the Supplier.

If suppliers choose to include maps, they should include a legend that depicts the type of feature, labels with the Supplier's unique identifiers, and metadata and/or data source(s). Maps can be combined if the features are still easily discernable. Oversized maps can be included to better display information.

Some boundaries that can be downloaded for mapping can be found at the SGMA Web GIS portal at sgma.water.ca.gov/webgis/?appid=SGMADataViewer#boundaries

Terrain and Soils (Water Code Section 10826 (a)(3))

A description of the terrain and soils is required by the Water Code. However, the way the service area terrain and soils are described is at the discretion of the Supplier. It is suggested that the Supplier provide the following:

- **Information for the Annual Water Budget.** Including soils data needed to determine the required annual water budget, effective precipitation, outflows, and deep percolation if not using a model database (e.g., California Simulation of Evapotranspiration of Applied Water (Cal-SIMETAW) already includes soils data to help in these calculations).
- **Topography.** Describe the topography of the Supplier's service area (e.g., hilly, flat, rolling, sloping to a water course, and others).
- **Drainage Characteristics.** Describe the local surface drainage characteristics of the service area. Include information, if applicable, of adjacent water courses,

wetlands, direction of surface runoff, and where drainage features are located. A map with labeled features and drainage directions would be beneficial.

- **Soil Classification and Properties.** Describe the general soil classifications found in the service area and where the soils are generally located. A map showing areas of major soil types is encouraged. It is also suggested that information such as erosion and runoff potential (e.g., soils hydrologic group), infiltration/percolation constraints (e.g., presence of shallow bedrock, shallow water table, heavy soils, sandy soils, and other characteristics), and other irrigation/water management information for the soil types be included in the description.

- **Historical Land Use.** Describe historical land use of the service area, as it may affect the soil behavior that is currently being observed. Some previous land use considerations could include changes in crop type and/or crop rotations, land conversion (e.g. natural wildland to agricultural or flood irrigation to sprinkler irrigation), and natural phenomena (e.g. flooding and wildfire).

- **Management Considerations.** It may also be useful to include a discussion on the potential for terrain and soil conditions that affect water operations and management within the service area, including any constraints or opportunities that may be present.

The Natural Resources Conservation Service (NRCS) provides general soils maps that may be a useful tool. Soils classification and water management properties information can be obtained at websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx. This Web Soil Survey tool can be used to delineate portions of the service area and calculate summary information for soils.

Digital soil databases, along with other useful digital maps and databases, can be downloaded here: datagateway.nrcs.usda.gov.

Climate (Water Code Section 10826 (a)(4))

A description of the climate is required by the Water Code and the level of detail is at the discretion of the Supplier.

It is suggested that the Supplier provide a description of the historic and current climate of the area in sufficient detail to:

- Facilitate agricultural water demand management planning.
- Determine the required annual water budget effective precipitation.

- Provide climate information for groundwater management planning and annual groundwater budgets as required under SGMA and the local Groundwater Sustainability Plan (GSP).

The details of the service area climate may be included in model databases developed for GSPs or used for determining the annual water budget (e.g., Cal-SIMETAW), however, climate still needs to be described in the AWMP.

This description could include, but is not necessarily limited to:

- Monthly and water-year annual precipitation.
- Average monthly maximum and monthly minimum precipitation, and the months in which these occur.
- Average monthly maximum and minimum temperatures and the months in which these occur.
- Average annual wet season (October through March) precipitation.

Climate Averages. Where available, it is suggested that the climate averages be calculated based on at least 20 years of historic data and any trends noted. Regardless, the years used to determine the average should be identified. The National Weather Service provides weather data from climatological stations throughout California and is a useful tool to describe historical climate. These can be found under Climate Summaries at wrcc.dri.edu.

Other Useful Information. Other useful climate information may be reported in order to facilitate water management planning and for determining the overall water budget within the service area. Such information could include:

- Extreme conditions information (e.g., daily maximums and minimums, 100-year storm events, critical dry year values, and others).
- Monthly average or daily reference evapotranspiration (ETo) for the area(s) to facilitate determination of effective precipitation and crop water use. Refer to DWR California Irrigation Management Information System (CIMIS) for ETo information and data at cimis.water.ca.gov.
- Pertinent climate factors summaries used in developing the required annual water budgets for each year covered under this AWMP.
- Potential future climate change conditions.

Variability. For areas within the Supplier's service area that are known to have substantially different climate conditions, a qualitative or quantitative description of the

differences and how these may affect water management decisions and operations would also be beneficial.

3.2.2.2 Operational Characteristics

A description of the operational characteristics is required by the Water Code. However, the detailed description of these characteristics is at the discretion of the Supplier.

Understanding and describing the operational characteristics, including infrastructure conditions and maintenance, could be a key component in identifying opportunities for improvements, infrastructure constraints, assisting in developing and implementing the Supplier's water management objectives and managing water supply shortages.

The Supplier is encouraged to include a description of how deliveries are fulfilled (e.g., on-demand deliveries, constant head flows, pressurized systems versus gravity fed, and others), if operations are manual or automated, how spills and storage is managed, use of groundwater to meet demands, and any other operational characteristics that may affect the Suppliers water use efficiency and management.

Drought Plan operating rules and regulations, along with associated water rate scheduling and billing information, should be addressed in the Drought Plan and Water Shortage Allocation Policy discussion (see Appendix F for the Drought Plan Checklist).

Operating Rules and Regulations (Water Code Section 10826 (a)(5))

A description of the operating rules and regulations is required by the Water Code. How they are described is at the discretion of the Supplier. Suppliers can attach a copy of their operating rules and regulations and/or describe their water allocation policy(s) with a summary included in this section. It is suggested that this section include information such as the lead time necessary for water orders and water shut-off, any policies regarding return flows and /or drainage leaving the Supplier's service area, restrictions on deliveries, and other practices, as appropriate.

Water Delivery Measurements or Calculations (Water Code Section 10826 (a)(6))

A description of the water delivery measurements or calculations is required by the Water Code. The way these are described is at the discretion of the Supplier. In this section, the Supplier is encouraged to provide information on the type(s) of measurement device(s), calibration, and maintenance, along with the estimated level of measurement accuracy.

The Supplier's compliance with the water measurement EWMP is discussed in Section VII of the AWMP. Details on the water measurement system, as applicable for

compliance with the Agricultural Water Measurement Regulations (refer to Section 6 of this Guidebook), can be included in Section VIII (Supporting Documentation) of the AWMP and referenced or summarized in this section.

Water Rate Schedules and Billing (Water Code Section 10826 (a)(7))

A description of water rate schedules and billing is required by the Water Code. The details for describing these are at the discretion of the Supplier. It is suggested that the AWMP describe:

- The basis for agricultural usage water charges and the adopted pricing structure. A copy of the Supplier's written operating rules and regulations may be used to provide this information if they describe the basis for water charges at least in part based on quantity delivered (i.e., by quantity plus other factors such as acres, crops, land assessment, or other charges). The volumetric pricing structure is a critical EWMP that must be implemented and reported on in the AWMP in accordance with Water Code Section 10826(e) and Section 10608.48(b). Refer to Section 4.1.1 for details on this EWMP.
- The rate structure used (e.g., allocation-based, uniform, or increasing block rate).
- The billing frequency (e.g., monthly, bimonthly, annually).

If the Supplier is considering a rate change or rate structure change, it would also be useful to include a summary of the Proposition 218 process plans and expected timeframe for the election and adoption.

3.3 Drought Plan (Water Code Section 10826.2) and Water Shortage Allocation Policies (Water Code Section 10826(a)(8))

3.3.1 Water Shortage Allocation Policies

> *"An agricultural water management plan shall be adopted in accordance with this chapter. The plans shall do all of the following:*
>
> > *(a) Describe the agricultural water supplier and the service area, including all of the following:*
> >
> > > *(8) Water shortage allocation policies.* (Water Code Section 10826(a)(8))

> *As part of its agricultural water management plan, each agricultural water supplier shall develop a drought plan for periods of limited water supply describing the actions of the agricultural water supplier for drought preparedness and management of water supplies and allocations during drought conditions."* (Water Code Section 10826.2)

A description of the water shortage allocation policies is required by the Water Code and will be a key component of the Drought Plan. Water suppliers that have a Water Shortage Allocation Policy can attach a copy of the policy in Section VIII of the AWMP and describe the allocation policies in Section VII or in the Drought Plan. If the supplier does not have such a policy, the Supplier can describe how water supplies will be allocated when supplies are limited.

3.3.2 Drought Plan

The Drought Plan, with specific elements, is required by Water Code as part of the AWMP. It may be useful to prepare the Drought Plan as a stand-alone document to make it easier to use and reference. The Drought Plan could then be included in the AWMP as an attachment in Section VIII. Regardless of where it is located, all the Water Code required elements must be included in the Drought Plan.

In addition to information included in the water shortage allocation policy, the Drought Plan must include both drought resilience and drought response planning (Water Code Section 10826.2).

3.3.2.1 Drought Resilience Planning

> *"The drought plan shall contain both of the following:*
>
> *(a) Resilience planning, including all of the following"* Water Code Section 10826.2(a)

Data and Indicators

> *"Data, indicators, and information needed to determine the water supply availability and levels of drought severity."* Water Code Section 10826.2(a)(1)

Resilience planning must include specific information used for determining the water supply availability and levels of drought severity. Data and indicators could include what hydraulic levels or conditions (reservoir levels, stream flows, groundwater, snowpack, and others) are monitored or measured to determine the water supply availability and level of drought severity.

The State Water Project (water.ca.gov/Programs/State-Water-Project), and *Central Valley Operations Office* (usbr.gov/mp/cvo) provide information on water supplies and reservoir data that may be of assistance. The California Water Plan also provides information on general conditions and trends that may help in determining what indicators or information could be monitored. Additionally, the California Statewide Groundwater Elevation Monitoring (CASGEM) Program provides seasonal and long-term groundwater elevation trends to assist in assessing groundwater availability (water.ca.gov/Programs/Groundwater-Management/Groundwater-Elevation-Monitoring--CASGEM)

The *National Integrated Drought Information System (NIDIS)* (drought.gov/drought/node/25) provides information on current drought conditions, outlooks and forecasts, groundwater and soil moisture, maps, links to other monitoring and reporting networks pertinent to drought, along with a host of additional information and data useful for determining water supply availability and levels of drought severity.

Drought Vulnerability Analysis

> *"Analyses and identification of potential vulnerability to drought."* Water Code Section 10826.2(a)(2)

Resilience planning must also include an assessment of the Supplier's vulnerability to droughts. A varied water supply portfolio is typically more resilient; Suppliers that rely on a single water source are more vulnerable if that water source has limited supplies. Additionally, districts with high water-use or permanent crops, soils that drain quickly or steep slope landscapes, less firm water rights, and environmental commitments may be more vulnerable to drought conditions. In this element, the Supplier should assess their conditions and identify their potential vulnerability to drought.

The Supplier is encouraged to be as realistic as feasible in their assessment in order to enable better preparation for the next period of limited water supplies. Lessons from the 2012- 2016 drought may inform their assessment in this section.

Opportunities and Constraints

> *"A description of the opportunities and constraints for improving drought resilience planning, including all of the following:*
>
> *(A) The availability of new technology or information.*
>
> *(B) The ability* of opportunities and constraints is another element *the agricultural water supplier to obtain or use additional water supplies during drought conditions.*

> *(C) A description* of *other actions planned for implementation to improve drought resilience planning."* Water Code Section 10826.2(a)(3)

Technology and Information. Technology and information is ever expanding and improving. Suppliers are encouraged to explore what new technology is currently available that might help prepare for periods of water shortage. Additionally, the Supplier can incorporate a policy or action in their Drought Plan to actively encourage exploration of future technologies.

Some resources to explore include:

- DWR Spatial CIMIS: cimis.water.ca.gov/SpatialData
- Cal Poly SLO ITRC: itrc.org
- Fresno State CIT: fresnostate.edu/jcast/cit

Additional Water Sources. In assessing potential vulnerability and resilience, the Supplier can also identify long-term projects and actions that may help mitigate existing and potential future vulnerabilities. Suppliers are encouraged to explore opportunities to diversify their water supply portfolio and develop alternatives for years with limited water supplies. This could include evaluating the availability of current and future urban recycled water, use and availability of water transfers, winter groundwater storage, and system improvements to maximize efficiency.

Some other items the Supplier may consider include:

- District water storage capacity.
- Water transfers and exchanges.
- Groundwater pumping (while avoiding overdraft and land subsidence) and conjunctive use of groundwater.
- Agreements with municipalities to receive tertiary- treated wastewater.
- Coordination and collaboration with adjacent agricultural and urban water districts and Groundwater Sustainability Agencies.

Other Planned Actions. The Drought Plan must include a description of any other planned actions for improving drought resilience. This could include plans for more storage facilities, groundwater banking, conjunctive use, construction of a nearby recycled water facility, grower education and technical assistance, land fallowing, and any other actions currently part of the Supplier's plans or under consideration for the future. To make the Drought Plan a more useful planning document, it is suggested that an implementation timeline also be included, along with potential funding mechanisms, if applicable.

3.3.2.2 Drought Response Planning

"The drought plan shall contain both of the following: …

(b) Drought response planning, including all of the following: Water Code Section 10826.2(b)

Water Shortage Policies Implementation

"Policies and a process for declaring a water shortage and for implementing water shortage allocations and related response actions". Water Code Section 10826.2(b)(1)

The Drought Plan must also contain specific elements for response planning. In this section, the Supplier must describe the district Board of Directors' process and policy for declaring a water shortage, implementing water shortage allocation policies, and implementing related response actions.

The process and policies should be clear and define the specific response actions, responsible parties, and other considerations or actions based on the data and indicators identified above and levels of drought severity. The Supplier is encouraged to consider multiple stages of action during a drought based on how severe or how long the drought continues or is expected to continue. The Supplier may want to include their Water Shortage Allocation Policy in this part of the Drought Plan, along with additional related response actions and the process in which they are implemented.

Methods for Enforcement and Appeals

"Methods and procedures for the enforcement or appeal of, or exemption from, triggered shortage response actions." Water Code Section 10826.2(b)(2)

For response planning, the Drought Plan must describe the methods and procedures for enforcement, exemptions, and appeals. Methods of enforcement, appeals, and exemptions These methods and procedures may vary depending on the severity of the drought. Consider developing an enforcement mechanism if one does not already exist, which may include fines, curtailments, or other sanctions.

In some cases, however, exemptions from enforcement may be applicable. The Supplier is encouraged to examine the uses and conditions within their service area to identify potential conditions where exceptions may be applicable. Even if the Supplier cannot identify a situation where an exemption would be reasonable, the Drought Plan must contain procedures where a customer can appeal an enforcement action.

Methods for Monitoring and Evaluation

> *"Methods and procedures for monitoring and evaluation of the effectiveness of the drought plan."* Water Code Section 10826.2(b)(3)

If a Drought Plan is not effective, it serves little purpose. As a part of drought response planning, the required monitoring and evaluation element should include methods and procedures to assess all resilience and response elements as to whether they worked, and if not, How would the district do things differently in the future? The monitoring element can also address how the district can learn and adapt to changes or unexpected outcomes, although this may instead be included as part of the resilience planning under (a)(3)(C).

Communication Protocols

> *"Communication protocols and procedures to inform and coordinate customers, the public, interested parties, and local, regional, and state government."* Water Code Section 10826.2(b)(4)

Communication and coordination are essential for implementing Drought Plan actions, compliance, and enforcement. The Drought Plan must describe how communication and coordination will be implemented. The procedures should include both the form and timing of communication. Consider the customer base and access to media to identify appropriate communication protocols. Is this accomplished through press releases? Web page posting? Mailings? Mass e-mail announcements? It is suggested that Suppliers coordinate in advance with other agencies and interest groups to develop an appropriate strategy and contacts.

Financial Impacts

> *"A description of the potential impacts on the revenues, financial condition, and planned expenditures of the agricultural water supplier during drought conditions that reduce water allocations, and proposed measures to overcome those impacts, including reserve-level policies."* Water Code Section 10826.2(b)(5)

Drought response planning also requires consideration of potential financial impacts. Describe if and how the district is financially resilient to survive prolonged drought and what measures can be implemented to improve financial resilience. The Supplier should closely examine their financial situation and how drought would affect their revenues and expenditures, what policies or mechanisms are in place or planned to help when allocations are reduced, and if there are reserves that can be relied on (and for how long). The supplier should also identify potential funding gaps, such as water infrastructure and data collection projects.

The Supplier is encouraged to consider the impacts from recent drought periods to inform this element, how well actions taken to improved financial resilience worked, and if additional actions were identified.

Additional Resources:

- **FAO Climate Smart Agriculture**
  fao.org/climate-smart-agriculture/knowledge/practices/drought/en
- **National Integrated Drought Information System**
  drought.gov/drought/resources/planning-preparedness
- **Lessons from California 2012-2016 Drought**
  ascelibrary.org/doi/full/10.1061/%28ASCE%29WR.1943-5452.0000984

3.4 Description of the Quantity of Water Uses of the Agricultural Water Supplier (Demands)

This section describes the water uses for agricultural, environmental, recreational, municipal and industrial, groundwater recharge, and other water uses within the Supplier's service area. Information in this section can be used to prepare the annual water budget as required by Water Code Section 10826(c) and assist in determining the annual groundwater budget as required under SGMA. This section may also be used to inform the Supplier's Drought Plan resilience planning and water management objectives. See Section III of the AWMP Template (Appendix A1).

Water Code Section 10826(b) requires a description of the quantity of all underlying items, including the water uses identified under Section 10826(b)(5). Section 10826(b)(5) requires that the AWMP include a description of:

> *Water uses within the agricultural water supplier's service area, including all of the following:*
>
> *(A) Agricultural.*
>
> *(B) Environmental.*
>
> *(C) Recreational.*
>
> *(D) Municipal and industrial.*
>
> *(E) Groundwater recharge, including estimated flows from deep percolation and from irrigation and seepage*.

Although the legislation does not require a specific method, timescale, or other parameters for quantifying water uses under this element, this Guidebook provides a suggested level of detail so that information can be used in determining the annual water budget as required by Water Code Section 10826 (c) (annual water budget) and to assist the Supplier in preparing an AWMP that is useful for water supply planning.

When describing quantities of water used, it is suggested that the Supplier consider the following:

- **Utility for Annual Water Budget.** The annual water budget, required by Water Code Section 10826(c), must include inflow components including surface inflow, groundwater pumping in the service area, and effective precipitation, along with outflow components including surface outflow, deep percolation, and evapotranspiration. The annual water budget for each of the preceding five years will need to be quantified on a water-year basis. Suppliers can use information provided in this section to facilitate calculation of their annual water budgets.

- **Water Sources.** If available, it is suggested (but not required) that annual quantities of water used from each water source within the service area, for each water use type, be reported, along with additional information that can be used in the annual water budget analysis. Understanding how much water comes from each water source could assist in drought planning and management, as well as for identifying and evaluating water management objectives.

- **Special Management Areas.** If special management or usage areas have been identified in Section II of the AWMP, it would further assist in water management planning to provide a table of water use estimates that delineates water use in each applicable area for each water use type (e.g., agriculture, environmental, and others).

- **Consistency.** In order to provide a meaningful and consistent basis for water budgeting in accordance with Water Code Section 10826(c), it is suggested that:

    - Information in this section also be reported on a water-year basis using the same previous five water-year(s) for all water use types listed under Water Code Section 10826(b)(5).
    - Information be reported by groundwater basin or sub-basin to assist in or inform any GSP requirements.
    - Monthly or bi-monthly water usage data be provided for each water use type to assist in evaluating timing of water supply needs and potential for conjunctive use considerations.

  - Use the same water-years to report all quantities in all tables/descriptions in Sections III through IV of the AWMP (see Section 3 of this Guidebook).
  - Report all water quantities based on a Plan Cycle water-year- basis and include information for the past five water-years. This will enable better determination of the annual water budget that must be reported on a water-year basis and align more closely with SGMA reporting.

- **Reporting Year(s) Characteristics.** The Supplier is encouraged to identify what type of year is used to describe the quantities in this section (e.g., an average year, Representative Year, calendar year, water-year, or other). It should be noted that for the annual water budget (see Section 3.6), quantities for the preceding five years are required, and these must be reported on a water-year basis. However, Suppliers are not required to report using these timeframes in this section. It is recommended that the AWMP include a detailed description of the basis for reporting water quantities; what year(s) are used to describe the water quantities and if there were any special conditions relevant to the determination of quantities (e.g., excessively wet year, water measurement system only partially implemented, couldn't measure a particular source or use, or other considerations).

  The Supplier may decide to characterize their water supplies in terms of Representative Year(s). The Representative Year can be an average or a range of hydrological variation such as drought, normal, and wet years.

  Representative Years that cover a range of hydrologic conditions may be useful in understanding opportunities and constraints in certain scenarios or can be used to inform drought resiliency planning. If a Representative Year is used to describe water uses and supplies, it should be defined and the year(s) it is based on identified. The rationale/description of what constitutes a Representative Year(s) should also be included in this section, if applicable.

- **Description of Methods Used to Determine Quantities.** It is suggested that the methods used to determine quantities be included in the descriptions in this section. If water uses are estimated instead of measured, DWR encourages the Supplier to provide justification and documentation of calculations and data used for the estimation. This information can be summarized in the discussion pertaining to quantification of the specific supplies and/or uses, with details included as an attachment in Section VIII if necessary. This information can also provide the basis for SGMA annual groundwater reports and Aggregated Farm Gate Delivery Reports.

- **Estimating Future Uses.** For water management planning, it is often advantageous to estimate future water use demands. While not required, the Supplier is encouraged to include a description of any anticipated changes or trends in water demand within their service area in order to facilitate the AWMP's use as a planning document and for development of the Drought Plan resilience component. This could include, but are not limited to, changes in water use related to:
    - Changes in crop types resulting in different crop water use requirements than current conditions;
    - Expected market fluctuations that would affect the type, number, and acres of crops grown;
    - Increased water use efficiency that would reduce water uses through reduced non-recoverable water;
    - Increased energy costs that would potentially reduce the amount of water used from higher energy sources (e.g., pumped groundwater);
    - Anticipated changes in land use (e.g., conversion of agricultural land to developed land, land fallowing); and/or,
    - Potential changes in climate conditions that could affect water use.

3.4.1 Agricultural Water Use (Water Code Section 10826 (b)(5)(A))

A description of the quantity of agricultural water use within the service area is required by Water Code 10826(b). How the quantity of agricultural water use is described is at the discretion of the Supplier. However, this information will be needed to calculate the annual water budget pursuant to Water Code Section 10826(c)) (see Section 3.6) and agricultural water use efficiency pursuant to Water Code Section 10826(h) (see Section 3.8). As such, Suppliers are encouraged to report this information in a manner that will facilitate these calculations.

For each water-year in the Plan Cycle, it is suggested that the Supplier provide the following information in the AWMP:

- Quantification of water delivered to all of the Supplier's agricultural customers within the service area.
- An estimate of private groundwater used for agricultural purposes in the service area.
- An estimate of the amount of precipitation used by agriculture (otherwise known as Effective Precipitation).

- An estimate of other water sources used to meet agricultural water use demands in the service area from sources such as recycled water, return flows, and others.

Data for Water Use Efficiency Quantification. The Supplier can also describe the type and acreage of crops grown in the service area in order to provide data that can be used in calculating the crop consumptive use and agronomic use, which are components for calculating water efficiency fractions as well as the annual water budget (see Section 3.6).

1. **Crop water use** can be calculated or modeled based on climate conditions, management practices, and types and location of crops grown. Alternatively, it can be measured (e.g., remote sensing, eddy-covariance, meters, and others).

2. **Agronomic water use** refers to water used for management practices such as salt leaching, frost control/weather modification, weed/pest control, and seedbed preparation. This fraction can be modeled or estimated based on management practices in the area for the types of crops grown, irrigation water salinity, and climate conditions.

Suggested data for each water-year in the Plan Cycle include:

- Types and acreage of crops grown within the service area
- Seasonal evapotranspiration amounts for each crop type or as a whole
- Water required for cultural practices (e.g., leaching requirement, seedbed preparation, weed/pest control, weather modifications, or other management practices)
- The types of irrigation systems used for each crop
- Amount of irrigated acres
- Alternate cropping systems that may affect water use each year

If the Supplier elects to use a comprehensive model to develop their annual water budget, crop water use and agronomic water use will likely be based on the model output. As such, the Supplier can include documentation of the model used, input parameters, and other decisions as an attachment in AWMP Section VII. The discussion in this section of the AWMP would then be a summary overview of the model outputs referenced to the appropriate attachment for details.

Technical assistance for determining agricultural water use is available through DWR's Regional Offices who have personnel trained in the use of Cal-SIMETAW. This model can be used to calculate the amount of water crops use and interfaces with land use cover and precipitation information.

DWR is also developing remote sensing databases on agricultural land use, including types of crops grown. Please visit the WUE website at water.ca.gov/programs/water-use-and-efficiency for updates on the status of this crop mapping and to download information as it becomes available, which can then be used to inform calculations of effective precipitation.

DWR's CIMIS database is a useful tool for obtaining crop ET in your area and is available at cimis.water.ca.gov.

Cropping data can be found at data.cnra.ca.gov/dataset/statewide-crop-mapping.

Some Suppliers that are required to prepare and submit an AWMP are also Groundwater Sustainability Agencies (GSA). Under SGMA, these Suppliers will need to submit an annual water budget. It may be helpful to begin collecting and reporting water budget data needed to meet SGMA requirements in their AWMP or use SGMA reports to help inform AWMP water uses.

3.4.2 Environmental Water Use (Water Code Section 10826 (b)(5)(B) and Section 10826 (h))

A description of the quantity of environmental water use is required by the Water Code Section 10826(b)(5)(B). DWR encourages the Supplier to describe what environmental resources (e.g., wetlands, vernal pools, streams, wildlife refuges) are located within their service area, which types and areas actively receive water supplies from the agricultural supplier to support their environmental functions, and what, if any, are the dedicated/jurisdictional amounts the supplier must deliver. Where possible, a distinction between supplier water and other water used to support environmental resources may be provided. If no environmental use demands are to be accounted for, a simple statement indicating such would be sufficient.

In some cases (e.g., winter flooded rice fields), water use may serve as both agronomic and environmental uses. It is up to the Supplier which water use is chosen for reporting and accounting, although categorizing the water use by its primary function is recommended. However, the Supplier should take care that they do not double-count the water used when allocating quantities and should consider the main purpose(s) of the water use and allocate accordingly.

3.4.3 Recreational Water Use (Water Code Section 10826 (b)(5)(C))

A description of the quantity of recreational water use is required by the Water Code. DWR encourages Suppliers to describe what recreational uses in the service area are supported by their water supplies and to quantify the amount of water to maintain these uses/facilities. These uses could be demands such as releases to provide recreational

flows or the amount of water left in reservoirs to provide boating access. Identification and quantification of any applicable jurisdictional requirements is also encouraged. If no recreational uses are to be accounted for, a simple statement indicating such would be sufficient.

3.4.4 Municipal and Industrial Use (Water Code Section 10826 (b)(5)(D))

A description of the quantity of municipal and industrial uses is required by the Water Code. DWR encourages the Supplier to describe what municipal and industrial uses in the service area receive water from the Supplier, as well as how much water is typically used by these entities. If no municipal or industrial uses are within the service area, a simple statement indicating such would be sufficient.

3.4.5 Groundwater Recharge Use (Water Code Section 10826 (b)(5)(E))

A description of the quantity of groundwater recharge use, including estimated flows from deep percolation of irrigation and seepage, is required by the Water Code 10826(b)(5)(E). Water Code 10826(c) also requires quantification of groundwater recharge from deep percolation for calculating the annual water budget.

Suppliers will need to describe and quantify the amount of water used annually for groundwater recharge. DWR encourages the Supplier to report recharge on a monthly or bimonthly basis (if available), identify the method of recharge, location of recharge (including groundwater basin or sub-basin, as applicable), and amount of any recharge water applied for conjunctive water uses. Identification and quantification of any jurisdictional or agreement-based recharge commitments is also encouraged. The Supplier may also attach any relevant SGMA plan as an appendix if applicable, with a summary of groundwater recharge use in this section.

If the Supplier contributes to groundwater recharge outside of the service area, this groundwater recharge use must also be identified and quantified in the AWMP.

3.5 Description of Quantity and Quality of the Water Resources of the Agricultural Water Supplier

This section describes the quantity and quality of sources of water available to the Supplier. By understanding the water sources, Suppliers can better identify opportunities and constraints to assist the Supplier in developing policies and plans to best use their water resources and to improve water supply reliability and resilience to water shortages.

This section also provides information on source water quality monitoring practices. See Section IV of the AWMP Template (Appendix A1).

3.5.1 Water Supply Quantity

Water Code Section 10826 requires that the AWMP:

> *(b) Describe the quantity and quality of water resources of the agricultural water supplier, including all of the following:*
>
> *(1) Surface water supply.*
>
> *(2) Groundwater supply.*
>
> *(3) Other water supplies, including recycled water.*
>
> *(4) Source water quality monitoring practices.*
>
> *(5) Water uses within the agricultural water supplier's* service area.

[Note: Item (5) was addressed in section 3.3 of this Guidebook.]

Although the legislation does not specify the mechanisms or level of detail for describing the quantity of water supplies, this Guidebook provides a process and level of detail that can be used for water management planning and for addressing Section 10826 (b), Section 10826(c), and Section 10826(h) requirements.

It is suggested that this section be used to identify all available water supply quantity data, qualitative descriptions of non-quantified data, and other water supply information and considerations. Additionally, this information can be used to inform the Drought Plan and in evaluating overall resiliency to water shortages. In Section 3.5, Calculating the Annual Water Budget, the Supplier is required to calculate the annual water budget based on what was delivered, used, and returned in a given year.

Origin. For each water source type, DWR encourages Suppliers to include discussions on origin (there may be multiple origins for a water source—for example, groundwater supplies can be obtained from different groundwater basins), type of use (e.g., agricultural, environmental, commercial, if applicable), and use limitations of each water supply source. To facilitate future planning, it is also suggested that the AWMP identify conditions (e.g., drought, wet year, other) during which current and historic amounts have been/are available and if supplies are limited based on operations or contract conditions. To assist SGMA planning and activities, it is highly encouraged that Suppliers report their groundwater supplies by groundwater basin or sub-basin, as applicable.

If wholesale water supplies are received from another supplier or if the Supplier provides water to another water user, the AWMP should make note of this. For water obtained from wholesale sources, the Supplier can include a reference to the wholesalers UWMP/AWMP and include a summary of the water supply's origin.

Consistency. The Water Code requires a description of the estimated or calculated quantities of water supplies for each of the three major categories of water supply sources used within the service area, surface water, groundwater, and 'other' water, as well as a quantification of the amount of effective precipitation in the service area (Water Code Section 10826 (c)). To provide a meaningful and consistent basis for water budgeting, in accordance with Water Code Section 10826 (c), it is suggested that the Supplier:

1. Report using the same water-year(s) for all descriptions of water resources quantities, consistent with water use reporting, in order to allow for ease of use and analysis.
2. Include monthly or bi-monthly water use data for each water supply source, which may help in understanding and managing limitations or opportunities.
3. Describe the quantity of average-year water supplies and planned projects to increase water supplies for each water supply.
4. Note any restrictions or operational constraints associated with the supplier's water supplies, if applicable, for each water supply type and source.
5. Use the same water-years to report all quantities in all tables/descriptions in Sections III through IV of the AWMP.
6. Report all water quantities based on a Plan Cycle water-year- basis and include information for the past five water-years. This will enable better determination of the annual water budget that must be reported on a water-year basis and align more closely with SGMA reporting.

Methods. If quantities are estimated, the Supplier is encouraged to provide justification and documentation of calculations and data used for the estimation(s) in the AWMP.

Special Management Areas. If special management or usage areas have been identified in Section II of the AWMP, a table or tables with water supply estimates for each water supply source available to each applicable area would further assist in water management planning.

3.5.1.1 Surface Water Supply (Water Code Section 10826 (b)(1))

To address the legislative requirements for a description of surface water supply quantities, DWR is providing the AWMP Template (Appendix A1) for the Suppliers to include the following surface water supply information:

- A brief description of the total amounts and types of each of the Supplier's contracted surface water supplies (i.e., CVP Class I water contract for agriculture, SWP water contract for agriculture, exchange contract).
- A brief description of the total amounts of surface water rights including pre-1914 water rights. This description can include the name of the surface water source, location of diversion(s), annual maximum diversion, monthly maximum diversion, diversion rate, and other water rights limitations on use.

For both contracted and water rights surface water supplies, DWR encourages the Supplier to include in the AWMP:

- The annual amount of water received from each source for representative year or 2025 Plan Cycle water-years, as well as allocations during dry years and multiple dry years, if available.
- A description of any restrictions on the time and amount of diversion.
- A description of any anticipated changes in the Supplier's surface water supplies during the next five years.

Water rights information and sources of surface water supplies are important because these will affect water supply availability during water shortage situations, as future demands change, and as climate change affects water use and availability.

3.5.1.2 Groundwater Supply (Water Code Section 10826 (b)(2))

A description of the quantity of groundwater supplies in the AWMP is required by Water Code. DWR encourages the Suppliers to attach any relevant SGMA plan as an appendix, if available, with a summary included in this section. The Supplier is also encouraged to include the following information in this section:

- Identify the groundwater basin(s)/subbasin(s) directly pumped by the Supplier to meet demands and briefly describe the basin(s) characteristics and total available groundwater supplies. For managed groundwater basins, a copy of the management plan can also be attached.
- A map showing the location of the Supplier's wells and groundwater recharge areas.
- The annual quantity of groundwater pumped directly by the Supplier. Provide the rationale and documentation for the method used if groundwater water supplies

are estimated from non-metered wells, whether owned by the Supplier or leased from private parties.

- Whether there were limitations or challenges to obtaining groundwater during the period reported in the AWMP in order to indicate the “sufficiency” of groundwater pumped.

If groundwater from a wholesaler is used to meet demands, it is suggested that the Supplier provide a brief description of the groundwater basin and amount of groundwater supplies available to the Supplier.

If the Supplier operates a conjunctive use program, DWR encourages the Supplier to describe this program in the AWMP. A description of any changes or expansions planned for the groundwater supply can also be provided. If the annual available groundwater is not used, this could result in ‘banked’ water that could be used in a subsequent year. Additionally, surface water recharge of groundwater supplies can also increase the available groundwater supply from year to year.

Private Groundwater Supply. A description of the quantity of groundwater pumped by private sources is not required by Section 10826(b)(2), however, this quantity is required for calculating the annual water budget in Section V (Section 10826(c)). The Supplier may choose to include the annual quantity of private groundwater pumping in this section or in Section 3.6 A. It is suggested that the Supplier:

- Identify the groundwater basin(s) underlying the service area that may be privately used by individual customers to meet water use demands if these are different from the Supplier’s basins. Briefly describe the basin(s) characteristics and total available groundwater supplies within the service area/usage area, whether the groundwater is managed by a Groundwater Sustainability Agency (GSA) and has a Groundwater Sustainability Plan (GSP), and any other characteristics pertaining to long term supply reliability and availability.
- Provide the annual amount of irrigation groundwater pumped by private wells within the service area (required for Section 10826(c) but does not need to be reported in this section).

If private groundwater wells are metered and data are available, the Supplier can simply report the amount pumped for each of the past five water-years. However, in most cases private groundwater pumping must be estimated or calculated using models. The Supplier may choose which model or calculation methods to use.

Models. For groundwater basins with a developed GSP, a model of all inflows and outflows to the groundwater basin should be available.

However, even with an existing model it may be necessary to modify the model output to separate out the pertinent components because the GSP will consider all groundwater uses in the groundwater basin. The Supplier will have to make sure that the modeled groundwater pumping values reported in the AWMP do not include private groundwater pumping for non-agricultural purposes.

If there is no existing model, the Supplier can develop or contract development of a model for their district. Typical models estimate groundwater pumping based on assuming a crop uses all the water it needs. The potential crop water use is typically calculated using measured crop consumption from a reference crop (ETo) multiplied by a crop-specific factor (Kc) developed for most agronomic crops in California. Potential crop water use demands are then assumed to be met entirely, using surface water, groundwater pumping, and effective precipitation. Alternatively, some models may use remote sensing or other measurements to determine the actual amount of crop water use (actual evapotranspiration or ETa), which is then used in the models to determine how much groundwater was used.

Helpful information necessary to describe ground water basins can be found in California DWR Bulletin 118 available at water.ca.gov/Programs/Groundwater-Management/Bulletin-118. Bulletin 118 can be used to identify the basin(s) that underlie the service area and their size, usable capacity, and safe yield. In a few cases, service areas overlie more than one groundwater basin. This bulletin describes the general boundaries of each basin and indicates if there is evidence of overdraft (pumped volume more than safe yield).

Under SGMA, groundwater basins have been prioritized for developing and implementing Groundwater Sustainability Plans (GSPs). DWR encourages Suppliers to identify the prioritization of groundwater basins or sub-basins underlying their service area. Information on basin prioritization can be found at water.ca.gov/Programs/Groundwater-Management/Basin-Prioritization.

If the Supplier is also a GSA tasked with preparing and implementing the GSP, careful completion of this section can assist the Supplier in scoping their GSP.

Information regarding groundwater basins is also available from the California Statewide Groundwater Elevation Monitoring (CASGEM) program developed by DWR. The intent of the CASGEM program is to establish a permanent, locally-managed program of regular and systematic monitoring in all of California's alluvial groundwater basins.

This information can be used to further describe the groundwater basin(s) and provide information related to potential supply conditions (e.g., lowering water level trends may indicate a declining groundwater supply). For further information, see

water.ca.gov/Programs/Groundwater-Management/Groundwater-Elevation-Monitoring--CASGEM

3.5.1.3 Other Water Supplies, including recycled water (Water Code Section 10826 (b)(3))

To address the legislative requirements for a description of the other water supplies, the quantity of any long-term other water supplies (e.g., recycled water, transfer agreements, desalinated water, storm water, and any other source water the Supplier considers part of its water supply portfolio) must be included in the AWMP. Additionally, even if effective precipitation is not normally considered part of the Supplier's portfolio, this quantity is required as part of the annual water budget and water use efficiency calculations (Water Code Section 10826(h)) and could be included either here or in the water budget section.

It is suggested that monthly and annual supply quantities be reported in the AWMP for each type of 'other' water supply. It is also suggested for planning purposes that the AWMP include a discussion on the potential opportunities and constraints to using or developing other water supplies.

Two water supplies that must be described in the AWMP are detailed below.

Recycled Water

The AWMP must describe the recycled water supply quantity.

> *"Recycled water" means recycled water, as defined in subdivision (n) of 13050. (Water Code Section 10608.12(q))*
>
> *"Recycled water" means water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is therefor considered a valuable resource. (Water Code Section 13050(n))*

The Supplier is encouraged to include information about the source of recycled water, location of use, and any commitments or contracts for supplies along with the annual water supply. If no recycled water is used, a simple statement to that effect is sufficient. However, because diversification of water supplies is an important component of drought and long-term resiliency, information regarding the availability and potential for recycled water use could be described in this section to inform the Drought Plan and assist the Supplier in long-term planning.

Effective Precipitation

A description of effective precipitation is not required by Section 10826(b)(2). However, this quantity is required for calculating the annual water budget in Section V (Section 10826(c)) and is used in the required water use efficiency calculation as defined in "*A Proposed Methodology for Quantifying the Efficiency of Agricultural Water Use*" (Quantification Methodology), even though it may not be considered part of the Supplier's 'portfolio'. If the Supplier does not quantify the amount of effective precipitation within their service area in section 5, they may wish to do so in this section.

Effective precipitation is the amount of precipitation that is used by the crops. Some precipitation will run off during a rainfall event, some will percolate below the crop rootzone, and some will remain on surfaces and later evaporate. In these situations, the precipitation will not be used by crops and this amount of rainfall will not be effective precipitation. Often, this component will be modeled or estimated based on an understanding of the types of crops grown, the soil runoff potential, the seasonal and event patterns of rainfall (or other types of precipitation such as fog and snow), and other climate conditions.

Factors for Suppliers to consider when describing effective precipitation in their service are include:

- Soil types and how they may affect how quickly precipitation will infiltrate, run off, or drain to deep percolation.
- Seasonal rainfall patterns, soil saturation, and the frequency of high-intensity rainfall events.
- Crop types and crop water use. Crop water use between rain events allows for infiltration of water from the next rain. Deeper roots increase the amount of water the soil can hold and still be available to plants.
- Temperature patterns and their effects on crop growth and soil saturation.

Future Water Supplies *(Optional)*

An assessment of future water supply is not required in the AWMP. However, understanding potential future water supplies is an important component of the water management planning process and long-term resiliency. As such, identification of potential changes in future water supplies, such as environmental constraints, drought, climate change, regulatory changes, or changes in water storage capacity, is encouraged. Possible management strategies to maximize future water supplies and/or future water supply reliability, such as conjunctive use programs or other water management options, could also be discussed or included in the Water Management Objectives (refer to Section 3.7).

DWR provides direct technical assistance and tools to Suppliers in determining components of their annual water budget, including effective precipitation.

- Spatial CIMIS operates a number of weather stations and provides access to climate data necessary for calculating effective precipitation. CIMIS climate data is available at cimis.water.ca.gov.

- The Cal-SIMETAW model was designed to estimate daily soil-water balance to determine crop evapotranspiration (consumptive use) and evapotranspiration of applied water for the California Water Plan updates. This model requires weather data, soils, crop coefficients, rooting depths, seepage, and other factors that influence the crop-water balance. Because crop water use and evapotranspiration of applied water require a computation of effective precipitation, this program can be used to help determine effective precipitation in an area.

DWR's Regional Offices are experienced in using Cal-SIMETAW. Suppliers are encouraged to contact their DWR Regional Office for assistance in generating models of their service area to estimate their annual effective precipitation.

Please visit the WUE Agricultural Water Use Models website for contact information and assistance (water.ca.gov/Programs/Water-Use-And-Efficiency/Land-And-Water-Use/Agricultural-Water-Use-Models)

If the Supplier has developed a model already, they can contact the GSA for assistance in determining local effective precipitation. If a model has not yet been developed, the Supplier is encouraged to work with the local GSA or the SGMA Program to develop the data and modules needed to determine effective precipitation and other water budget components for reporting in the AWMP. The Supplier may also choose to use a number of other available models or a private consulting firm to calculate effective precipitation and associated water budget components.

3.5.2 Water Supply Quality

Water Code Section 10826 requires that the AWMP:

> *"(b) Describe the quantity and quality of water resources of the agricultural water supplier, including all of the following:*
>
> *(1) Surface water supply.*
>
> *(2) Groundwater supply.*
>
> *(3) Other water supplies, including recycled water.*

(4) Source water quality monitoring practices"

The legislation does not specify the mechanisms or level of detail that would satisfy requirements for describing the quality of water supplies. In this section, this Guidebook provides a process and level of detail to assist the Supplier in preparing an AWMP that can be used for water management planning.

DWR encourages the Supplier to report average values and range of values for water quality parameters. If water quality improvements have been implemented, it is suggested that only those water quality data for the period following the improvements be reported.

DWR also encourages the Supplier to include a discussion on whether water quality from certain water supplies would constrain their uses (e.g., high salinity requiring management to reduce salt build up in soils). The AWMP can also include an evaluation of the water supply's suitability to support the uses identified in Section 3.4 of this Guidebook. Information on applicable water quality criteria/goals for various use categories can be found in, "A Compilation of Water Quality Goals" under the Water Quality Assessment Program available at waterboards.ca.gov/water_issues/programs/water_quality_goals. It is also suggested that any planned improvements for water quality be identified in the AWMP.

If extensive information is available, tables and reports on water quality can be included as an attachment or appendix, with a summary included in the AWMP main body. Where quantified information is not available, a qualitative description of water quality must be provided.

The AWMP must also include a description of the source water quality monitoring practices. If water quality monitoring of water supply sources has been conducted by the Supplier or their wholesaler, the monitoring practices must also be described in the AWMP (Section IV.C).

3.5.2.1 Surface Water Supply Quality (Water Code Section 10826 (b)(1))

To address the legislative requirement for a description of the surface water supply quality, DWR encourages the Supplier to identify:

- Potential or known water quality conditions as described in the Regional Basin Plan for the surface water source.
- If the surface water source is listed as impaired on the 303(d) list, and if so, for what pollutants. Refer to the latest Water Quality Assessment/Total Maximum Daily Load (TMDL) Program for the 303(d) list at

waterboards.ca.gov/water_issues/programs/water_quality_assessment/#impaired.

- If the surface water source is subject to a TMDL, and if so, for what pollutants (for applicable TMDLs within the Supplier's regional basin, refer to the Water Quality Assessment/TMDL Program above).
- Any known or potential water quality constraints to its use within the service area for uses identified in Section 3.3 of this Guidebook.

3.5.2.2 Groundwater Supply Quality (Water Code Section 10826 (b)(2))

To address the legislative requirement for a description of the groundwater supply quality, DWR encourages the Supplier to provide water quality information as described above (Section 3.4.B). If data is not available, it is suggested that the Supplier identify potential or known water quality conditions for the groundwater source as described in the Regional Basin Plan, DWR Bulletin 118, and/or any applicable groundwater management plan or document along with any potential water quality constraints to its use within the service area for the uses described in Section 3.3.

Some useful groundwater quality data may be available at:

- DWR's Water Data Library
  wdl.water.ca.gov
- GAMA – Groundwater Ambient Monitoring & Assessment Program
  waterboards.ca.gov/gama

3.5.2.3 Other Water Supplies (Water Code Section 10826 (b)(3))

A description of the quality of other water supplies is required by the Water Code for all 'other' water supply sources listed in Section 3.5.1 (Water Supply Quantity sub-section). The extent of this description and availability of information will depend upon the supply source. For recycled water, water quality measurements should be available under the applicable Waste Discharge Requirement permit. DWR encourages the Supplier to provide water quality information for 'other' supplies as described above for the surface water and groundwater supplies.

Surface Drainage. A description of surface drainage water quality from the Supplier's service area is not required if it is not used as a source of water supplies. Drainage discharges to land or surface water are regulated by a Waste Discharge Requirement permit issued by the Water Board. Nevertheless, it may be useful to describe drainage water quality in the AWMP, regardless of its status as a source of water supplies, in

order to evaluate its usefulness for reuse within the service area. Other useful information may include:

- The outlet location for drainage water supplies and whether drainage is surface or sub- surface.
- Contaminants (e.g., salts, selenium, boron, pesticides) that may limit the reuse of drainage water or that may affect discharge locations (e.g., drainage to an environmentally sensitive area).

3.5.2.4 Source Water Quality Monitoring Practices (Water Code Section 10826 (b)(4))

The AWMP must describe the source water quality monitoring practices, as required by the Water Code. This includes the water quality monitoring program for drainage water if it is used as a water supply source by the Supplier. Monitoring allows the Supplier to assess water quality problems that may limit the use of available water sources.

DWR encourages the Supplier to include:

- A description of water quality monitoring practices currently conducted for surface water and groundwater supplies including: the timing and frequency of monitoring, what constituents are analyzed, and the location of sampling/monitoring.
- A description of the data evaluation process and potential mitigation of identified water quality constraints.

3.6 Annual Water Budget

The purpose of this section is to bring together water use and supply for an overall picture of agricultural water used and the ability of water supplies to meet water demands within the supplier's service area.

The Water Code Section 10826(c) requires that the AWMP:

> *Include an annual water budget based on the quantification of all inflow and outflow components for the service area of the agricultural water supplier. Components of inflow shall include surface inflow, groundwater pumping in the service area, and effective precipitation. Components of outflow shall include surface outflow, deep percolation, and evapotranspiration. An agricultural water supplier shall report the annual water budget on a water-year basis. The department shall provide tools and resources to assist Suppliers in developing and quantifying components necessary to develop a water budget*.

The means by which these components are quantified are at the discretion of the Supplier, although the Water Code does specifically identify three inflow components and three outflow components that must be quantified. The Supplier can quantify the component using measurements, calculations and data analysis, or models. Suppliers may also choose to hire a private consultant to perform this analysis for them. Suppliers are encouraged to work with DWR and SGMA in obtaining data, deciding on methodology, and performing calculations.

Information presented in AWMP Sections III and IV can be used to help complete the Water Code required annual water budget and any detailed descriptions, data, and methods can be referred to in this section. An adopted GSP can also provide water budget information and be referenced in this section.

Suppliers are encouraged to use the tables at the end of this section to tally and calculate district service area water inflows and outflows (Microsoft Excel spreadsheets are available upon request at agwue@water.ca.gov).

3.6.1 Quantifying the Inflows

The Water Code requires Suppliers to quantify all inflow components and specifically requires that surface water, groundwater pumping, and effective precipitation be included. All data sources and calculation methods should be clearly identified in the AWMP and uncertainty estimates are encouraged because this data will become public information. Uncertainty estimates and methods can be important information needed to qualify data. How details are presented is at the discretion of the Supplier, however, Suppliers are encouraged to fill out the water budget tables (Tables 2a & 2b) at the end of this section.

In the AMWP, the Supplier should report the annual water supply quantities along with a description of the calculations or process used to arrive at the reported quantities. An adopted GSP that describes the methods used can also be referenced in this section.

All quantities must be reported for each of the previous five years, by water-year (October 1 through September 1 of the following year):

Surface water inflow (Specifically Required)

Surface water inflows must be reported in the water budget. Include quantities of annual surface water directly diverted by the Supplier, along with any imported surface water and any other sources of surface water. These surface inflows may be reported separately or in aggregate. Surface water diversions should be measured per SB 88 (waterboards.ca.gov/waterrights/water_issues/programs/diversion_use/water_measurement.html).

The Supplier may also wish to include the measured amounts of surface water delivered to customers. This will assist in calculation of some outflow components attributed to the conveyance and storage systems losses, such as deep percolation of seepage and evaporation from canals.

Groundwater pumping inflow (Specifically Required)

Groundwater pumping must be reported in the water budget. Groundwater pumping includes both groundwater pumped directly by the Supplier, as well as any private groundwater pumped by growers – the Water Code does not distinguish between these two processes.

(a) **Water Supplier Groundwater Pumping.** Include quantities of annual direct groundwater pumping and any imported groundwater. These quantities can be measured or calculated. The AWMP may also identify the conditions under which minimum, average, and maximum amounts may occur (e.g., climate, pump capacities, private well rental agreements, surface water curtailments, and others) in order to facilitate planning.

(b) **Private Groundwater Pumping.** Groundwater supplies for agricultural uses may be available from non-Supplier parties (e.g., private wells) within Supplier's boundaries. If the district has metered private groundwater wells, this quantity can be measured. If groundwater meters or their data are not available, the AWMP can estimate or model the annual private groundwater pumping within the service area. Refer to section 3.5 A2 of this Guidebook for more detailed assistance.

Effective precipitation inflow (Specifically Required)

The AWMP must provide the quantity of effective precipitation within the service area. Not all precipitation that falls down can be used by crops; for instance, some precipitation runs off the landscape, some is evaporated, and some percolates beyond the crop rooting zone (refer to the Quantification Methodology as a reference). Refer to section 3.5 A.3 of this Guidebook for more details and assistance. This component is often estimated or modeled based on crops grown, soils, climate, and other factors. This typically requires modeling, such as Cal-SIMETAW to identify the quantity, although sometime a simple fraction of total precipitation is used.

Recycled water inflow

If recycled water is used for agriculture within the district, it is an inflow component and must be quantified. It may be included in the overall surface water inflow component,

however, it may be useful to report this quantity separately. It would also be beneficial to note if more recycled water could be expected in the future.

Other water supplies inflow

If other water supplies are used for agricultural purposes within the district, it is an inflow component and must be quantified. Report the quantity and type of any other water (e.g., desalinated water) as described in section 3.5 A.3, if applicable. Identify and report the quantity of any other sources of water supply that are used for agriculture in the district, even if they are not included in the Supplier's portfolio but are inflows into the service area (e.g., unmanaged return flows). Identification of potential changes in future water supplies such as environmental constraints, drought, or changes in water storage capacity is encouraged. Possible management strategies to maximize future water supplies and/or future water supply reliability, such as improvements in conjunctive use programs or other water management options, could also be discussed in this section or section 3.7, Water Management Objectives.

3.6.2 Quantifying the Outflows

The Water Code requires that Suppliers quantify all outflow components and specifically requires that surface outflow, deep percolation, and evapotranspiration be included. All data sources and calculation methods should be clearly identified in the AWMP and uncertainty estimates for the resulting quantity are recommended.

Because this data becomes public information, uncertainty estimates and methods can be important information needed to qualify data that may be analyzed or used by others. How details are presented is at the discretion of the Supplier. However, Suppliers are encouraged to fill out the water budget tables (Tables 2a & 2b) at the end of this section.

In the AWMP, the Supplier must report the annual outflow quantities along with a description of the calculations or process used to arrive at the reported quantities. An adopted GSP that describes the methods used can also be referenced in this section. All quantities must be reported for each of the previous five years, by water-year (October 1 through September 1 of the following year). The Supplier is also encouraged to identify the conditions under which minimum, average, and maximum amounts may occur (e.g., climate, grower irrigation management, others) in order to facilitate planning.

Surface water outflow (Specifically Required)

Include the quantities of surface water leaving the district from all inflows identified above (surface water, groundwater, and others). This may be measured, estimated, or modeled based on deliveries, seepage, crop water use, and other factors.

The AWMP does not need to include the quantity of surface water outflow for each individual inflow component; a simple total volume is sufficient. However, the Supplier may wish to calculate each surface water supply outflow component for their own planning purposes.

DWR encourages the Supplier to also identify where surface drainage goes (e.g., to a wildlife refuge or other wildlife habitat, another water service area, a saline sink, evaporation ponds, or other). If drainage leaves the service area and is reused, it is suggested that the discharge location and quantity of discharge to that location also be identified. The Supplier is also encouraged to include a description of any use limitations (e.g., capture and return is not feasible, water quality constraints for irrigation use, instream flow commitments, and others). The Water Board's Irrigated Lands Regulatory Program provides information regarding the protection of receiving waters from agricultural water discharges at waterboards.ca.gov/water_issues/programs/agriculture.

The Supplier should also identify if surface outflow is to a useable surface water source for use in quantifying water use efficiency. If surface water outflow is to a useable water source, this water is considered 'recoverable' and is used in calculating the Water Management Fraction (refer to Guidebook section 3.8 Quantify the Efficiency of Agricultural Water Use (Water Code Section 10826(h)).

Deep percolation outflow (Specifically Required)

Include the quantity of water used for agricultural purposes, from all inflows identified above, that seeps from canals or other district structures, and irrigation water that seeps beyond the crop root zone and beyond any shallow groundwater. Also include the quantity of deep percolation from any groundwater recharge facilities. This component of the water budget is often modeled based on balancing the water budget.

The AWMP does not need to include the quantity of deep percolation outflow for each individual inflow component; a simple total volume is sufficient. However, the Supplier may wish to calculate each deep percolation outflow component for their own planning purposes.

It is recommended that the Supplier also identify if deep percolation is to a useable groundwater source for use in quantifying water use efficiency. If deep percolation is to a useable water source, this water is considered 'recoverable' and is used in calculating

the water management fraction (refer to Guidebook Section 3.8 Quantify the Efficiency of Agricultural Water Use (Water Code Section 10826(h)).

Evapotranspiration outflow (Specifically Required)

Evapotranspiration is considered equivalent to crop consumptive use (refer to the Quantification Methodology as a reference). This water budget outflow component is also required for all water use efficiency fraction determinations in accordance with Water Code Section 10826(h). Typical methods include using the local reference evapotranspiration (ETo, available from Spatial CIMIS) and multiplying it by standard factors based on the crop (Kc, or crop coefficient factor). The typical method assumes that crops are growing optimally with no limitations in irrigation. However, often crops are deficit irrigated or other factors limit crop growth such that the crops do not use as much water as predicted. Remote sensing can be used to directly measure the amount of crop consumptive use (ETa, or actual evapotranspiration).

Subsurface or shallow groundwater outflow

If shallow groundwater or subsurface drainage from the district occurs, this is an outflow component that must be quantified. The Supplier should consider whether any seepage from their district is to deep percolation or to shallow groundwater that eventually returns to the surface water systems or is used by others outside of the district. If drainage water stays within the district and does not contribute to deep percolation (e.g., tailwater returns), it is not considered an outflow component and does not need to be quantified. If water percolates to shallow groundwater that is later discharged to a stream, canal, or tile drain, or otherwise leaves the district boundaries this would be an outflow component.

Other outflows

All other outflows must be quantified. For example, open channels and storage systems may lose water through evaporation. Water supplies may be used by the district for dust control that is subsequently lost to evaporation. The Supplier should consider all the pertinent outflows from their district.

3.6.3 Annual Water Budget

Suppliers must report the annual inflow and outflow quantities along with a description of the calculations or process used to arrive at the reported quantities. The annual water budget is then simply a tabulation of all inflow and outflow quantities.

As noted above, the annual water budget must be calculated for each of the five plan-cycle years on a water-year basis.

Use of the tables at the end of this section is encouraged. These tables allow the Supplier to report the minimum required components along with a short description of how values were determined (modeled, estimated, calculated, measured) and the estimated percent uncertainty in order to keep this information tied to the values.

Because AWMPs are public information, it is beneficial to report the estimated percent uncertainty and how values were determined in order to ensure that data and analyses are used appropriately.

Resources to Assist in Development of the Annual Water Budget

- **Best Management Practices for the Sustainable Management of Groundwater** can help guide the AWMP water budget process. water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-4-Water-Budget_ay_19.pdf.

- **Well Completion Report Map Application** dwr.maps.arcgis.com/apps/webappviewer/index.html?id=181078580a214c0986e2da28f8623b37).

- **DWR's Land and Water Use** group develops water use estimates used in a variety of statewide water planning efforts. water.ca.gov/Programs/Water-Use-And-Efficiency

- **Reference Evapotranspiration** cimis.water.ca.gov

- **SGMA Data Viewer** provides downloadable GIS files for Central Valley inflows and outflows, groundwater elevation and storage data, downloadable GIS files for evapotranspiration, and other information useful in determining the water budget. sgma.water.ca.gov/webgis/?appid=SGMADataViewer

- **California Natural Resources Agency Open Data** data.cnra.ca.gov

- **California Crop and Soil Evapotranspiration, January, 2003** prepared by the Irrigation Training and Research Center (ITRC) provides information on crop water use and crop coefficients waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/dd_jardins/part2/ddj_267.pdf.

- **Basic Irrigation Scheduling (BIS)**, University of California 2000, revised March 2014 includes crop coefficient information. biomet.ucdavis.edu/basic-irrigation-scheduling-(BIS).html.

- **Water Budget Models Developed by SGMA** water.ca.gov/Programs/Groundwater-Management/Data-and-Tools. Although intended primarily for groundwater budgeting, these models include components that can be used to calculate AWMP water balance requirements.

- **The United States Geological Survey Central Valley Hydrologic Model (CVHM)** simultaneously accounts for changing water supply and demand across the landscape and simulates surface water and groundwater flow across the entire Central Valley (with supporting data sets). ca.water.usgs.gov/projects/central-valley/central-valley-hydrologic-model.html.

- **ITRC-METRIC** uses a modified Mapping of EvapoTranspiration with Internal Calibration (METRICTM)) procedure to compute actual evapotranspiration using LandSAT Thematic Mapper data. itrc.org/projects/metric.htm.

Table 2a. Water Budget Inflows

Optional Groundwater Basin: [Input groundwater basin number]

Inflow Component	AWMP Location for Supporting Calculation	How Quantified?	Uncertainty	How Quantified?	Water Year 19/20*	Water Year 20/21	Water Year 21/22	Water Year 22/23	Water Year 23/24	Water Year 24/25*
Units	Page Number or Section	Drop down (Measured, Calculated, Modeled, Estimated)	Percent	Drop down (Measured, Calculated, Modeled, Estimated)	Acre-Feet per Year	Acre-Feet per Year	Acre-Feet per Year	Acre-Feet per Year	Acre-Feet per Year	Acre-Feet per Year
Effective Precipitation										
Water Supplier Surface Water Diversions										
Water Supplier Groundwater Pumping										
Private Groundwater Pumping										
Other - describe each										
Total										

*Note for columns: 5 years of data is required. The Supplier may select the first five columns years or the last five column years and can delete the non-relevant columns. The WUEData Portal (wuedata.water.ca.gov) will allow the user to select which five years of data will be reported and the non-relevant column will not be displayed.

**Note for row: Other water inflows can include overland surface flows from other districts, recycled water, imported water, direct diversions by growers, and any others. Add a row for each additional surface inflow and include a description. The WUEData portal will allow the user to add additional rows and change the row description. Do not include tailwater returns reused within the water district.

All cells must be filled in. Use ‘0’ for non-applicable components.

DWR is not using this information to compare districts. This is for Water Code compliance requirements only.

Table 2b. Water Budget Outflows

Optional Groundwater Basin: [Input groundwater basin number]

Outflow Component	AWMP Location for Supporting Calculation	How Quantified?	Uncertainty	How Quantified?	Water Year 19/20*	Water Year 20/21	Water Year 21/22	Water Year 22/23	Water Year 23/24	Water Year 24/25*
Units	Page Number or Section	Drop down (Measured, Calculated, Modeled, Estimated)	Percent	Drop down (Measured, Calculated, Modeled, Estimated)	Acre-Feet per Year	Acre-Feet per Year	Acre-Feet per Year	Acre-Feet per Year	Acre-Feet per Year	Acre-Feet per Year
Crop Consumptive										
Surface Outflows										
Deep Percolations										
Other - describe each										
Total										

*Note for columns: 5 years of data is required. The Supplier may select the first five columns years or the last five column years and can delete the non-relevant columns. The WUEdata Portal (wuedata.water.ca.gov) will allow the user to select which five years of data will be reported and the non-relevant column will not be displayed. The same water years used in Table 2a must be used in this table.

**Note for row: Other water outflows can include non-crop evaporation/evapotranspiration, flows to environmental uses within the service area, transfers, any other uses within the services area, and any other outflows from your district service area. Add a row for each additional surface inflow and include a description. The WUEdata Portal will allow the user to add additional rows and change the row description.

All cells must be filled in. Use ‘0’ for non-applicable components.

DWR is not using this information to compare districts. This is for Water Code compliance requirements only.

3.7 Water Management Objectives (Water Code Section 10826(f))

Per Water Code Section 10826(f), Suppliers must identify water management objectives in their AWMP:

> *Identify water management objectives based on the water budget to improve water system efficiency or to meet other water management objectives. The agricultural water supplier shall identify, prioritize, and implement actions to reduce water loss, improve water system management, and meet other water management objectives identified in the plan.*

This section provides a venue for the Supplier to assess opportunities for, and constraints to, improved water use efficiency and other long-term water supply reliability considerations in their district. This section also allows Suppliers to tell a complete story of their achievements in the last five years and how they plan to improve water management in the coming five years, or longer.

The Supplier can identify objectives to improve water system efficiency and/or meet other water management objectives (WMOs). This section must include:

1. Identification of the WMOs
2. Prioritization of the WMOs
3. Actions to be implemented to reduce water loss
4. Actions to be implemented to meet other WMOs

As a useful planning tool for the Supplier, DWR encourages the Supplier to assess their whole system and select those EWMPs and Water Management Objectives that would best fit them. An assessment of water use efficiency, before and after implementing EWMPs, along with new water budget information can be used to identify how effective EWMPs have been, where improvements can be made, and which improvements would be the most effective to implement.

Participation in a GSP preparation process can help inform the Supplier about WMOs pertinent to improved agricultural water use efficiency that aligns with sustainable groundwater management goals and objectives. These could be the starting point for developing water management objectives in the AWMP.

The Supplier may also choose to consider WMOs to improve long-term planning and resiliency, climate change adaptation strategies, and improvements in regional self-reliance.

The California Water Plan offers water management objectives for local agencies and governments to consider (see water.ca.gov/Programs/California-Water-Plan/Water-Resource-Management-Strategies). These include:

- Reduce water demand using scientific processes to control agricultural water delivery.
- Improve operational efficiency and transfers (see water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/California-Water-Plan/Docs/RMS/2016/07_Water_Transfers_July2016.pdf).
- Improve water quality, such as groundwater remediation, and salinity management.
- Agricultural land stewardship (see http://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/California-Water-Plan/Docs/RMS/2016/20_Ag_Lands_Stewardship_July2016.pdf).
- Economic incentives, including financial assistance, water pricing and policies to influence water management (see water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/California-Water-Plan/Docs/RMS/2016/27_Economic_Incentives_July2016.pdf).

3.8 Quantify the Efficiency of Agricultural Water Use (Water Code Section 10826(h))

Per Water Code Section 10826(h), Suppliers must now provide a calculation of water use efficiency in their AWMP:

> *Quantify the efficiency of agricultural water use within the service area of the agricultural water supplier using the appropriate method or methods from among the four water use efficiency quantification methods developed by the department in the May 8, 2012, report to the Legislature entitled "A Proposed Methodology for Quantifying the Efficiency of Agricultural Water Use." The agricultural water supplier shall account for all water uses, including crop water use, agronomic water use, environmental water use, and recoverable surface flows.*

A Supplier must choose one of the methods identified in Section 3.8.2 to calculate their water use efficiency. The method chosen must account for all the applicable water uses below:

- Crop water use
- Agronomic water use
- Environmental water use
- Recoverable surface flows

3.8.1 Water Uses

Crop Water Use. Crop water use, or crop consumptive use, is a component of the annual water budget. As defined in the Quantification Methodology, this value is equivalent to actual evapotranspiration, which is described above in Section 3.6.

Agronomic Water Use. Agronomic water use refers to water used for growing that is not directly used by the crops and may include water used for leaching, seedbed preparation, climate control, and other factors. These can be estimated based on the types of crops grown, irrigation water quality, soil drainage characteristics, climate conditions, and other factors.

Environmental Water Use. Environmental water use would be any water used for supporting environmental benefits. This should include any legally required commitments. This could also be water returned to support instream flows, water used to maintain wetlands, or other environmental uses the Supplier supports, but is not legally required to. For suppliers with significant acreage of winter flooded rice fields, the Supplier may have to decide how much should be attributed to environmental water use and how much to agronomic water use.

Recoverable Flows. Maximizing use of recoverable flows and minimizing irrecoverable flows improves water use efficiency. It is suggested that the Supplier include an estimate of the amount of recoverable and irrecoverable water flows, however, recoverable surface flows is a water use component that must be considered:

- If drainage water can be reused, it would be ‘recoverable’ flow. From the water budget, this would be the sum of the outflow components: surface outflows plus subsurface outflows. While an estimate is acceptable, installation of flow devices upstream and downstream of the district drainage may improve or inform the estimate. Reliable outflow data is a best management practice and one of the key components of an accurate water inventory.
- If deep percolation recharges a useable groundwater aquifer, this would be a ‘recoverable’ flow. This includes both intended groundwater recharge as well as incidental recharge by deep percolation of irrigation water and canal seepage.
- If surface or subsurface drainage water flows to a saline sink or contaminated water body, these flows would not be recoverable.

- Water lost by evaporation is considered irrecoverable.

Other Water Uses. In addition to accounting for the four required water uses identified above, the Supplier must account for any other water uses that are applicable to their situation.

3.8.2 Water Use Efficiency Methods

There are four methods for calculating water use efficiency. These methods can be used to inform the Supplier where improved water use efficiency is possible and to track changes in water use efficiency. Each of these methods can be used to inform the Supplier where improvements can be made.

Suppliers must use at least one to satisfy the requirements of the Water Code; Suppliers must use the method(s) that accounts for all of the applicable water uses identified above. For example, if there are agronomic uses in the service area, but no environmental uses or recoverable flows, Method 2 is required. In this case, the Supplier may also choose to report Method 1.

The Supplier may choose to also include calculations of additional methods for determining water use efficiency. In addition to using the required equation (see paragraph above), it is suggested that the Supplier calculate water use efficiency using the method or methods best suited for their own planning purposes.

Method 1: Crop Consumptive Use Fraction (CCUF)

CCUF=(ETAW)/(AW), where ETAW is Evapotranspiration of Applied Water. ETAW is crop evapotranspiration minus the amount of effective precipitation used by the crop. This method quantifies the efficiency of applied irrigation water consumed directly for the purpose of crop growth. It evaluates the relationship between the consumptive use of a crop and the quantity of water used for irrigation within the boundary.

Method 2: Agronomic Water Use Fraction (AWUF)

AWUF= [ETAW+AU]/AW, where **Agronomic** use (AU) is the portion of applied water needed to produce a desired agricultural commodity in addition to how much the crop directly uses. This includes water applied for salinity management or frost control, decomposition, and other water applications essential for production of crops. This method quantifies the efficiency of all water use for growing crops. It allows for evaluation of the relationship between the consumptive use and agronomic uses of a crop and the quantity of water applied to an area.

Method 3: Total Water Use Fraction (TWUF)

TWUF= [ETAW+AU+EU]/[AW], where Environmental use (EU) is the portion of applied water directed to environmental purposes, including water to produce and/or maintain wetlands, riparian, or terrestrial habitats. This method quantifies the efficiency of water used to meet crop demands and environmental demands. It is the ratio of the sum of these three water demands (agronomic (AU), environmental (EU), and crop consumptive (ETAW) water use) to the amount of applied water (AW).

Method 4: Water Management Fraction (WMF)

WMF= (ETAW+ RF)/(AW), where Recoverable flow (RF) is the amount of water leaving a given area as surface flows to non-saline bodies or percolation to usable groundwater that is available for supply or reuse. RF is calculated from surface and shallow groundwater return flows using gauge data or models and estimates of deep percolation, while excluding evaporation and flows to salt sinks.

This method quantifies the efficiency of water management. Comparison of WMF and CCUF (calculated from Equation 1) within the same scale (supplier or basin) provides an opportunity to recognize that a portion of water applied to a region for crop irrigation but is not used by crops is not 'lost' water – it may be recovered and used.

Submittal Tables

DWR requests use of at least one of the applicable following tables to present water use efficiency calculations. Descriptions of how these values were determined and supporting documentation should be included in the AWMP discussion (Microsoft Excel spreadsheets are available upon request by emailing agwue@water.ca.gov).

Please complete one or more of the following tables. The WUEdata Portal will allow the user to select which table(s) to fill out. DWR is not using this information to compare districts. This is for reporting and informational purposes only. When submitting on WUE Data Portal, ensure to input the correct values into the form(s).

Table 3a. Crop Consumptive Use Fraction

Evapotranspiration of Applied Water (ETAW)	Applied Water (AW)	Crop Consumptive Use Fraction
Acre-Feet per Year	Acre-Feet per Year	No units

Table 3b. Agronomic Use Fraction

Evapotranspiration of Applied Water (ETAW)	Applied Water (AW)	Agronomic Use (AU)	Agronomic Use Fraction
Acre-Feet per Year	Acre-Feet per Year	Acre-Feet per Year	No units

Table 3c. Total Water Use Fraction

Evapotranspiration of Applied Water (ETAW)	Applied Water (AW)	Agronomic Use (AU)	Environmental Water Use (EU)	Total Water Use Fraction
Acre-Feet per Year	Acre- Feet per Year	Acre-Feet per Year	Acre-Feet per Year	No units

Table 3d. Water Management Fraction

Evapotranspiration of Applied Water (ETAW)	Recoverable Flows (RF)*	Water Management Fraction
Acre-Feet per Year	Acre-Feet per Year	No units

*Column note: Recoverable Flows includes the sum of both recoverable surface water and groundwater

3.9 Climate Change

The Water Code requires that the AWMP:

> *"Include an analysis, based upon available information, of the* effect of climate change on future water supplies" (Water Code Section 10826 (d))

Climate change has the potential to profoundly affect agriculture and water management in California. The impacts of climate change will differ regionally;

therefore, this section should include an analysis of the potential impacts of climate change on local water supply availability and demand.

While this is a required element of the AWMP, the way the climate change analysis is conducted is at the discretion of the Supplier. However, Suppliers are strongly encouraged to include a thorough discussion of the effects of climate change on future water supplies and their potential actions and responses to these changes. California agriculture has a history of being highly adaptive to stressors, and our continued ability to adapt to and mitigate climate change will determine our future resiliency.

The potential effects of climate change would not only impact local areas but would also result in statewide changes that could affect the supplier and its water supplies. Historically, snowpack in the Sierra Nevada has contributed up to 65 percent of California's water supply by acting as a natural reservoir that stores winter precipitation as snow for spring and summer runoff. However, this figure varies by year and region and may not represent future conditions. Projected estimates indicate that by the end of this century the snowpack will be reduced 48-65%. More precipitation is expected to fall as rain instead of snow during winter, and therefore, cannot be stored in our current reservoir system for later use. The climate is also expected to become more variable and extreme, bringing more droughts and floods. Suppliers will need to be prepared to adapt to greater variability in weather patterns.

Within the next 20 years, DWR expects that water supplies, water demand, sea level, and the occurrence and increased severity of floods will be affected by climate change.

3.9.1 Overall climate change impacts to consider

DWR suggests the Supplier consider the following climate change impacts on water resources, many of which have already been documented in California (CalEPA 2022 Indicators of Climate Change in California) and will be exacerbated in the future. Some examples of impacts might include:

- **Increased Water Demand** – Milder winters, increasing air temperatures, increasingly variably rainfall patterns, and more frequent and intense heat waves, may result in a longer irrigation season, which could increase water demand.
- **Decreased Water Supply and Quality** – Reduced snowpack, reduced groundwater recharge, wildfires, and shifting spring runoff to earlier in the year has the potential to impact water supply and quality.
- **Accelerating Sea Level Rise** – It is expected that sea level will continue to rise due to the warming of the oceans, which will increase salinity in coastal aquifers and the Delta. Other, near-shore ocean changes such as stronger storm surges,

more forceful wave energy, and more extreme high tides will also affect levee stability in low-lying areas and increase the risk of flooding.

- **Extreme Weather Events** – Extreme weather events are expected to become more frequent as climate change brings increased climate variability, resulting in more droughts, floods, and heat waves.
- **Groundwater** – Suppliers that rely on groundwater should include an analysis of the impacts of climate change on groundwater resources. Many agricultural water users rely heavily on groundwater resources even in years of average or above average rainfall. Since climate change is expected to increase the frequency and intensity of droughts, pressure on groundwater resources may increase and could result in groundwater overdraft, land subsidence, water quality degradation, and salt water intrusion in certain regions. Climate change may also alter groundwater recharge. Reductions in spring run-off, run-off occurring earlier in spring when basins are already full, and higher evapotranspiration because of warmer temperatures, could reduce the amount of water available for recharge.

Additionally, Suppliers may consider the following additional climate change impacts:

- Irrigation demand is likely to increase as temperatures rise and rainfall becomes more variable.
- Permanent crops such as fruit and nut trees could be adversely affected by climate change and are not easily shifted to alternative crops. Areas with significant water demand from these crops may have reduced flexibility for adapting to changing climatic conditions.
- Flooding risk is expected to increase because of more severe rainfall patterns and warmer winter rains. Flooding could inundate crops, as well as effect water supply and conveyance.
- Snowpack is expected to significantly diminish as the climate warms. Diminished snowfall in the mountains and earlier runoff will result in reduced water supply availability for Suppliers that rely on this source of water. A water supply source that depends upon snowmelt and barely meets water demands under existing conditions is more likely to be vulnerable to climate change.
- The Sacramento-San Joaquin River Delta is particularly vulnerable to impacts of climate change, most notably sea level rise. Higher sea levels will make it more difficult to export water to farms from the Delta with the existing infrastructure and may result in reduced water deliveries over time.

3.9.2 Coordinated Planning

DWR also encourages the Supplier to participate in their regional water management, Groundwater Sustainability Agency (GSA), Urban Water Management Planning, or other local general planning or hazard mitigation planning effort. Agricultural water

management planning, groundwater sustainability planning, and urban water management planning all have a similar planning horizon which can foster regional plan alignment. The Water Code allows for the AWMP requirements to be satisfied through participation in area-wide, regional, watershed, or basin-wide water management planning (Water Code Section 10829).

Many regional water management groups have already completed a climate change vulnerability analysis for their IRWM Plan which could be utilized by the local Suppliers.

- **Integrated Regional Water Management**
  water.ca.gov/Programs/Integrated-Regional-Water-Management.

- **Climate Change Handbook for Regional Water Planning (2012)**
  cawaterlibrary.net/wp-content/uploads/2017/05/Climate_Change_IRWM_CA.pdf

- **Regional GSPs**
  Sustainable Groundwater Management Act (SGMA) Portal - Department of Water Resources (ca.gov)

- **UWMPs**
  wuedata.water.ca.gov

Suppliers can find additional information and guidance on completing their analysis of regional vulnerabilities in the *California Adaptation Planning Guide* resources.ca.gov/docs/climate/01APG_Planning_for_Adaptive_Commu nities.pdf, including steps for assessing vulnerabilities and developing adaptation strategies. In addition, the website, cal-adapt.org, offers easy-to-use visualization tools and data to identify climate change impacts at a local level to aid in decision making.

Resources for Climate Change Planning

- **2022 CalEPA Indicators of Climate Change in California**
  oehha.ca.gov/media/downloads/climate-change/document/2022caindicators report.pdf

- **DWR Climate Change Webpage**
  water.ca.gov/Programs/All-Programs/Climate-Change-Program

- **California State University Center for Irrigation Technology**
  fresnostate.edu/jcast/cit

- **Cal Poly Irrigation Training and Research Center**
  itrc.org

- **University of California Cooperative Extension**
  ucanr.edu
- **USDA Climate Change Program Office**
  usda.gov/oce/energy-and-environment/climate
- **California Agricultural Water Stewardship Initiative**
  agwaterstewards.org
- **Cal-Adapt**
  cal-adapt.org
- **California Adaptation Planning Guide: Planning for Adaptive Communities**
  resources.ca.gov/docs/climate/01APG_Planning_for_Adaptive_Communities.pdf
- **Sustainable Conservation**
  suscon.org
- **California Water Plan Update 2023**
  water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/California-Water-Plan/Docs/Update2023/Final/California-Water-Plan-Update-2023.pdf
- **Central Valley Flood Protection Plan Scenario**
  cvfpb.ca.gov/wp-content/uploads/2018/03/Draft-Central-Valley-Flood-Protection-Plan-Climate-Change-Analysis-Technical-Memorandum.pdf
  Data can be requested via Questions@CVFlood.ca.gov.
- **Climate Change Impacts on Water Supply and Agricultural Water Management in California's Western San Joaquin Valley, and Potential Adaptation Strategies (August 2009)**
  waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/comments102612/desjardins/climatechgimpacts.pdf
- **2006 Climate Change Report** analysis of future climate change impacts on water for agriculture and other sectors: a case study in the Sacramento Valley.
  weap.sei.org/downloads/CCSacramento.pdf

3.10 Exhibits (as applicable):

As applicable, Suppliers are encouraged to include the following exhibits and documentation in their AWMPs or appendixes, as applicable:

- Coordination documentation, as applicable

    - Notification of AWMP Preparation
    - Comments received on the AWMP
    - Copies of outreach materials
    - Hearing/equivalent process notifications
    - Newspaper ads
    - Copies of AWMP notice of availability
    - Others, as applicable

- Resolution of Plan Adoption
- Water supplier maps
- Water Supplier Operating Rules and Regulations
- Additional Agricultural Water Measurement Regulation compliance documentation
- Water Shortage Allocation Policy
- Water Shortage Contingency Plan
- Agricultural supplier groundwater wells and recharge locations maps
- Groundwater Management Plan
- Detailed water quality information
- Cost-benefit analysis/ technical infeasibility documentation
- Additional information/data/calculations as applicable.
- Supplier’s Completed Checklist
- Water Budget Model description, input, and output data
- Groundwater Sustainability Plan
- Demonstrating Compliance with the Delta Plan

4.0 Efficient Water Management Practices

This section of the Guidebook describes the AWMP reporting and EWMPs implementation requirements. Water Code Section 10608.48 requires that Suppliers implement efficient water management practices (EWMPs) and report on EWMP implementation in their AWMP (Water Code Section 10608.48(d)). EWMPs are best management practices that Suppliers must implement to improve water use efficiency.

Specific EWMPs are required to be implemented and are listed in Water Code Section 10608.48:

- **Critical EWMPs** (Water Code Section 10608.48(b)) are required to be implemented by all Suppliers.
- **Conditional EWMPs** (Water Code Section 10608.48(c)) are required only if they are locally cost-effective and technically feasible. Suppliers are encouraged to carefully examine the list and determine which EWMPs can be implemented, how well they are working, if there is room for improvement, and what the priorities may be to meet WMOs.

Suppliers are not eligible for water grants or loans if they fail to implement Critical EWMPs and locally cost effective and technically feasible Conditional EWMPs (Water Code Section 10608.56(b)) unless they submit a schedule, financing plan, and budget to DWR for implementing those Conditional EWMPs (Water Code Section 10608.56(d)).

4.1 EWMP Implementation and Reporting

Water Code requires that AWMPs include:

> *"...a report on which efficient water management practices have been implemented and are planned to be implemented, an estimate of the water use efficiency improvements that have occurred since the last report, and an estimate of the water use efficiency improvements estimated to occur five and 10 years in the future. If an agricultural water supplier determines that an efficient water management practice is not locally cost effective or technically feasible, the supplier shall submit information documenting that determination." (Water Code Section 10608.48 (d)).*

Therefore, Suppliers must include the following in their AWMPs:

1. A list of implemented and planned-to-be-implemented EWMPs (refer to Table VII.A.1 of the AWMP Template in Appendix A1)

2. An estimate of the water use efficiency improvements since the previous report and estimated to occur in five and ten years (refer to Table VII.A.2 of the AWMP Template in Appendix A1).

3. Documentation demonstrating that any Conditional EWMPs not implemented were not locally cost-effective or technically feasible (refer to Table VII.B of the AWMP Template in Appendix A1).

Reporting on Implementation

Items 1 and 2 are to be reported using DWR's standardized forms, which are Tables VII.A.1 and VII.A.2 (Water Code Section 10608.48(e)). See Section VII of the AWMP Template (Appendix A1) for the required reporting forms (Tables VII.A.1 and VII.A.2). DWR encourages Suppliers to also report on how implementation of EWMPs may have affected or is anticipated to affect operations.

Any conditional EWMP that is not locally cost-effective or technically feasible needs to have sufficient documentation demonstrating this in the AWMP or accompanying attachments. This documentation may include technical studies, legal access restrictions, cost-benefit analysis, and other documentation demonstrating validity of exemption (see Section 4.1.3, below).

It is suggested that Suppliers also include in their AWMP a plan, schedule, finance plan, and budget to implement conditional EWMPs that are locally cost-effective and technically feasible but have not yet been implemented in order to be eligible for State water loans or grants (Water Code Section 10608.48 (b) and (c)) (Refer to Table VII.A.3 of the AWMP Template in Appendix A1).

Reporting on Water Use Efficiency Improvements

Water use efficiency improvements can be quantitative or descriptive, depending upon the nature of the EWMP and information available to the Supplier. Additionally, estimating water use efficiency may not be practical or possible for individual EWMPs. In such cases, an overall estimate for multiple EWMPs is advised (refer to Table VII.A.2 of the AWMP Template in Appendix A1).

Where possible, it is recommended that Suppliers report on the quantity of water use efficiency that occurred (either water conserved or water used more efficiently) for each

EWMP in order to prioritize where and which improvements can be made. Quantification of EWMP effectiveness may also enable the Supplier to demonstrate improved regional self-reliance.

In assessing the water use efficiency improvements that have occurred since the previous plan, the Supplier may consider using estimates of water savings, amount of water directly affected by the EWMPs, a comparison of previous and current quantification of water use efficiency fraction (as identified and described in Section 3.8), analysis of any surveys conducted, or other analysis.

The metrics defined in the Quantification Methodology are suitable for evaluating current conditions and strategies for improving agricultural water management on the diverse array of agricultural irrigation systems and operations found throughout California.

The delivery fraction (DF) is also described in the Quantification Methodology. It is an irrigation and delivery systems performance indicator that evaluates the relationship between the water delivered to an area and the total applied surface or groundwater, which may be of relevance to Suppliers. This can be determined using data from the supplier's water budget where:

Delivery Fraction (DF) = Aggregated Farm Gate Delivery / Water Supply

4.1.1 Critical EWMPs

Two EWMPs are required to be implemented by all Suppliers that must prepare an AWMP, regardless of cost or an evaluation of feasibility. These critical EWMPs include (Water Code Section 10608.48(b)):

(1) Measure the volume of water delivered to customers with sufficient accuracy to comply with subdivision (a) of Section 531.10 and to implement paragraph (2).

(2) Adopt a pricing structure for water customers based at least in part on quantity delivered.

(1) Water Measurement

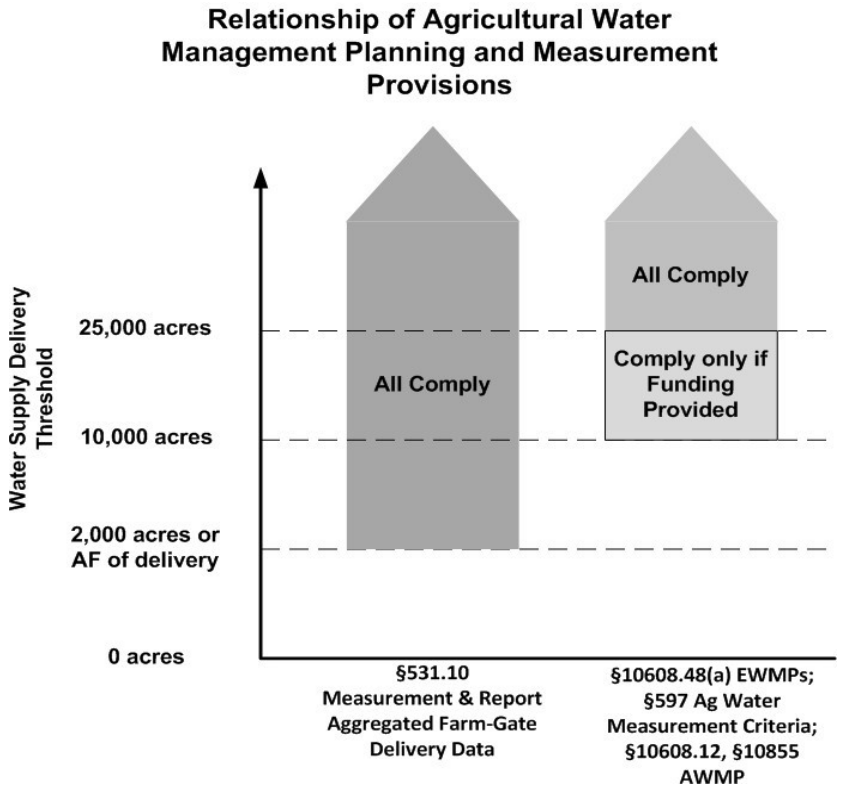
Water Code Section 531.10 requires Suppliers, as defined in Water Code Section 531(b) (more than 2,000 acres or 2,000 AFY of surface water delivered for agriculture), to annually report on aggregated water delivered to their service area customers.

Water Code Section 10608.48(b)(1) specifies that Suppliers, as defined in Water Code Section 10608.12(a) (more than 10,000 irrigated acres, excluding recycled water), must measure customer deliveries with devices meeting certain accuracy requirements.

Pursuant to Water Code Section 10608.48(i), the water measurement accuracy requirements and reporting form were adopted in the Agricultural Water Measurement Regulation (23 CCR Section 597 et seq.) to specify the range of options to implement for complying with the water measurement Critical EWMP. This regulation specified that agricultural suppliers with less than 25,000 irrigated acres (excluding recycled water) were only required to meet the measurement device accuracy requirements if they received sufficient funding specifically for that purpose. Otherwise, they would only need to meet the accuracy requirement of using best professional practices to measure or estimate customer water use.

Figure 1, below, illustrates the difference between who must comply with which criteria.

Figure 1. Agricultural Water Measurement Compliance Overview



The Agricultural Water Measurement Regulation also required additional reporting to be included in AWMPs as described in Section 6 and Appendix B.8.

Water suppliers are encouraged to include information on the total number of farm-gates in the service area, the number of farm-gates complying with the Agricultural Water Measurement Regulation at the farm-gate, number of laterals, and number of laterals complying with the accuracy standards in the AWMP. Suppliers are also

encouraged to include the number of each type planned for future water use measurement, if applicable.

(2) Volumetric Pricing

All Suppliers that must prepare an AWMP must also implement a pricing structure based at least in part on the volume of water delivered to that customer. In accordance with the Agricultural Water Measurement Regulation, if access to individual customer delivery points (farm gates) is not available or if measurement is not technically feasible, Suppliers must provide specific documentation in their AWMP and include a description of how compliance with the pricing structure EWMP was implemented or planned for implementation if water measurements cannot be conducted at the farm-gate (see Section 6).

4.1.2 Conditional EWMPs

As noted above, if Conditional EWMPs are not locally cost-effective or technically feasible, they are not required to be implemented. However, if any of these EWMPs are locally cost- effective and technically feasible, they must be implemented by Suppliers providing water to at least 10,000 irrigated acres, excluding recycled water (Water Code Section 10608.48 (c)).

All Conditional EWMPs that are implemented or planned to be implemented must be reported in the AWMP. However, only those Suppliers with more than 25,000 irrigated acres (excluding recycled water) are required to prepare and submit an AWMP.

(1) Facilitate Alternate Land Use

> *(1) "Facilitation of alternative land use for lands with exceptionally high water duties or whose irrigation contributes to significant problems,* including problem drainage" (Water Code Section 10608.48 (c)(1)).

Alternative land uses could include switching to a less water-intensive commodity, land fallowing, or other less intensive water use function. A Supplier can facilitate alternative land uses by offering financial incentives, education, assistance in applying for grants or loans, or other methods.

If there are no high water-duty or problem drainage conditions in the service area, the Supplier can state that this EWMP is not technically feasible because these conditions do not exist in the district. Documentation for this claim could include demonstrating that the types of crops grown in the service area are not excessively irrigated and are not high water-use crops, along with an assessment that there are no problem drainage areas as identified by compliance with the Irrigated Lands Regulatory Program and

applicable general Waste Discharge Requirement (refer to: waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/regulatory_information/#outreach).

(2) Facilitate Use of Recycled Water

> *(2) "Facilitation of use of available recycled water that otherwise would not be used beneficially, meets health and safety criteria, and does not harm crops or soils. The use of recycled urban wastewater can be an important element in overall water management"* (Section 10608.48 (c)(2)).

The Supplier can facilitate use of recycled water by infrastructure improvements to receive and deliver recycled water, participation in a recycled water program or plan, or other activities.

If no recycled water facility is located or planned to be located near the district, or recycled water is not otherwise available, the Supplier could document this is technically not feasible by including an assessment of recycled water availability. This may include information such as distance to the nearest facility, availability of infrastructure to deliver, local development plans, or a statement from a nearby facility that recycled water has been fully committed to other purposes. The Supplier may also perform a cost-benefit analysis to show that this EWMP is not locally cost-effective (e.g., cost of new infrastructure, cost of purchasing water). Water suppliers do not have to show that availability of recycled water is both technically infeasible and not locally cost-effective.

(3) Facilitate Financing of On-Farm Irrigation Systems

> *(3) "Facilitate the financing of capital improvements for on-farm irrigation systems*" (Water Code Section 10608.48 (c)(3)).

The Supplier can facilitate financing capital improvements for on-farm irrigation systems by providing financial assistance or by providing technical assistance to landowners to help them apply for financial assistance programs implemented by other entities.

If the on-farm irrigation systems in the districts are already efficient, this EWMP would not be technically feasible and the Supplier can document this with an assessment of the irrigation systems in their district. If only Supplier funds are available, Suppliers can perform a cost-benefit analysis to document if implementation of this EWMP is locally cost-effective.

(4) Incentive Pricing Structure

> *(4) "Implement an incentive pricing structure that promotes one or more of the following goals"* (Water Code Section 10608.48 (c)(4)):

(A) More efficient water use at the farm level.

(B) Conjunctive use of groundwater.

(C) Appropriate increase of groundwater recharge.

(D) Reduction in problem drainage.

(E) Improved management of environmental resources.

(F) Effective management of all water sources throughout the year by adjusting seasonal pricing structures based on current conditions.

Because this EWMP likely requires changing the pricing structure, the Supplier may have to complete the Proposition 218 process. Water suppliers could conduct a cost-benefit analysis for the Proposition 218 process to identify if this EWMP is locally cost-effective. Documentation of the process and unsuccessful election may indicate that this is not technically feasible.

Suppliers only need to promote one or more of the below goals to implement this EWMP; however, Suppliers may choose to implement more for increased on-farm water use efficiency.

A. **"*More efficient water use at the farm level such that it reduces waste*" (Section 10608.48 (c)(4)(A)).**

Explanation: Water suppliers could implement tiered water rates or water budget-based rates to increase on-farm water use efficiency. On-farm water use efficiency evaluations may also document that this EWMP is technically not feasible if on-farm water use is already efficient and little waste occurs.

B. ***"Conjunctive use of groundwater"* (Section 10608.48 (c)(4)(B)).**

Explanation: In dry years, Suppliers may encourage pumping more groundwater through higher prices for surface water. Conversely, Suppliers may charge less for surface water during wet years to encourage use of surface water instead of groundwater. Conjunctive use of groundwater will, however, have to be consistent with any applicable GSP.

C. ***"Appropriate increase of groundwater recharge" (Section 10608.48 (c)(4)(C)).***

Explanation: In wet years, pricing may be used to encourage greater on-farm use of surface water to facilitate groundwater recharge. The Supplier may also choose to

implement a pricing structure to finance implementation of district owned groundwater recharge facilities or to contribute to an off-site banking facility. For examples, see: interactive case studies database at agwaterstewards.org/.

D. ***"Reduction in problem drainage" (Section 10608.48 (c)(4)(D)).***

Explanation: Pricing structures that encourage on-farm water use efficiency could also encourage reductions in problem drainage. If problem drainage returns to the Supplier conveyance system, the Supplier may wish to consider additional fees to encourage reductions in problem drainage. For an example, see Red Rock Ranch interactive case studies database at agwaterstewards.org/.

E. ***"Improved management of environmental resources" (Section 10608.48 (c)(4)(E)).***

Explanation: Water pricing structures to improve management of environmental resources may include charges to cover the cost of supplying water from a certain source that would accurately reflect the scarcity and limitation of that source or the value of environmental benefits that would be impacted by diverting or extracting the water. These could also include additional pollution charges for clean-up of return flows or for fees associated with degradation of water resources, as well as the subsequent environmental management and restoration costs.

It should be noted that efficient water management for environmental beneficial uses could mean encouraging use of more water by certain customers. For situations such as flooded rice fields, using more water and leaving water on the fields for longer could also have a concurrent beneficial environmental use by supporting wildlife. Additionally, off-site drainage could also benefit wetlands and other wildlife habitat. In situations like these, Suppliers may choose to reduce the costs of water to certain users at certain times of the year to encourage more water use for subsequent environmental benefits.

F. ***"Effective management of all water sources throughout the year by adjusting seasonal pricing structures based on current conditions" (Section 10608.48 (c)(4)(F)).***

Explanation: In California, surface water resources can be excessive during the wet season and during wet water-years. Similar to item C., in wet seasons, pricing may be used to encourage greater use of surface water in order to facilitate groundwater recharge and reduce groundwater pumping. When surface water resources diminish, a pricing structure that encourages groundwater use may be considered, so long as groundwater use is not in conflict with any GSP. Higher surface water and/or groundwater prices during dry seasons could encourage less water use,

which make use of recycled water (Conditional EWMP 4), deficit irrigation, or other conservation measures more acceptable.

(5) Conveyance and Storage Infrastructure

(5) "Expand line or pipe distribution systems, construct regulatory reservoirs to increase distribution system flexibility and capacity, decrease maintenance, and reduce seepage" (Section 10608.48 (c)(5)).

Lining or piping the distribution system could increase distribution system flexibility and capacity and decrease maintenance and seepage. Seepage and evaporation losses in earthen canals and laterals can be minimized by replacement with pipelines or lining with bentonite clay, pour-in-place concrete, or plastics/textile membranes. To reduce on-farm seepage losses, districts may wish to consider helping growers to line their ditches or install pipelines.

The Supplier should conduct an assessment of their distribution and storage systems to identify areas where improvements could be made. If the district is already operating efficiently, this assessment could be used to document that implementation of this EWMP is not technically feasible. If improvements are identified, this assessment could be used to inform the cost-benefit analysis of implementation and the plan, schedule, and finance plan for implementation.

Implementation of this EWMP should be considered in light of the Supplier's WMOs, which may consider canal seepage an important component of groundwater recharge for implementation of conjunctive use of groundwater (Conditional EWMP 8).

(6) Water Ordering Flexibility

(6) "Increase flexibility in water ordering by, and delivered to, water customers within operational limits" (Section 10608.48 (c)(6)).

Improved delivery flexibility (on-demand deliveries) can contribute to water use efficiency because only the water needed is delivered and only at the times it is needed. This reduces district excess water waste (spills, drainage, and evaporation) and allows growers to improve on-farm water use efficiency by enabling growers to irrigate at optimal times with optimal amounts. Water suppliers are encouraged to evaluate their systems to identify where improvements could be beneficial, if any, and the associated cost-benefit of improvements.

(7) Spill and Tail-Water Recovery

(7) "Construct and operate supplier spill and tail-water systems" (Section 10608.48 (c)(7)).

Spill and tail-water recovery systems could increase water use efficiency by reducing losses of water from operational spills and excess on-farm drainage. In some areas, interception and recovery of farm tail-water may be advantageous. Consideration must be given to the impacts of such activities on water quality, crop yields, soil salinity and other conditions, third parties, and the environment. An assessment of local drainage operations could be used to document if there are no spills or return flows from the Suppliers conveyance system, or if spills are allocated to other beneficial uses (e.g., environmental uses) to support a determination of technical infeasibility. Water suppliers can also conduct a cost-benefit analysis to determine if any improvements are locally cost-effective.

(8) Conjunctive Use of Groundwater

(8) "Increase planned conjunctive use of surface water and groundwater within the supplier service area" (Section 10608.48 (c)(8)).

Where permitted by the GSP, conjunctive use of groundwater can allow for groundwater recharge and surface water irrigation when surface water supplies are plentiful. When surface water supplies are limited, groundwater can be used for irrigation. Developing groundwater recharge basins or encouraging on-farm systems to maintain the ability to flood irrigate while also implementing more efficient pressurized systems could allow for conjunctive use of groundwater. If there are no areas suitable for groundwater recharge within the district (because of soils, terrain, and geology), this EWMP would not be technically feasible. Water suppliers may also consider a cost-benefit analysis of on-site construction and operation of a groundwater recharge facility or contribution to an off-site facility to determine local cost- effectiveness.

(9) Automation

(9) "Automate canal control devices" (Section 10608.48 (c)(9)).

Automation of canal control devices may increase flexibility in water deliveries (Conditional EWMP 6) and increase the Supplier's control over its water supplies, thereby providing the opportunity to improve the efficiency of water use.

Automated systems also typically allow for more timely monitoring of delivery system operations that allow faster response times if a problem occurs. Water suppliers should conduct a cost-benefit analysis to determine if this EWMP is locally cost-effective. Documentation that the Supplier's distribution system is entirely piped and/or automated could be used to support the determination that this EWMP is not technically feasible.

(10) Facilitate Customer Pump Testing

(10) "Facilitate or promote customer pump testing and evaluation" (Section 10608.48 (c)(10)).

Efficiently operating pump systems often result in both energy and water use efficiency. An inefficient pump system may not provide sufficient pressure for an irrigation system resulting in non-uniform or insufficient irrigation. Water suppliers can implement this EWMP by providing these services directly or by assisting customers in finding, applying for, or paying programs that offer free or reduced rate pump tests. Water suppliers can also implement this EWMP by promoting the use of pump tests through a variety of mechanisms such as outreach events, mailers, or bill notices. A cost-benefit analysis can be conducted to identify local cost-effectiveness of this EWMP.

(11) Water Conservation Coordinator

(11) "Designate a water conservation coordinator who will develop and implement the water management plan and prepare progress reports" (Section 10608.48 (c)(11)).

A Water Conservation Coordinator (WCC) may be anyone employed or contracted by the Supplier. This may be a full-time or part-time position. Efficient water management needs someone making sure that EWMPs and policies are implemented and that monitoring and evaluation is conducted on a regular basis in order to keep abreast of how well the system is operating and what improvements could be made. The WCC should have knowledge of the district's systems, operations, and characteristics in order to prepare the AWMP, interim reports, annual water budget analysis, and calculations of district water use efficiency fraction. This will provide management and operators with reliable information for decision making and allow them to track progress on water management objectives. Water suppliers may also consider the utility of a WCC in annual aggregated farm gate delivery reporting and annual water budget tracking and reporting for meeting SGMA requirements.

(12) Technical Assistance

(12) "Provide for the availability of water management services to water users. These services may include, but are not limited to, all of the following" (Section 10608.48 (c)(12)):

(A) On-farm irrigation and drainage system evaluations.

(B) Normal year and real-time irrigation scheduling and crop evapotranspiration information.

(C) Surface water, groundwater, and drainage water quantity and quality data.

(D) Agricultural water management educational programs and materials for farmers, staff, and the public.

Providing technical assistance to water users is a crucial service that Suppliers can provide to improve water use efficiency and management. The Water Code lists several types of services.

A. ***"On-farm irrigation and drainage system evaluations" (Water Code Section 10608.48 (c)(12)(A)).***

Explanation: An efficient irrigation system uses less water to maximum benefit. An efficient drainage system can avoid salt built up in soils that require more water for leaching. Mobile labs are programs that evaluate the performance of irrigation systems. These laboratories measure water application rates and system distribution uniformity and give recommendations for irrigation system maintenance and improvement. Water suppliers can assist customers by providing these services directly to customers at free or reduced costs to encourage customer efficiencies.

B. ***"Normal year and real-time irrigation scheduling and crop evapotranspiration information" (Water Code Section 10608.48 (c)(12)(B)).***

Explanation: Efficient irrigation makes use of knowing how much water is necessary and when. How much water is needed depends on the crop, climate conditions, drainage conditions, and other crop management factors. Several methods can be used for real-time irrigation scheduling, however some customers may lack technical expertise, data, or equipment. Water suppliers can help their customers through training and outreach programs, identifying and providing data resources, or by identifying free or low-cost, easy to use tools. An important source of ET data (used to determine crop water needs) for California is the California Irrigation Management Information System (CIMIS). CIMIS is a network of over 140 automated weather stations scattered throughout California that provide ETo and weather data to the public free of charge: cimis.water.ca.gov/.

C. ***"Surface water, groundwater, and drainage water quantity and quality data" (Water Code Section 10608.48 (c)(12)(C)).***

In order for customers to use water efficiently, they need sufficient data on the quality and quantity in order to make management decisions. For example, if forecasts indicate curtailed surface water supplies, customers need to have an idea of how much water will be available to make early decisions on deficit irrigation, land fallowing, or other management practices. Water quality is an important factor in

knowing how much water to use for irrigation, how it is best applied, and when irrigation is best applied. If water has high salinity, water use practices need to minimize salt build up in the soils. Providing this information to customers on water quality and quantity data, along with information as to how this data can be used (EWMP 12.D), can allow for improved decision making and efficient water use.

D. ***"Agricultural water management educational programs and materials for farmers, staff, and the public" (Section 10608.48 (c)(12)(D)).***

These could include such items as: soil moisture and salinity monitoring, in-school awareness programs, budgeting software, efficient irrigation techniques, crop water budget and other approaches, program delivery via workshops, seminars, newsletters, field days and demonstration, and others that Suppliers can make available to customers and the public. Staff training can ensure that operations, monitoring, and maintenance are conducted correctly to maximize efficiency and minimize response time to any problems encountered.

(13) Evaluate Policies

(13) "Evaluate the policies of agencies that provide the supplier with water to identify the potential for institutional change to allow more flexible water deliveries and storage." (Water Code Section 10608.48 (c)(13)).

Water supply delivery and availability often depend on water rights, contracts, transfer agreements, and other agencies regulatory requirements and policies. These may be variable depending on local conditions, climate, regulations, season, other management plans, and other factors. Examination of all water sources and details of governing policies and water allocations may help identify areas for changes to allow for more flexible water deliveries and storage. The Supplier can identify the policies and rules associated with all of their water supplies to conduct an analysis of the potential for change.

(14) Water Supplier Pump Efficiency

(14) "Evaluate and improve the efficiencies of the supplier's pumps." (Section 10608.48 (c)(14)).

Inefficient Supplier pumps can contribute to energy and water use inefficiencies. Water suppliers can describe their pump testing and maintenance activities, along with information from their latest reports.

4.1.3 Documentation for Non-Implemented EWMPs

Conditional EWMPs may be omitted if they are not locally cost-effective or technically feasible; however, documentation in the AWMP for this determination is required for compliance with the Water Code (Water Code Section 10608.48 (d)). This option is not available for Critical EWMPs - the Water Code requires that critical EWMPs be implemented, regardless of cost or technical issues. Table VII.B can be used to document the rationale for non-implemented EWMPs.

- Documentation for the determination should be defensible, based on objective information and analysis, and included in the AWMP in sufficient detail to justify the determination.

- Water suppliers may omit a Conditional EWMP for *either* being not locally cost-effective *or* by being technically infeasible.

DWR encourages the Supplier to provide a cost-benefit analysis, engineering determination, or other documentation supporting the omission of a conditional EWMP as not locally cost-effective or technically not feasible in the AWMP. Additional documentation (e.g., detailed cost-benefit analysis, engineering calculations, and others) can be attached in Section VIII of AWMP.

Not Locally Cost-Effective. The Supplier may use documented and referenced approaches to determine local cost-effectiveness, such as the USBR's Mid Pacific Region 2020 Standard Criteria, Addendum A, which provides a method for assessing local cost-effectiveness and certain aspects of technical non-feasibility: usbr.gov/mp/watershare/docs/2020-water-managment-planner-2020-08-18-final.pdf.

Water suppliers should clearly identify the methodology used, calculations, and sources of data.

> Locally cost effective is defined in the Water Code as: "*the present value of the local benefits of implementing an agricultural efficiency water management practice is greater than or equal to the present value of the local cost of implementing that measure."* (Water Code Section 10608.12 (k))

Not Technically Feasible. The determination of technical infeasibility would depend upon the nature of the EWMP being implemented.

For example:

- Conditional EWMP 10: if there are no customers within the service area who operate their own groundwater pumps, or if customers are highly resistant to allowing pump testing and evaluation, implementation of EWMP number 10, "Facilitate or promote customer pump testing and evaluation," may not be

possible. Documentation of this may require surveys, consultation with customers, and other processes to identify and support a non-feasibility determination.

- Conditional EWMP 8: If available groundwater resources are minimal or under adjudication or subject to GSP limitations, EWMP number 8, “Increase planned conjunctive use of surface water and groundwater with the supplier service area,” may not be possible. Documentation of technical non- feasibility may include such items as records of basin adjudication and identification of the Supplier and customers groundwater allotments; groundwater management plan basin descriptions, basin boundaries, other basin characteristics; any other documentation of the lack of groundwater resources or ability to extract groundwater.

- Conditional EWMP 9: The canal and distribution system may not be amendable to EWMP number 9, *“Automate canal control devices*” because of structural limitations or the distribution system is piped. An engineering report may be prepared to document the inability to implement this EWMP.

4.2 Supporting Documentation

For Suppliers serving more than 25,000 acres (excluding recycled water), supporting documentation as required by 23 CCR Section 597 et seq. for compliance with the Agricultural Water Measurement Regulation, described in Section 5, can be included in Section VIII of AWMP. Section VIII can also include any other documentation and information you wish to include to support your descriptions and analyses in AWMP Sections I through VII. DWR encourages the Supplier to include in this section:

4.2.1 Agricultural Water Measurement Regulation Supporting Documentation (as applicable):

(Refer to Section 6 for details on requirements and applicability of this regulation)

A. Legal Certification and Apportionment Required for Water Measurement
B. Engineer Certification and Apportionment Required for Water Measurement
C. Description of Water Measurement Best Professional Practices
D. Documentation of Water Measurement Conversion to Volume
E. Device Corrective Action Plan Required for Water Measurement

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5.0 USBR CVPIA/RRA Process Guidance

Suppliers that submit Water Conservation/Management Plans to USBR may submit those plans as their AWMP (see section 5.1) with the additional documentation identified here (see sections 5.2 and 5.3) for compliance with Water Code Division 6, Part 2.8. Additional documentation includes Agricultural Water Measurement Regulation AWMP documentation required by 23 CCR Section 597.4(e) identified in Section 5.2 below. To be compliant with Water Code Division 6, Part 2.8, Chapter 3, Article 1 (notification of preparation) and Article 3 (public participation and submittal sections), the Supplier should comply with requirements identified in section 5.3 below. To the extent federal review process includes the requirements specified in Water Code Division 6, Part 2.8, Chapter 3 Article 1 and Article 3, the AWMPs meet the requirements of the Water Code Division 6, Part 2.8, Chapter 3.

Recent legislative changes (AB 1668) to the Water Code do not apply to Federal contractors who submit a Federal Water Management Plan. However, if a Federal contractor chooses to submit a state AWMP, they must comply with all of the current Water Code requirements, including those in AB 1668.

5.1 USBR- CVPIA/RRA Water Management/ Conservation Plans that are Accepted as Adequate

Water Code Section 10828 allows Suppliers subject to the USBR CVPIA/RRA water management/ conservation plan process to submit those plans for compliance with Water Code Section 10826 provided that: 1) the water management/conservation plan has been adopted by the Supplier and submitted to the U.S. Bureau of Reclamation (USBR) within the previous four years, and 2) the USBR has accepted the water management/ conservation plan as adequate.

DWR accepts CVPIA/RRA Water management/conservation plans that have been accepted as adequate by the USBR within the previous four years, but no earlier than April 1, 2021 for 2025 plans. These Suppliers must also submit additional documentation to DWR for compliance with the Agricultural Water Measurement Regulations as identified in Section 42 and detailed in section 6.

"(a) Agricultural water suppliers that are required to submit water conservation plans to the United States Bureau of Reclamation pursuant to either the Central Valley Project Improvement Act (Public Law 102-575) or the Reclamation Reform Act of 1982, or both, may submit those water conservation plans to satisfy the requirements of Section 10826, if both of the following apply:

(1) The agricultural water supplier has adopted and submitted the water conservation plan to the United States Bureau of Reclamation within the previous four years.

(2) The United States Bureau of Reclamation has accepted the water conservation plan as adequate.

*(b) This part does not require agricultural water suppliers that are required to submit water conservation plans to the United States Bureau of Reclamation pursuant to either the Central Valley Project Improvement Act (Public Law 102- 575) or the Reclamation Reform Act of 1982, or both, to prepare and adopt water conservation plans according to a schedule that is different from that required by the United States Bureau of Reclamation." (*Water Code Section 10828)

5.2 Additional Documentation Requirements

Additional information must be included in the water management/conservation plan submitted to DWR for compliance with the Agricultural Water Measurement Regulations (23 CCR Section 597.4 (e)). For 2025 compliance, submit to DWR the documentation identified below as an attachment with the USBR-accepted water management/conservation plan. Refer to Section 4 for details regarding the Agricultural Water Measurement Regulation reporting and documentation requirements. This documentation must also be approved by the Supplier following the adoption process identified in section 4.3. DWR encourages the use and submittal of the checklist (section 2) along with all other documentation.

5.3 Agricultural Water Measurement Regulation Documentation (as applicable)

Attachment A – Legal Certification and Apportionment Required for Water Measurement (if water is measured at a location upstream of delivery points or farm gates, 23 CCR Section 597.3(b)(2)(A))

Attachment B – Engineer Certification and Apportionment Required for Water Measurement (if water is measured at a location upstream of delivery points or farm gates, 23 CCR Section 597.3(b)(2)(B))

Attachment C – Description of Water Measurement Best Professional Practices (23 CCR Section 597.4(e)(2))

Attachment D – Documentation of Water Measurement Conversion to Volume (23 CCR Section 597.4(e)(3))

Attachment E – Device Corrective Action Plan Required for Water Measurement (23 CCR Section 597.4(e)(4))

5.4 Documentation Required for Loan and Grant Eligibility only

If the Supplier has not implemented all the Water Code Section 10608.48 EWMPs, the Supplier must submit to DWR for approval, a schedule, financing plan, and budget for implementation of remaining EWMPs for loan and grant eligibility.

If applicable, it is suggested that this documentation be included as an attachment to the water management/conservation plan. Table 4 provides an example reporting format that can be used to provide this information with the water management/conservation plan.

Table 4a. Schedule to Implement Critical EWMPs (Water Code Section 10608.56 (d))

EWMP	Implementation Schedule	Finance Plan	Budget Allotment	USBR 2020 Criteria
1 – Water Measurement				Critical 1
2 – Volume-Based Pricing				Critical 4

Table 5b. Schedule to Implement Conditional EWMPs (Water Code Section 10608.56 (d))

EWMP	Implementation Schedule	Finance Plan	Budget Allotment	USBR 2020 Criteria
1 – Alternate Land Use				Exemptible 1
2 – Recycled Water Use				Exemptible 2
3 – On-Farm Irrigation Capital Improvements				Exemptible 3
4 – Incentive Pricing Structure				Exemptible 4
5 – Infrastructure Improvements				Exemptible 5a Exemptible 5b
6 – Order/Delivery Flexibility				Exemptible 6
7 – Supplier Spill and Tailwater Systems				Exemptible 7
8 – Conjunctive Use				Exemptible 9
9 – Automated Canal Controls				Exemptible 10
10 – Customer Pump Test/Eval.				Exemptible 11
11 – Water Conservation Coordinator				Critical 2

EWMP	Implementation Schedule	Finance Plan	Budget Allotment	USBR 2020 Criteria
12 – Water Management Services to Customers				Critical 3
13 – Identify Institutional Changes				No equivalent
14 – Supplier Pump Improve Efficiency				Critical 5
Grand Total All EWMPs				

Note: There is no equivalent USBR Conditional EWMP #13 or #14.

5.5 Additional Documentation for Notification, Public Participation, Adoption, and Submittal Requirements for Federal Water Contractors

All Suppliers required to prepare new agricultural water management/conservation plans must prepare and complete their plan in accordance with Water Code Division 6, Part 2.8, Chapter 3 Article 1 and Article 3 requirements for notification, public participation, adoption, and submittal (refer to Section 3.1 for details). The federal review process may incorporate many requirements specified in Division 6, Part 2.8, Chapter 3, Articles 1 and 3, and therefore, may meet the requirements of Division 6, Part 2.8, Chapter 3. If it does not, the Supplier would have to complete those requirements in Division 6, Part 2.8, Chapter 3, Articles 1 and 3 that are not already a part of the federal review process. Division 6, Part 2.8 requirements are discussed below.

5.5.1 Notification of AWMP Preparation

Notify each city or county that receives water from you that you will be preparing a plan or considering amendments to or changes to the plan:

> *"(a) An agricultural water supplier required to prepare a plan pursuant to this part shall notify each city or county within which the supplier provides water supplies that the agricultural water supplier will be preparing the plan or reviewing the plan and considering amendments or changes to the plan. The agricultural water supplier may consult with, and obtain comments from, each city or county that receives notice pursuant to this subdivision.*
>
> *(b) The amendments to, or changes in, the plan shall be adopted and submitted in the manner set forth in Article 3 (commencing with Section 10840)."* (Water Code Section 10821).

5.5.2 Public Participation

Prior to adopting the plan, make the plan available for public inspection and hold a public hearing on the plan in accordance with Government Code Section 6066 (public suppliers) or equivalent process (private suppliers):

> *"Prior to adopting a plan, the agricultural water supplier shall make the proposed plan available for public inspection and shall hold a public hearing on the plan. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned agricultural water supplier pursuant to Section 6066 of the Government Code. A privately-owned agricultural water supplier shall provide an equivalent notice within its service area and shall provide a reasonably*

equivalent opportunity that would otherwise be afforded through a public hearing process for interested parties to provide input on the plan. After the hearing, the plan shall be adopted as prepared or as modified during or after the hearing." (Water Code Section 10841) Refer to Section 3.1.B.2 for details on the public hearing process.

5.5.3 AWMP Adoption, Submittal, and Availability

Specific requirements for plan adoption and submittal are contained in the Water Code.

AWMP Adoption

"After the public hearing, the plan shall be adopted as prepared or as modified during or after the hearing." (Water Code Section 10841)

"Amendments to, or changes in the plan shall be adopted and submitted in the manner set forth in Article 3 (commencing with Section 10840)." (Water Code Section 10820(b))

The Supplier is encouraged to include a copy of the Resolution of Plan Adoption to show compliance with plan adoption requirements.

AWMP Submittal

Within 30 days of adoption, the Supplier must submit copies of the water management plan, amendments, or changes to the water management plan (including the required attachments/additions identified in Section 5.2, above) to the following entities (Water Code Section 10843(a) and Section 10843(b)):

"The DWR (*electronically).*

Any city, county, or city and county within which the agricultural water supplier provides water supplies.

Any groundwater management entity within which jurisdiction the agricultural water supplier extracts or provides water supplies.

Any city or county library within which jurisdiction the agricultural water supplier provides water supplies.

The California State Library."

Refer to Section 3. of this Guidebook for details on how to submit AWMPs to DWR and the California State Library.

AWMP Availability

Within 30 days after plan adoption by the Supplier's governing entity, the water management plan must be made available for public review on the Supplier's website or an electronic copy submitted to DWR if the supplier does not have an website (Water Code Section 10844). Electronic copies sent to the DWR should preferably be in Adobe PDF or Microsoft Word format.

> *"(a) Not later than 30 days after the date of adopting its plan, the agricultural water supplier shall make the plan available for public review on the agricultural water supplier's Internet Web site.*
>
> *(b) An agricultural water supplier that does not have an Internet Web site shall submit to the department, not later than 30 days after the date of adopting its plan, a copy of the adopted plan in an electronic format. The department shall make the plan available for public review on the department's Internet Web site."* (Water Code Section 10844)

6.0 Agricultural Water Measurement Regulation Documentation

The Agricultural Water Measurement Regulation applies to Suppliers that serve more than 25,000 acres (excluding recycled water). Suppliers with 10,000 to 25,000 irrigated acres, excluding recycled water, do not have to comply with the Agricultural Water Measurement Regulation unless funding has been specifically provided for that purpose (23 CCR Section 597.1(e)). This regulation requires that water measurements be conducted at the delivery point or farm-gate of a single customer and that measurement devices are certified as accurate through field-testing, laboratory/engineer certification, or inspection. There are specific requirements for water measurement and reporting in the AWMP that are identified in 23 CCR Section 597.3(b)(2), Section 597.4(b)(2) and Section 597.4 (e). This Section describes the pertinent Agricultural Water Measurement Regulation documentation that must be included in AWMPs or CVPIA/RRA plans, if applicable. The pertinent text of this regulation is included in Appendix B6.2.

All documentation needed for water measurement compliance may be included in Section VIII of the AWMP or as attachments/additions to CVPIA/RRA water management/conservation plans submitted to DWR.

If the Supplier cannot measure water deliveries at the delivery point or farm-gate of a single customer, they may be able to measure deliveries at an upstream location, provided certain criteria are met and that this is documented in the AWMP or CVPIA/RRA plan. The criteria for allowing upstream measurements are specified in 23 CCR Section 597.3(b)(1). The criteria for measurement device accuracy and certification are specified in 23 CCR Section 597.3(a), Section 597.4(a), and Section 597.4(b).

The following information is required in the AWMP to document that this criterion was satisfied, if applicable (see Table VII.A.1 for summarized detail):

6.1 Lack of Access or Technical Feasibility (As Applicable)

Legal Certification and Apportionment Required for Water Measurement – Lack of Legal Access to Farm-gate

If a Supplier cannot measure water at the farm-gate because of lack of legal access needed to install, measure, maintain, operate, and monitor a measurement device (23

CCR Section 597.3(b(1)(A)), the following must be included in the AWMP or CVPIA/RRA plan/attachment(s) for Certification for lack of legal access by the Supplier's legal counsel (23 CCR Section 597.3(b)(2)(A)):

Engineer Certification and Apportionment Required for Water Measurement – Technically Infeasible

If a Supplier does not measure water at the farm-gate but instead measures water at the lateral (upstream of multiple customers) because flow or water level fluctuations or other conditions prevent the ability to accurately measure at the farm-gate, the Supplier must provide the following in the AWMP or CVPIA/RRA plans:

- Engineer determination that accuracy standards of 23 CCR Section 597.3(a) cannot be met at the farm- gate (23 CCR Section 597.3(b)(1)(B) and Section 597.3(b)(2)(B)),
- Documentation on apportionment of volume of water delivered to customers as described above (23 CCR Section 597.3(b)(2)(C)).

Documentation on apportionment of volume of water delivered to customers (23 CCR Section 597.3(b)(2)(C))

Under 23 CCR Section 597.3(b)(2)(C), if water measurements cannot be conducted at the delivery point or farm-gate of a single customer, all of the following criteria about how the Supplier apportions the volume of water delivered to individual downstream customers must be documented in the AWMP:

1. How differences in water use among individual customers is accounted for based on (but not limited to):
    - Duration of water delivery
    - Annual customer water use patterns
    - Irrigated acreage
    - Crops planted, and
    - On-farm irrigation system
2. That this delivery apportioning is sufficient for establishing a pricing structure based at least in part on the volume delivered, and
3. That it was approved by the Supplier's governing board or body.

6.2 Description of Water Measurement Best Professional Practices

All Suppliers required to implement agricultural water measurement in accordance with 23 CCR Section 597 must include a description of Best Professional Practices about, but not limited to (23 CCR Section 597.4(e)(2)):

- The collection of water measurement data.
- Frequency of measurements.
- Method for determining irrigated acres.
- Quality control and quality assurance procedures.

Include this description in the AWMP or CVPIA/RRA plan or as an attachment submitted to DWR.

6.3 Documentation of Water Measurement Conversion to Volume (As Applicable)

If water measurement device(s) are not measuring water volume, the Supplier must provide documentation on how measurements are converted to volume. Specific flow-rate, velocity, and water elevation measurement conversions are identified in 23 CCR Section 597.4(e)(3).

Include this documentation in the AWMP or CVPIA/RRA plan or as an attachment submitted to DWR.

6.4 Device Corrective Action Plan Required for Water Measurement (As Applicable)

All existing water measurement devices must measure water delivered at the delivery point or farm-gate of a single customer with the following accuracy: (23 CCR Section 597.3(a))

- Existing devices with an accuracy of + 12% by volume
- New or replacement devices with a laboratory certified accuracy of 5% by volume or field- certified accuracy of 10% by volume

23 CCR Section 597.4(a) describes the initial certification of device accuracy protocols and 23 CCR Section 597.4(b) describes the field-testing and field-inspection of existing devices protocols. Field-testing must be conducted as a statistically random representative sample of devices. However, field inspections and analysis must be completed for every measurement device. In both cases, only trained and qualified individuals can perform these assessments, and the tests must be documented in a report that is approved by an engineer.

If field testing or inspection shows that a measurement device does not meet the accuracy criteria, it must be repaired and brought into compliance or replaced with a measurement device meeting the accuracy criteria above. Include this documentation in the AWMP or CVPIA/RRA plan or as an attachment submitted to DWR.

Table 6. Water Measurement Documentation Information

Information that may be submitted to DWR in the AWMP or with a USBR-accepted water management/conservation plan to satisfy water measurement requirements.

Subject	State Regulation (23 CCR)	Information that may be submitted
Requirements for Measuring at Upstream of Multiple Customers	***Section 597.3(b)*** – allows installing measurement device upstream of multiple customers if certain conditions are met.	If water measurement device is installed upstream of multiple farm- gates, provide information on lack of legal access or conditions as described in Sections 597.3(b)(1)(A), 597.3(b)(1)(B), and 597.3(b)(2) of regulation
Performance Requirements	***Section 597.4(d)*** – 1. Devices shall be correctly installed, maintained, operated, inspected, and monitored 2. Devices no longer meeting the accuracy requirements shall be repaired or replaced	Provide a description of device performance.

Subject	State Regulation (23 CCR)	Information that may be submitted
Reporting Requirements	***Section 597.4(e)(1)-(4)*** - Document compliance w/ 597.3 (b) Description of best professional practices used Protocols used to convert non- volume readings Schedule, budget and finance plan for taking corrective actions	Provide documents for Section 597.4(e)(1)-(4).
Requirements for bringing existing devices under compliance	***Section 597.4(e)(4)*** – Schedule, budget and finance plan	If applicable, provide information for Section 597.4(e)(4).

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Appendix A – AWMP Content and Template

A1. AWMP Content and Template

Elements of an AWMP are identified in the AWMP Template, below. The outline/organizational structure is not required. AWMP Template boxes are for format only and do not denote any expectation or requirement as to the quantity of information to be presented.

More information on what Suppliers may consider submitting in the AWMP Template are provided in section 3, following the same outline as the AWMP Template.

Template in Adobe Acrobat available at water.ca.gov/Programs/Water-Use-And-Efficiency/Agricultural-Water-Use-Efficiency. Editable template in Microsoft Word available upon request, please email agwue@water.ca.gov.

A2. Relationship of Water Code with USBR Standard Criteria

Table A2A summarizes the relationship between the Water Code AWMP and USBR water management/conservation plan content/elements. Table A2B summarizes applicable Efficient Water Management Practices (EWMPs) and Agricultural Water Measurement Regulation documentation reported in the AWMPs. It also lists documentation to be reported by Suppliers for loan and grant eligibility if the supplier has not implemented an EWMP.

Table A2A. Comparison of California Water Code AWMP Required Elements with and USBR Plan Requirements

Required Element	Water Code Section	USBR CVPIA 2020 Criteria[1]
Coordination	*N/A*	N/A
Plan Adoption	*10821*	Section 8

Required Element	Water Code Section	USBR CVPIA 2020 Criteria[1]
Previous Water Management Activities	*10826 (d)*	N/A
Agricultural Water Supplier Service Area	*10826 (a)*	Section I
Inventory of Water Supplies	*10826 (b)*	Section II
Source Water Quality Monitoring Practices	*10826 (b) (4)*	Section IID
Water Uses	*10826 (b) (5)*	Section IIE
Drainage from the Supplier's surface area	*10826 (b) (6)*	Section IIF
Water accounting	*10826 (b) (7)*	Section IIG
Effects of Climate Change on Future Supply	*10826 (d)*	N/A
EWMPs	*10826(e) & 10608.48(b)-(c)*	Section III
Regional Plan	*10829*	Section 2

Notes:

1. Sections 4-7 are unique to USBR's process (Section 4: BMPs for Urban Contractors; Section 5: Plan Implementation; Section 6: Exemption Process)

Table A2B. EWMPs and Agricultural Water Measurement Regulation Documentation Required for Water Code and USBR Contractors

Required by	Requirement details	Water Code AWMP	CVPIA 2020 Criteria Alternative for USBR Contractors
Required by the Water Code (see Section 3.7)	Tables VII.A.1 and VII.A.2: Report of 10608.48 EWMPs Implemented	Required	These suppliers may meet this requirement by submitting a CVPIA/RRA Water Conservation Plan
Required by the Water Code (see Section 3.7)	Table VII.B: Non-Implemented 10608.48 EWMPs Documentation	Required	These suppliers may meet this requirement by submitting a CVPIA/RRA Water Conservation Plan
Required by Agricultural Water Measurement Regulation, where applicable (see Section 6)	Attachment A- Legal Certification	Required	Required
Required by Agricultural Water Measurement Regulation, where applicable (see Section 6)	Attachment B- Engineer Certification	Required	Required
Required by Agricultural Water Measurement Regulation, where applicable (see Section 6)	Attachment C- Description of Best Professional Practices	Required	Required
Required by Agricultural Water Measurement Regulation, where	Attachment D- Water Measurement Conversion	Required	Required

Required by	Requirement details	Water Code AWMP	CVPIA 2020 Criteria Alternative for USBR Contractors
applicable (see Section 6)			
Required by Agricultural Water Measurement Regulation, where applicable (see Section 6)	Attachment E-Correction Action	Required	Required

Table A2C. Documentation Required for Grant and Loan Eligibility If Supplier Has Not Implemented All EWMPs

Required by	Requirement details	Water Code AWMP	CVPIA 2020 Criteria Alternative for USBR Contractors
Required by the Water Code (see Section 3.7)	Table VII.A.3 - Schedule to Implement 10608.48 EWMPs	Required if all of the Water Code 10608.48 EWMPs have not been implemented.	Required if all of the Water Code 10608.48 EWMPs have not been implemented.

Appendix B – Supporting Information

B1. Frequently Asked Questions (FAQs)

Q1: Who must submit an Agricultural Water Management Plan (AWMP)?

A1: The law specifies Suppliers that provide water to greater than 25,000 irrigated acres, excluding recycled water, shall be required to adopt and implement an AWMP and submit a plan to DWR.

Q2: What happens if a Supplier doesn't submit a plan?

A2: Water Code 10820(b) specifies that DWR shall notify a Supplier they are not in compliance and the Supplier has 120 days to comply. DWR may contract with a state academic institution or qualified entity to prepare or complete an AWMP. Costs and expenses shall be recoverable. If a Supplier does not provide data necessary for the preparation or completion of the plans, DWR may assess a fine of $1,000 per day, not to exceed $25,000, until data is made available.

Q3: Do USBR contractor suppliers submit AWMPs to DWR?

A3: Suppliers that are required to submit water conservation plans (also known as water management plans) every five years to USBR, pursuant to the CVPIA or the RRA, or both, may submit those plans to DWR to satisfy the requirements to adopt an AWMP as required by the Water Code if the following apply:

- The Supplier has adopted and submitted the plan to the Bureau of Reclamation within the previous four years (Water Code Section 10828(a)(1)).
- USBR has accepted the plan as adequate (Water Code Section 10828(a)(2)).

Q4: Do USBR Reclamation contractor suppliers comply with the state's Agricultural Water Measurement Regulation?

A4: All Suppliers as described in the Agricultural Water Measurement Regulation are subject to the Regulation. Federal Suppliers that currently comply with USBR 2020 Criteria, and measure water using devices that are maintained and calibrated to meet the federal standards, would meet the accuracy standards of state regulation. However, some information is required to be reported in the AWMP that may not be in the USBR plan. Therefore, along with the USBR plan, information submitted to DWR should include the following:

- If measurement is done upstream from multiple customer's farm-gates due to lack of legal access or water level or flow conditions, the supplier should provide information that includes a Supplier's legal counsel document for lack of legal access or documents for existence of fluctuating water flow conditions as described in 23 CCR Section 597.3(b) of the Agricultural Water Measurement Regulation, along with how the supplier accounts for differences in customer water use.

- Water measurement conversion to volume.

- Performance information, including devices correctly installed, maintained, operated, inspected, and monitored.

- If existing devices are not in compliance with Reclamation or Regulation, provide schedule, budget, and finance plan to correct the deficiencies.

Q5: Is there anything in the SB X7-7 Water Conservation (Steinberg, Statute of 2009) that requires tiered water pricing for Suppliers?

A5: There is no language in the Water Code regarding tiered pricing, per se. However, see the following sections from the law regarding pricing structure:

Water Code Section 10608.48 states:

> *(b) Agricultural water suppliers shall implement all of the following critical efficient management practices:*
>
> > *(2) Adopt a pricing structure for water customers based at least in part on quantity delivered, and…*
>
> *(c) Agricultural water suppliers shall implement additional efficient management practices, including, but not limited to, practices to accomplish all of the following, if the measures are locally cost effective and technically feasible:…*
>
> > *(4) Implement an incentive pricing structure that promotes one or more of the following goals:*
> >
> > *(A) More efficient water use at the farm level.*
> >
> > *(B) Conjunctive use of groundwater.*
> >
> > *(C) Appropriate increase of groundwater recharge.*
> >
> > *(D) Reduction in problem drainage.*

(E) Improved management of environmental resources.

(F) Effective management of all water sources throughout the year by adjusting seasonal pricing structures based on current conditions.

Q6: Explain the condition of "sufficient funding provided to a Supplier" that would make the implementation of the requirements of the Water Code mandatory (e.g., adoption and submission to DWR of an AWMP).

A6: For suppliers providing water to 10,000 or more but less than 25,000 irrigated acres, funding from the State or other entities may be made available for implementing a specific requirement (e.g., preparation of AWMPs). In the event where full funding or cost-share has been provided to a supplier to implement a specific SB X7-7 requirement, then the supplier would be required to implement that requirement. Funding may be from state or other entities including local.

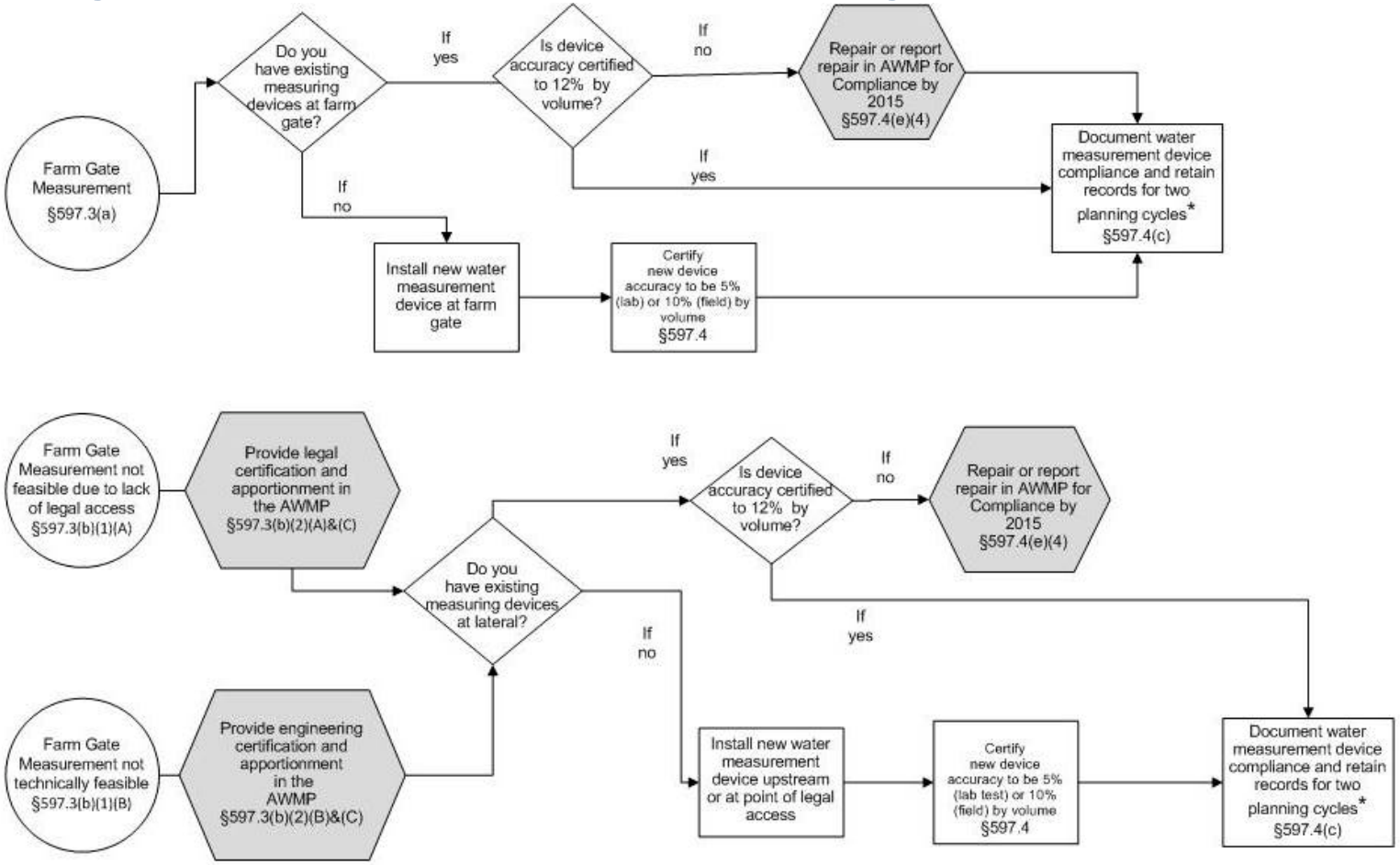
Q7: When a Supplier recharges a groundwater basin for the purpose of providing irrigation water to customers who pump the water through private wells, how is the supplier's total irrigated acreage calculated for the purpose of determining SB X7-7 applicability?

A7: When a supplier recharges a groundwater basin used by customers to pump water for irrigation, and there exists a customer – supplier relationship, then the total irrigated acres supplied from the pumped groundwater would count toward the supplier's total irrigated acreage.

Q8: We have 33,000 acres within the district, but we transfer 20,000-acre feet to a neighboring district. We only irrigate 9,000 acres within our district. Are we subject to SB X7-7 planning requirements?

A8: It depends on the total irrigated acres served by the Supplier's water. If Supplier A routinely transfers a portion of its water to Supplier B (receiving Supplier), supplier A is a wholesale supplier and its irrigated acreage is determined by the irrigated area of its direct customers and the irrigated area of the receiving Supplier customers served by the transfer.

B2. Agricultural Water Measurement Regulation Flow Chart



*Other documentation and records retention requirements for compliance with the Ag Measurement Regulations are not detailed in this flow chart but are listed in Section E.

Agricultural Water Measurement Compliance Overview

B3. Detailed Comparison of the Water Code and USBR CVPIA Processes

	Water Code	USBR CVPIA 2020 Criteria
1	**Section 10826** An agricultural water management plan shall be adopted in accordance with this chapter. The plan shall do all of the following: (a) Describe the agricultural water supplier and the service area, including all of the following:	**Section I** Description of the District
2	(1) Size of the service area.	**Section IA** History
3	(2) Location of the service area and its water management facilities	**Section IB** Location and facilities
4	(3) Terrain and soils	**Section IC** Topography and Soils
5	(4) Climate	**Section ID** Climate
6	Not required (N/R)	**Section IE** Natural and Cultural Resources
7	(5) Operating rules and regulations	**Section IF** Operating Rules and Regulations
8	(6) Water delivery measurements or calculations	**Section 1I** Water Measurement, Pricing and Billing
9	(7) Water rate schedules and billing	**Section IG** Water Measurement, Pricing and Billing
10	(8) Water shortage allocation policies	**Section IH** Water Shortage Allocation Policies
11	(b) Describe the quantity and quality of water resources of the agricultural	**Section II** Inventory water resources

	Water Code	USBR CVPIA 2020 Criteria
	water supplier, including all of the following:	
12	(1) Surface water supply	**Section IIA** Surface Water Supply
13	(2) Groundwater supply	**Section IIB** Groundwater Supply
14	(3) Other water supplies	**Section IIC** Other Water Supplies
15	(4) Source water quality monitoring practices	**Section IID** Source Water Quality Monitoring Practices
16	(5) Water uses within the agricultural water supplier's service area, including all of the following:	**Section IIE** Water Uses within the District
17	(A) Agricultural	**Section IIE1** Agricultural
18	(B) Environmental	N/R
19	(C) Recreational	N/R
20	(D) Municipal and industrial	**Section IIE2** Urban
21	(E) Groundwater recharge, including estimated flows from deep percolation from irrigation and seepage.	**Section IIE3** Groundwater Management Plan/Banking Programs
22	N/R	**Section IIE4** Transfers, Exchanges, Rescheduling, Purchases, or Sales
23	N/R	**Section IIE5** Other
24	N/R	**Section IIF** Outflow from the District
25	(c) Include an annual water budget based on the quantification of all inflow and outflow components for the service area of the agricultural water	**Section IIG** Water Accounting

	Water Code	USBR CVPIA 2020 Criteria
	supplier. Components of inflow shall include surface inflow, groundwater pumping in the service area, and effective precipitation. Components of outflow shall include surface outflow, deep percolation, and evapotranspiration. An agricultural water supplier shall report the annual water budget on a water-year basis. The department shall provide tools and resources to assist agricultural water suppliers in developing and quantifying components necessary to develop a water budget.	
26	N/R	**Section IIG1** Quantify Contractor's Water Supplies
27	N/R	**Section IIG2** Quantify Water Used
28	N/R	**Section IIG3** Overall Water Inventory
29	(d) Include an analysis, based on available information, of the effect of climate change on future water supplies	N/R
30	(e) Describe previous water management activities	N/R
31	(f) Identify water management objectives based on the water budget to improve water system efficiency or meet other water management objectives. The agricultural water supplier shall identify, prioritize, and implement actions to reduce water loss, improve water system management, and meet other water management objectives identified in the plan.	N/R

	Water Code	USBR CVPIA 2020 Criteria
32	(g) Include in the plan the water use efficiency information required pursuant to Section 10608.48	**Section IIIA** Critical BMPs for Agricultural Contractors
33	(h) Quantify the efficiency of agricultural water use within the service area of the agricultural water supplier using the appropriate method or methods from among the four water use efficiency quantification methods developed by the department in the May 8, 2012 report to the Legislature entitled “A Proposed Methodology for Quantifying the Efficiency of Agricultural Water Use.” The agricultural water supplier shall account for all water uses, including crop water use, agronomic water use, environmental water use, and recoverable surface flows.	N/R
34	**Section 10608.48(a)** On or before July 31, 2012, an agricultural water supplier shall implement efficient water management practices pursuant to subdivisions (b) and (c). (b) Agricultural water suppliers shall implement all of the following critical efficient management practices:	**Section IIIA** Critical BMPs for Agricultural Contractors
35	**Chapter 3, Article 1, Section 10820** (a) An agricultural water supplier shall prepare and adopt an agricultural water management plan in the manner set forth in this chapter on or before December 31, 2012, and shall update that plan on December 31, 2015, and on or before December 31 every five years thereafter.	**Section 210 of the Reclamation Reform Act of 1982 (RRA); Central Valley Project Improvement Act of 1992 (Public Law 102-575)** Requires federal contractors to prepare and submit plans every 5 years

	Water Code	USBR CVPIA 2020 Criteria
36	**Section 10608.48 (a)(1)** Measure the volume of water delivered to customers with sufficient accuracy to comply with subdivision (a) of Section 531.10 and to implement paragraph (2)	**Section IIIA1** Water Measurement
37	(2) Adopt a pricing structure for water customers based at least in part on quantity delivered	**Section IIIA4** Pricing Structure
38	(c) Agricultural water suppliers shall implement additional efficient management practices, including, but not limited to, practices to accomplish all of the following, if the measures are locally cost effective and technically feasible:	**Section IIIB** Exemptible BMPs for Agricultural Contractors
39	(1) Facilitate alternative land use for lands with exceptionally high water duties or whose irrigation contributes to significant problems, including drainage	**Section IIIB1** Facilitate Alternative Land Use
40	(2) Facilitate use of available recycled water that otherwise would not be used beneficially, meets all health and safety criteria, and does not harm crops or soils	**Section IIIB2** Facilitate Use of Available Recycled Water that Otherwise Would Not be Used Beneficially, Meets all Health and Safety Criteria, and Does Not Cause Harm to Crops or Soils.
41	(3) Facilitate the financing of capital improvements for on-farm irrigation systems	**Section IIIB3** Facilitate the Financing of Capital Improvements for On-Farm Irrigation Systems.
42	(4) Implement an incentive pricing structure that promotes one or more of the following goals:	**Section IIIB4** Incentive Pricing

	Water Code	USBR CVPIA 2020 Criteria
43	(A) More efficient water use at the farm level	N/R
44	(B) Conjunctive use of groundwater	**Section IIIB9** Optimize Conjunctive Use
45	(C) Appropriate increase of groundwater recharge	(see above)
46	(D) Reduction in problem drainage	N/R
47	(E) Improved management of environmental resources	N/R
49	(F) Effective management of all water sources throughout the year by adjusting seasonal pricing structures based on current conditions	N/R
49	(5) Expand line or pipe distribution systems, and construct regulatory reservoirs to increase distribution system flexibility and capacity, decrease maintenance, and reduce seepage	N/R
50	(6) Increase flexibility in water ordering by, and delivery to, water customers within operational limits	**Section IIIB6** Increase Flexibility in Water Ordering By, and Delivery To, Water Users
51	(7) Construct and operate supplier spill and tailwater recovery systems	**Section IIIB7** Construct and Operate Spill and Tailwater Recovery Systems
52	N/R	**Section IIIB8** Plan to Measure Outflow
53	(8) Increase planned conjunctive use of surface water and groundwater within the supplier service area	**Section IIIB9** Optimize Conjunctive Use

	Water Code	USBR CVPIA 2020 Criteria
54	(9) Automate canal control structures.	**Section IIIB10** Automate Distribution and/or Drainage System Structures
55	(10) Facilitate or promote customer pump testing and evaluation	**Section IIIB11** Facilitate or Promote Water User Pump Testing and Evaluation
56	N/R	**Section IIIB12** Mapping (GIS)
57	(11) Designate a water conservation coordinator who will develop and implement the water management plan and prepare progress reports	**Section IIIA2** Designate the Water Conservation Coordinator
58	(12) Provide for the availability of water management services to water users. These services may include, but are not limited to, all of the following:	**Section IIIA3** Provide or Support the Availability of Water Management Services to Water Users
59	(A) On-farm irrigation and drainage system evaluations	**Section IIIA3a** On-farm evaluations
60	(B) Normal year and real-time irrigation scheduling and crop evapotranspiration information	**Section IIIA3b** Normal year and real-time irrigation scheduling and crop ET information
61	(C) Surface water, groundwater, and drainage water quantity and quality data	**Section IIIA3c** Surface, ground, and drainage water quantity and quality data.
62	(D) Agricultural water management educational programs and materials for farmers, staff, and the public	**Section IIIA3d** Agricultural water management educational programs and material for farmers and staff, and the public.

	Water Code	USBR CVPIA 2020 Criteria
63	(13) Evaluate the policies of agencies that provide the supplier with water to identify the potential for institutional changes to allow more flexible water deliveries and storage	**Section III.I** Evaluate Polices of Regulatory Agencies Affecting the Contractor and Identify Policies that Inhibit Good Water Management
64	(14) Evaluate and improve the efficiencies of the supplier's pumps.	**Section IIIA5** Evaluate and Improve Efficiencies of Contractor's Pumps
65	**Section 10608(d)** Agricultural water suppliers shall include in the AWMPs a report on which EWMPs have been implemented and are planned to be implemented, an estimate of the water use efficiency improvements since the last report, and an estimate of the water use efficiency improvements estimated to occur five and 10 years in the future. Submit documentation if an EWMPs is not locally cost effective or technically feasible.	**Section IIIB Exemptible BMPs for Agricultural Contractors** Each contractor shall implement the following BMPs, unless the contractor has an approved exemption from Reclamation. The contractor is required to follow the exemption process (see Addendum A) to justify exemptions. Refer to Addendum B for example justifications for each exemptible BMP. Document the exemption in this section. **Section 3C. Provide a 5-Year Budget** Provide current year actual expenditures and a projected budget for the 4 following years following the Plan implementation for the cost of implementing the BMPs.
66	**Section 10608(e)** The data shall be reported using a standardized form developed pursuant to Section 10608.52	N/R

	Water Code	USBR CVPIA 2020 Criteria
67	**Section 10841 (Plan Review)** Prior to adopting a plan, the agricultural water supplier shall make the proposed plan available for public inspection, and shall hold a public hearing on the plan. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned agricultural water supplier pursuant to **Section 6066** of the Government Code. A privately owned agricultural water supplier shall provide an equivalent notice within its service area and shall provide a reasonably equivalent opportunity that would otherwise be afforded through a public hearing process for interested parties to provide input on the plan. After the hearing, the plan shall be adopted as prepared or as modified during or after the hearing	**USBR** releases the plans for public comment after they are received from the water supplier and deemed adequate.
68	**Section 10608.48(g**) On or before December 31, 2013, and December 31, 2016, and December 31, 2021, DWR, in consultation with the Water Board, shall submit to the Legislature a report on the agricultural efficient water management practices that have been implemented and are planned to be implemented, and an assessment how those measures have affected and will affect agricultural operations, and estimated water use efficiency improvements, if any.	N/R – No Congressional report required. A Ten-year progress report was issued in 2004 for years 1993-2002 and covered all aspects of CVPIA.
69	**Section 10845** DWR shall prepare and submit to the Legislature, on or before December 31, 2013, and thereafter in the years ending in six and one, a report summarizing the status of the plans adopted.	N/R

	Water Code	USBR CVPIA 2020 Criteria
70	**Section 10608.56** On and after July 1, 2013, an agricultural water supplier is not eligible for a water grant or loan awarded or administered by the state unless the supplier complies with this part.	Consequences of Non-Compliance (2020 Standard Criteria) An adequate Plan must be in place before Reclamation will consider extending any discretionary benefits, such as financial and technical assistance. Consequences of noncompliance may include but are not limited to ineligibility for any Reclamation grants. Non-compliance status may result in limiting water deliveries to public health and safety amounts.

B4. Annual Aggregated Farm-Gate Delivery Report

The annual Agricultural Aggregated Farm-Gate Delivery Report to DWR is required under the AB 1404 (Water Code Section 531.10); however, it does not need to be included in the AWMP or USBR plans for compliance with Water Code agriculture management planning. It is due annually on April 1 of each year, beginning in 2019 and each year thereafter. The form can be found on the WUEdata Portal at wuedata.ca.gov.

B4.1 Guidance for Compliance with the Requirements of submitting Agricultural Aggregated Farm-Gate Delivery Report

1. Suppliers (defined by Water Code Section 10608.12(a) as Suppliers providing supplies to at least 25,000 irrigated acres or at least 10,000 but less than 25,000 irrigated acres if funding is provided) are required to measure water delivery to its customers and send an annual report to DWR. The Suppliers use the Aggregated Farm-Gate Delivery Reporting Format for Article 2 (Rev. 10-15-2018) to submit data electronically to DWR.

2. Water suppliers (as defined by AB 1404, in Water Code Section 531.10) that are serving less than 10,000 acres of agricultural land (or less than 25,000 acres if no funding is provided) and at least 2,000 acres of agricultural land (or at least 2,000 acre feet annually for agricultural purposes) are to measure water deliveries using best professional practices, report annually to DWR, and use the same form. However, measurement is required only if it is locally cost- effective.

B4.2 Definitions of Terms (from AB 1404 and SB X7-7)

Agricultural Water Supplier: for the purposes of AB1404 requirements, Water Code Section 531.1 defines "agricultural water supplier" as *"a supplier either publicly or privately owned, supplying 2,000 acre-feet or more of surface water annually for agricultural purposes or serving 2,000 or more acres of agricultural land. An agricultural water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells water for ultimate resale to customers*" (Water Code Section 531.b)

For the purpose of SB X7-7 requirements (Article 2), Water Code Section 10608.12(a) defines "agricultural water supplier" as *"a water supplier, either publically or privately owned, providing water to 10,000 or more irrigated acres, excluding recycled water. "Agricultural water supplier" includes a supplier or contractor for water, regardless of the basis of right that distributes or sells water for ultimate resale to customers. "Agricultural water supplier*" does not include the department."

Aggregated Farm-Gate Delivery Data: *""Aggregated farm-gate delivery data" means information reflecting the total volume of water an agricultural water supplier provides to its customers and is calculated by totaling its deliveries to individual customers"* (Water Code Section 531.a)

Farm-gate: *""Farm-gate" means the point at which water is delivered from the agricultural water supplier's distribution system to each of its customers"* (Water Code Section 531.f)

Best Professional Practices: for the purposes of AB 1404 requirements*, ""Best professional practices" means practices attaining and maintaining accuracy of measurement and reporting devices and methods"* (Water Code Section 531.d). This definition applies to agricultural Suppliers <10,000 acres (and less than 25,000 acres if no funding is made available to the Supplier).

23 CCR Section 597: *""Best professional practices" means practices attaining to and maintaining accuracy of measurement and reporting devices and methods described in this article, such as operation and maintenance procedures and practices recommended by measurement device manufacturers, designers, and industry professionals"* (23 CCR Section 597.2(a)(4)). This definition applies to Suppliers ≥10,000 acres.

Not Locally Cost-Effective: *"The present value of the local benefits of implementing a water demand management measure is less than the present value of the local costs of implementing that measure"* (Water Code Section 10631.5 (a)(4)(B)).

B4.3. Requirements for Agricultural Water Supplier Compliance with Water Measurement Reporting

For those Suppliers providing farm-gate delivery data to DWR:

1. Provide DWR with aggregated monthly or bimonthly farm-gate deliveries on an annual basis, and

2. Provide DWR with information on their farm-gate measurement program or practices to document that:

    (a) They are using "Best Professional Practices" if they are suppliers providing water to less than 25,000 irrigated acres, excluding acres that receive only recycled water, and if locally cost-effective.

    (b) They measure water delivered to customers in accordance with Agricultural Water Measurement Regulation if they are suppliers providing water to at least 25,000 irrigated acres, excluding acres that receive only recycled water.

(c) They measure water delivered to customers in accordance with Agricultural Water Measurement Regulation when funding is provided to them for that purpose, if they are suppliers providing water to 10,000 or more irrigated acres but less than 25,000 irrigated acres, excluding acres that receive only recycled water.

3. For those Suppliers greater than 2,000 acres who are not providing farm-gate delivery data to DWR, they must provide DWR with information that documents that the implementation of a program or practices to measure farm-gate deliveries using Best Professional Practices is not locally cost- effective. Reporting is mandatory (local cost-effectiveness does not apply) for those suppliers that provide water to at least 25,000 irrigated acres, excluding acres that receive only recycled water, and for those providing water to 10,000 or more irrigated acres but less than 25,000 irrigated acres, when funding is provided for the purpose of measurement.

B4.4 Reporting Required Information

Suppliers must submit to DWR the required information listed below using the *Aggregated Farm-Gate Delivery Reporting Format for Article 2 (Rev. 8-28-2013)* (see Figure 3 in Appendix B.8)

- Report basic information about the Supplier.
- Report the Supplier representative's contact information.
- Report of the monthly or bimonthly aggregated farm-gate deliveries by groundwater basin or sub-basin, and to identify the Best Professional Practices used
- Provide DWR with comments and explanations if the implementation of a farm-gate measurement program or practices using Best Professional Practices is not locally cost effective.

B4.5 Information on "Best Professional Practices" and "Not Locally Cost-Effective" for purpose of Suppliers <10,000 irrigated acres to comply with AB 1404

AB1404 defines "Best Professional Practices" as *"Practices attaining and maintaining accuracy of measurement and reporting devices and methods*". It does not specify any method of measurement. The Water Code defines "Not Locally Cost-Effective" as *"The present value of the local benefits of implementing a water demand management measure is less than the present value of the local costs of implementing that measure"*. The Water Code does not require DWR to develop any methods, or standards on "Best Professional Practices" or "Not Locally Cost-Effective", nor does it to require Suppliers

to use any specific water measurement methods. The Water Code does not require DWR to evaluate or review any information provided by Suppliers.

As technical assistance to Suppliers, DWR is providing different sources of information on “Best Professional Practices” and “Not Locally Cost-Effective” to Suppliers.

The final report, “Independent Panel on Appropriate Measurement of Agricultural Water Use” (September 2003) contains information pertaining to farm-gate deliveries that could help a local Supplier in gaining more understanding about measurement programs and practices and their accuracies. It also includes some information related to costs and benefits of measurement programs and practices that might be helpful. The report can be found at ucanr.edu/sites/groundwater/files/136342.pdf.

B4.6 Submitting the Annual Report

The completed form must be submitted electronically to DWR annually by April 1. The completed forms should be submitted to DWR through the on-line submittal tool at wuedata.water.ca.gov.

B5. Legislative History, Current Legislation and Regulations, and Related Programs

B5.1 Legislative History

Agricultural Water Management Planning Act of 1986 (AB 1658)

AB 1658 (1986) required all Suppliers delivering over 50,000 acre-feet of water per year to prepare an Information Report and identify whether the district has a significant opportunity to conserve water or reduce the quantity of saline or toxic drainage water through improved irrigation water management. The legislation applied to the 80 largest Suppliers in California. The districts that had a significant opportunity to conserve water or reduce drainage were required to prepare water management plans. The legislation required that DWR provide funding to the Suppliers to prepare informational reports and for the preparation of water management plans. This legislation was required to sunset on January 1, 1993.

AB 3616 Agricultural Efficient Water Management Act of 1990

This legislation required DWR to establish an advisory committee consisting of state, federal, and local agencies; agricultural communities, California university system; environmental and public interest groups; and other interested parties to develop a list of efficient water management practices for Suppliers. In addition, then California

Governor Pete Wilson directed the AB 3616 Advisory Committee to develop a Memorandum of Understanding between the agricultural and environmental communities and other interested parties to further address efficient use of agricultural water in California.

Water Code Section 531.1 - AB 1404 (2007) Water Measurement Information

AB 1404 requires Suppliers to submit to DWR an annual report that includes measured aggregated farm-gate deliveries data on a monthly or bi-monthly basis. The submittals are also to include farm-gate measurement programs or practices to document implementation of "Best Professional Practices" (BMPs). If water measurement is not locally cost-effective, then the Supplier may provide supporting documentation to DWR.

B5.2 Current Legislation and Regulations

AB 1668 (Friedman, Statute of 2018) – amended Water Code Section 531.10 *et seq.* and Water Code Section 10820 *et seq.*

SB X7-7 Water Conservation (Steinberg, Statute of 2009)

Agricultural Water Measurement (Title 23 California Code of Regulations, Section 597 *et seq., 2011*)

B5.3 Related Programs

California Water Plan 2023 Update
water.ca.gov/Programs/California-Water-Plan/Update-2023

SGMA Groundwater Management
water.ca.gov/Programs/Groundwater-Management/SGMA-Groundwater-Management

Integrated Regional Water Management Plans
water.ca.gov/Programs/Integrated-Regional-Water-Management

Bureau of Reclamation Water Central Valley Project
usbr.gov/mp/cvp-water

Bureau of Reclamation RRA Plans
usbr.gov/rra

Bureau of Reclamation 2008 Conservation Efficiency Standards (PL 102-575)
usbr.gov/mp/cvpia/docs/public-law-102-575.pdf

B6. Code Pertaining to Agricultural Water Suppliers

B6.1 Water Code

Section 531.10 of the Water Code:

531.10.

(a) (1) An agricultural water supplier shall submit an annual report to the department that summarizes aggregated farm-gate delivery data, on a monthly or bimonthly basis, using best professional practices. The annual report for the prior year shall be submitted to the department by April 1 of each year. The annual report shall be organized by basin, as defined in Section 10721, within the service area of the agricultural water supplier, if applicable.

(2) The report, and any amendments to the report, submitted to the department pursuant to this subdivision shall be submitted electronically and shall include any standardized forms, tables, or displays specified by the department.

(3) The department shall post all reports on its Internet Web site in a manner that allows for comparisons across water suppliers. The department shall make the reports available for public viewing in a timely manner after it receives them.

(b) Nothing in this article shall be construed to require the implementation of water measurement programs or practices that are not locally cost effective.

(c) It is the intent of the Legislature that the requirements of this section shall complement and not affect the scope of authority granted to the department or the board by provisions of law other than this article.

Section 10608.48 of the Water Code:

10608.48. (a) On or before July 31, 2012, an agricultural water supplier shall implement efficient water management practices pursuant to subdivisions (b) and (c).

(b) Agricultural water suppliers shall implement both of the following critical efficient management practices:

(1) Measure the volume of water delivered to customers with sufficient accuracy to comply with subdivision (a) of Section 531.10 and to implement paragraph (2).

(2) Adopt a pricing structure for water customers based at least in part on quantity delivered.

(c) Agricultural water suppliers shall implement additional efficient management practices, including, but not limited to, practices to accomplish all of the following, if the measures are locally cost effective and technically feasible:

(1) Facilitate alternative land use for lands with exceptionally high water duties or whose irrigation contributes to significant problems, including drainage.

(2) Facilitate use of available recycled water that otherwise would not be used beneficially, meets all health and safety criteria, and does not harm crops or soils.

(3) Facilitate the financing of capital improvements for on-farm irrigation systems.

(4) Implement an incentive pricing structure that promotes one or more of the following goals:

(A) More efficient water use at the farm level.

(B) Conjunctive use of groundwater.

(C) Appropriate increase of groundwater recharge.

(D) Reduction in problem drainage.

(E) Improved management of environmental resources.

(F) Effective management of all water sources throughout the year by adjusting seasonal pricing structures based on current conditions.

(5) Expand line or pipe distribution systems, and construct regulatory reservoirs to increase distribution system flexibility and capacity, decrease maintenance, and reduce seepage.

(6) Increase flexibility in water ordering by, and delivery to, water customers within operational limits.

(7) Construct and operate supplier spill and tailwater recovery systems.

(8) Increase planned conjunctive use of surface water and groundwater within the supplier service area.

(9) Automate canal control structures.

(10) Facilitate or promote customer pump testing and evaluation.

(11) Designate a water conservation coordinator who will develop and implement the water management plan and prepare progress reports.

(12) Provide for the availability of water management services to water users. These services may include, but are not limited to, all of the following:

(A) On-farm irrigation and drainage system evaluations.

(B) Normal year and real-time irrigation scheduling and crop evapotranspiration information.

(C) Surface water, groundwater, and drainage water quantity and quality data.

(D) Agricultural water management educational programs and materials for farmers, staff, and the public.

(13) Evaluate the policies of agencies that provide the supplier with water to identify the potential for institutional changes to allow more flexible water deliveries and storage.

(14) Evaluate and improve the efficiencies of the supplier's pumps.

(d) Agricultural water suppliers shall include in the agricultural water management plans required pursuant to Part 2.8 (commencing with Section 10800) a report on which efficient water management practices have been implemented and are planned to be implemented, an estimate of the water use efficiency improvements that have occurred since the last report, and an estimate of the water use efficiency improvements estimated to occur five and 10 years in the future. If an agricultural water supplier determines that an efficient water management practice is not locally cost effective or technically feasible, the supplier shall submit information documenting that determination.

(e) The department shall require information about the implementation of efficient water management practices to be reported using a standardized form developed pursuant to Section 10608.52.

(f) An agricultural water supplier may meet the requirements of subdivisions (d) and (e) by submitting to the department a water conservation plan submitted to the United States Bureau of Reclamation that meets the requirements described in Section 10828.

(g) On or before December 31, 2013, December 31, 2016, and December 31, 2021, the department, in consultation with the board, shall submit to the Legislature a report on the agricultural efficient water management practices that have been implemented and are planned to be implemented and an assessment of the manner in which the implementation of those efficient water management practices has affected and will affect agricultural operations, including estimated water use efficiency improvements, if any.

(h) The department may update the efficient water management practices required pursuant to subdivision (c), in consultation with the Agricultural Water Management Council, the United States Bureau of Reclamation, and the board. All efficient water management practices for agricultural water use pursuant to this chapter shall be adopted or revised by the department only after the department conducts public hearings to allow participation of the diverse geographical areas and interests of the state.

(i) (1) The department shall adopt regulations that provide for a range of options that agricultural water suppliers may use or implement to comply with the measurement requirement in paragraph (1) of subdivision (b).

(2) The initial adoption of a regulation authorized by this subdivision is deemed to address an emergency, for purposes of Sections 11346.1 and 11349.6 of the Government Code, and the department is hereby exempted for that purpose from the requirements of subdivision (b) of Section 11346.1 of the Government Code. After the initial adoption of an emergency regulation pursuant to this subdivision, the department shall not request approval from the Office of Administrative Law to readopt the regulation as an emergency regulation pursuant to Section 11346.1 of the Government Code.

Section 10801 of the Water Code:

10801. The Legislature finds and declares all of the following:
(a) The waters of the state are a limited and renewable resource.

(b) The California Constitution requires that water in the state be used in a reasonable and beneficial manner.

(c) The efficient use of agricultural water supplies is of great statewide concern.

(d) There is a great amount of reuse of delivered water, both inside and outside the water service areas of agricultural water suppliers.

(e) Significant noncrop beneficial uses are associated with agricultural water use, including the preservation and enhancement of fish and wildlife resources.

(f) Significant opportunities exist in some areas, through improved irrigation water management, to conserve water or to reduce the quantity of highly saline or toxic drainage water.

(g) Changes in water management practices should be carefully planned and implemented to minimize adverse effects on other beneficial uses currently being served.

(h) Agricultural water suppliers that receive water from the federal Central Valley Project are required by federal law to prepare and implement water conservation plans.

(i) Agricultural water users applying for a permit to appropriate water from the board are required to prepare and implement water conservation plans.

Section 10802 of the Water Code:

10802. The Legislature finds and declares that all of the following are the policies of the state:

(a) The efficient use of water shall be pursued actively to protect both the people of the state and the state's water resources.

(b) The efficient use of agricultural water supplies shall be an important criterion in public decisions with regard to water.

(c) Agricultural water suppliers shall be required to prepare water management plans to achieve greater efficiency in the use of water.

Section 10820 of the Water Code:

10820. (a) (1) Except as provided in paragraph (2), an agricultural water supplier shall prepare and adopt an agricultural water management plan in the manner set forth in this chapter on or before December 31, 2012, and shall update that plan on December 31, 2015.

(2) (A) The agricultural water management plan shall be updated on or before April 1, 2021, and thereafter on or before April 1 in the years ending in six and one. The plan shall satisfy the requirements of Section 10826.

(B) An agricultural water supplier shall submit its plan to the department no later than 30 days after the adoption of the plan. The plan shall be submitted electronically and shall include any standardized forms, tables, or displays specified by the department.

(b) (1) The department shall review each plan that is due pursuant to paragraph (2) of subdivision (a). The department may coordinate its review with the Department of Food and Agriculture and the board.

(2) The department shall notify an agricultural water supplier that it is not in compliance with this part if the department determines that actions are required to comply with the requirements of this part or if a supplier fails to update a plan as provided in paragraph (2) of subdivision (a). The department shall identify the specific deficiencies and the supplier shall have 120 days to remedy an identified deficiency. The department may provide additional time to remedy a deficiency if it finds that a supplier is making substantial progress toward remedying the deficiency. An agricultural water supplier that fails to submit corrective actions or a completed plan shall not be in compliance with this part.

(3) If the department has not received a plan or the department has determined that the plan submitted does not comply with the requirements of this part, and a revised plan has not been submitted, the department may undertake the following actions:

(A) Contract with a state academic institution or qualified entity to prepare or complete an agricultural water management plan on behalf of the supplier. The costs and expenses related to preparation or completion of a plan, including

the costs of the contract and contract administration, shall be recoverable by the department from the supplier.

(B) If a supplier does not provide data necessary for the preparation or completion of a plan to the department or the contracting entity as determined by the department in accordance with subparagraph (A), the department may assess a fine of one thousand dollars ($1,000) per day, not to exceed twenty-five thousand dollars ($25,000), until data is made available.

(4) (A) A plan prepared or completed pursuant to paragraph (3) shall be deemed the adopted plan for the supplier.

(B) Any action to challenge or invalidate the adequacy of the plan prepared or completed pursuant to paragraph (3) shall be brought against the supplier for whom the plan was prepared.

(c) Every supplier that becomes an agricultural water supplier after December 31, 2012, shall prepare and adopt an agricultural water management plan within one year after the date it has become an agricultural water supplier.

(d) A water supplier that indirectly provides water to customers for agricultural purposes shall not prepare a plan pursuant to this part without the consent of each agricultural water supplier that directly provides that water to its customers.

Section 10825 of the Water Code:

10825. (a) It is the intent of the Legislature in enacting this part to allow levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

(b) This part does not require the implementation of water use efficiency programs or practices that are not locally cost effective.

Section 10826 of the Water Code:

10826. An agricultural water management plan shall be adopted in accordance with this chapter. The plan shall do all of the following:

(a) Describe the agricultural water supplier and the service area, including all of the following:

(1) Size of the service area.

(2) Location of the service area and its water management facilities.

(3) Terrain and soils.

(4) Climate.

(5) Operating rules and regulations.

(6) Water delivery measurements or calculations.

(7) Water rate schedules and billing.

(8) Water shortage allocation policies.

(b) Describe the quantity and quality of water resources of the agricultural water supplier, including all of the following:

(1) Surface water supply.

(2) Groundwater supply.

(3) Other water supplies, including recycled water.

(4) Source water quality monitoring practices.

(5) Water uses within the agricultural water supplier's service area, including all of the following:

(A) Agricultural.

(B) Environmental.

(C) Recreational.

(D) Municipal and industrial.

(E) Groundwater recharge, including estimated flows from deep percolation from irrigation and seepage.

(c) Include an annual water budget based on the quantification of all inflow and outflow components for the service area of the agricultural water supplier. Components of inflow shall include surface inflow, groundwater pumping in the service area, and effective precipitation. Components of outflow shall include surface outflow, deep percolation, and evapotranspiration. An agricultural water supplier shall report the annual water budget on a water-year basis. The department shall provide tools and resources to assist agricultural water suppliers in developing and quantifying components necessary to develop a water budget.

(d) Include an analysis, based on available information, of the effect of climate change on future water supplies.

(e) Describe previous water management activities.

(f) Identify water management objectives based on the water budget to improve water system efficiency or to meet other water management objectives. The agricultural water

supplier shall identify, prioritize, and implement actions to reduce water loss, improve water system management, and meet other water management objectives identified in the plan.

(g) Include in the plan information regarding efficient water management practices required pursuant to Section 10608.48.

(h) Quantify the efficiency of agricultural water use within the service area of the agricultural water supplier using the appropriate method or methods from among the four water use efficiency quantification methods developed by the department in the May 8, 2012, report to the Legislature entitled “A Proposed Methodology for Quantifying the Efficiency of Agricultural Water Use.” The agricultural water supplier shall account for all water uses, including crop water use, agronomic water use, environmental water use, and recoverable surface flows.

Section 10826.2 of the Water Code:

10826.2. As part of its agricultural water management plan, each agricultural water supplier shall develop a drought plan for periods of limited water supply describing the actions of the agricultural water supplier for drought preparedness and management of water supplies and allocations during drought conditions. The drought plan shall contain both of the following:

(a) Resilience planning, including all of the following:

(1) Data, indicators, and information needed to determine the water supply availability and levels of drought severity.

(2) Analyses and identification of potential vulnerability to drought.

(3) A description of the opportunities and constraints for improving drought resilience planning, including all of the following:

(A) The availability of new technology or information.

(B) The ability of the agricultural water supplier to obtain or use additional water supplies during drought conditions.

(C) A description of other actions planned for implementation to improve drought resilience.

(b) Drought response planning, including all of the following:

(1) Policies and a process for declaring a water shortage and for implementing water shortage allocations and related response actions.

(2) Methods and procedures for the enforcement or appeal of, or exemption from, triggered shortage response actions.

(3) Methods and procedures for monitoring and evaluation of the effectiveness of the drought plan.

(4) Communication protocols and procedures to inform and coordinate customers, the public, interested parties, and local, regional, and state government.

(5) A description of the potential impacts on the revenues, financial condition, and planned expenditures of the agricultural water supplier during drought conditions that reduce water allocations, and proposed measures to overcome those impacts, including reserve-level policies.

Section 10843 of the Water Code:

10843. (a) An agricultural water supplier shall submit to the entities identified in subdivision (b) a copy of its plan no later than 30 days after review of the plan pursuant to subdivision (b) of Section 10820.

(b) An agricultural water supplier shall submit a copy of its plan to each of the following entities:

(1) The department.

(2) Any city, county, or city and county within which the agricultural water supplier provides water supplies.

(3) Any groundwater management entity within which jurisdiction the agricultural water supplier extracts or provides water supplies.

(4) The California State Library.

Section 10845 of the Water Code:

10845. (a) The department shall prepare and submit to the Legislature, on or before April 30, 2022, and thereafter in the years ending in seven and years ending in two, a report summarizing the status of the plans adopted pursuant to this part.

(b) The report prepared by the department shall identify the outstanding elements of any plan adopted pursuant to this part. The report shall include an evaluation of the effectiveness of this part in promoting efficient agricultural water management practices and recommendations relating to proposed changes to this part, as appropriate.

(c) The department shall provide a copy of the report to each agricultural water supplier that has submitted its plan to the department. The department shall also prepare reports and provide data for any legislative hearing designed to consider the effectiveness of plans submitted pursuant to this part.

(d) This section does not authorize the department, in preparing the report, to approve, disapprove, or critique individual plans submitted pursuant to this part.

B6.2 California Code of Regulations, Title 23, Section 597 et seq. Agricultural Water Measurement

Section 597. Agricultural Water Measurement

Under the authority included under California Water Code Section 10608.48(i)(1), the Department of Water Resources (Department) is required to adopt regulations that provide for a range of options that agricultural Suppliers may use or implement to comply with the measurement requirements in paragraph (1) of subdivision (b) of Section 10608.48.

For reference, Section 10608.48(b) of the California Water Code states that:

Agricultural water suppliers shall implement both of the following critical efficient management practices:

> (1) Measure the volume of water delivered to customers with sufficient accuracy to comply with subdivision (a) of Section 531.10 and to implement paragraph (2).
>
> (2) Adopt a pricing structure for water customers based at least in part on quantity delivered.

For further reference, Section 531.10(a) of the California Water Code requires that:

(a) (1) An agricultural water supplier shall submit an annual report to the department that summarizes aggregated farm-gate delivery data, on a monthly or bimonthly basis, using best professional practices. The annual report for the prior year shall be submitted to the department by April 1 of each year. The annual report shall be organized by basin, as defined in Section 10721, within the service area of the agricultural water supplier, if applicable.

Notes:

(1) Paragraphs (1) and (2) of Section 10608.48(b) specify agricultural water suppliers' reporting of aggregated farm-gate water delivery and adopting a volumetric water pricing structure as the purposes of water measurement. However, this article only addresses developing a range of options for water measurement.

(2) Agricultural water suppliers reporting agricultural water deliveries measured under this article shall use the “Agricultural Aggregated Farm – Gate Delivery Reporting Format for Article 2” (Rev. 6-20-12), developed for this article and hereby incorporated by reference.

(3) The Department shall report on the availability of new commercially available water measurement technologies and impediments to implementation of this article when reporting to the Legislature the status of adopted Agricultural Water Management

Plans in plan submittal years 2012, 2015 and every five years thereafter as required by California Water Code Section 10845. The Department shall also report the findings to the California Water Commission.

Note: Authority cited: Section 10608.48, Water Code. Reference: Sections 531.10, 10608.48 (b), 10608.48 (i), 10608.52 (b) and 10845 Water Code.

Section 597.1. Applicability

(a) An agricultural water supplier providing water to 25,000 irrigated acres or more, excluding acres that receive only recycled water, is subject to this article.

(b) A wholesale agricultural water supplier providing water to another agricultural water supplier (the receiving water supplier) for ultimate resale to customers is subject to this article at the location at which control of the water is transferred to the receiving water supplier. However, the wholesale agricultural water supplier is not required to measure the receiving agricultural water supplier's deliveries to its customers.

(c) A water supplier providing water to wildlife refuges or habitat lands where (1) the refuges or habitat lands are under a contractual relationship with the water supplier, and (2) the water supplier meets the irrigated acreage criteria of Water Code Section 10608.12(a), is subject to this article.

(d) An agricultural water supplier providing water to less than 10,000 irrigated acres, excluding acres that receive only recycled water, is not subject to this article.

(e) An agricultural water supplier providing water to 10,000 or more irrigated acres but less than 25,000 irrigated acres, excluding acres that receive only recycled water, is not subject to this article unless sufficient funding is provided specifically for that purpose, as stated under Water Code Section 10853.

(f) A canal authority or other entity that conveys or delivers water through facilities owned by a federal agency is not subject to this article.

(g) Pursuant to Water Code Section 10608.8(d), an agricultural water supplier “that is a party to the Quantification Settlement Agreement, as defined in subdivision (a) of Section 1 of Chapter 617 of the Statutes of 2002, during the period within which the Quantification Settlement Agreement remains in effect,” is not subject to this article.

(h) Pursuant to Water Code Section 10608.12(a), the Department is not subject to this article.

Note: Authority cited: Section 10608.48, Water Code. Reference: Section 10608.12 (a), 10608.48 (d), 10608.48 (f), 10828, and 10853 Water Code.

Section 597.2. Definitions

(a) For purposes of this article, the terms used are defined in this section.

(1) “Accuracy” means the measured volume relative to the actual volume, expressed as a percent. The percent shall be calculated as 100 x (measured value – actual value) / actual value, where “measured value” is the value indicated by the device or determined through calculations using a measured value by the device, such as flow rate, combined with a duration of flow, and “actual value” is the value as determined through laboratory, design or field testing protocols using best professional practices.

(2) “Agricultural water supplier,” as defined in Water Code Section 10608.12(a), means a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding acres that receive only recycled water. “Agricultural water supplier” includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells water for ultimate resale to customers. “Agricultural water supplier” does not include the Department.

(3) "Approved by an engineer" means a California-registered Professional Engineer has reviewed, signed and stamped the plans, design, testing, inspection, and/or documentation report for a measurement device as described in this article.

(4) “Best professional practices” means practices attaining to and maintaining accuracy of measurement and reporting devices and methods described in this article, such as operation and maintenance procedures and practices recommended by measurement device manufacturers, designers, and industry professionals.

(5) “Customer” means the purchaser of water from an agricultural water supplier who has a contractual arrangement with the agricultural water supplier for the service of conveying water to the customer delivery point.

(6) “Delivery point” means the location at which the agricultural water supplier transfers control of delivered water to a customer or group of customers. In most instances, the transfer of control occurs at the farm-gate, which is therefore, a delivery point.

(7) “Existing measurement device,” means a measurement device that was installed in the field prior to the effective date of this article.

(8) “Farm-gate,” as defined in Water Code Section 531(f), means the point at which water is delivered from the agricultural water supplier’s distribution system to each of its customers.

(9) “Irrigated acres,” for purposes of applicability of this article, is calculated as the average of the previous five-year acreage within the agricultural water supplier’s service area that has received irrigation water from the agricultural water supplier.

(10) “Manufactured device” means a device that is manufactured by a commercial enterprise, often under exclusive legal rights of the manufacturer, for direct off-the-shelf purchase and installation. Such devices are capable of directly measuring flow

rate, velocity, or accumulating the volume of water delivered, without the need for additional components that are built on-site or in-house.

(11) “Measurement device” means a device by which an agricultural water supplier determines the numeric value of flow rate, velocity or volume of the water passing a designated delivery point. A measurement device may be a manufactured device, on-site built device or in-house built device.

(12) "New or replacement measurement device" means a measurement device installed after the effective date of this article.

(13) “Recycled water” is defined in subdivision (n) of Section 13050 of the Water Code as water that, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is therefore considered a valuable resource.

(14) “Type of device” means a measurement device that is manufactured or built to perform similar functions. For example, rectangular, v-notch, and broad crested weirs are one type of device. Similarly, all submerged orifice gates are considered one type of device.

Note: Authority cited: Section 10608.48, Water Code. Reference: Section 10608.12 (a), 10608.12 (m), 10608.48, and 10813 Water Code.

Section 597.3 Range of Options for Agricultural Water Measurement

An agricultural water supplier subject to this article shall measure surface water and groundwater that it delivers to its customers pursuant to the accuracy standards in this section. The supplier may choose any applicable single measurement option or combination of options listed in paragraphs (a) *or (b) of this section. Measurement device accuracy and operation shall be certified, tested, inspected and/or analyzed as described in Section 597.4 of this article.*

(a) Measurement Options at the Delivery Point or Farm-gate of a Single Customer

An agricultural water supplier shall measure water delivered at the delivery point or farm-gate of a single customer using one of the following measurement options. The stated numerical accuracy for each measurement option is for the volume delivered. If a device measures a value other than volume, for example, flow rate, velocity or water elevation, the accuracy certification must incorporate the measurements or calculations required to convert the measured value to volume as described in Section 597.4(e).

(1) An existing measurement device shall be certified to be accurate to within ±12% by volume. and,

(2) A new or replacement measurement device shall be certified to be accurate to within:

(A) ±5% by volume in the laboratory if using a laboratory certification.

(B) ±10% by volume in the field if using a non-laboratory certification.

(b) Measurement Options at a Location Upstream of the Delivery Points or Farm-gates of Multiple Customers

(1) An agricultural water supplier may measure water delivered at a location upstream of the delivery points or farm-gates of multiple customers using one of the measurement options described in Section 597.3(a) if the downstream individual customer's delivery points meet either of the following conditions:

(A) The agricultural water supplier does not have legal access to the delivery points of individual customers or group of customers needed to install, measure, maintain, operate, and monitor a measurement device.

Or,

(B) An engineer determines that, due to small differentials in water level or large fluctuations in flow rate or velocity that occur during the delivery season at a single farm-gate, accuracy standards of measurement options in Section 597.3(a) cannot be met by installing a measurement device or devices (manufactured or on-site built or in-house built devices with or without additional components such as gauging rod, water level control structure at the farm- gate, etc.). If conditions change such that the accuracy standards of measurement options in Section 597.3(a) at the farm-gate can be met, an agricultural water supplier shall include in its Agricultural Water Management Plan, a schedule, budget and finance plan to demonstrate progress to measure water at the farm-gate in compliance with Section 597.3(a) of this article.

(2) An agricultural water supplier choosing an option under paragraph (b)(1) of this section shall provide the following current documentation in its Agricultural Water Management Plan(s) submitted pursuant to Water Code Section 10826:

(A) When applicable, to demonstrate lack of legal access at delivery points of individual customers or group of customers downstream of the point of measurement, the agricultural water supplier's legal counsel shall certify to the Department that it does not have legal access to measure water at customers delivery points and that it has sought and been denied access from its customers to measure water at those points.

(B) When applicable, the agricultural water supplier shall document the water measurement device unavailability and that the water level or flow conditions described in Section 597.3(b)(1)(B) exist at individual customer's delivery points downstream of the point of measurement as approved by an engineer.

(C) The agricultural water supplier shall document all of the following criteria about the methodology it uses to apportion the volume of water delivered to the individual downstream customers:

(i) How it accounts for differences in water use among the individual customers based on but not limited to the duration of water delivery to the individual customers, annual customer water use patterns, irrigated acreage, crops planted, and on-farm irrigation system, and;

(ii) That it is sufficient for establishing a pricing structure based at least in part on the volume delivered,

and;

(iii) *That it was approved by the agricultural water supplier's governing board or body.*

Note: Authority cited: Section 10608.48, Water Code. Reference: Section 531.10, 10608.48 (i) (1), and 10826 Water Code.

Section 597.4 Accuracy Certification, Records Retention, Device Performance, and Reporting

(a) Initial Certification of Device Accuracy

The accuracy of an existing, new or replacement measurement device or type of device, as required in Section 597.3, shall be initially certified and documented as follows:

(1) For existing measurement devices, the device accuracy required in Section 597.3(a) shall be initially certified and documented by either:

(A) Field-testing that is completed on a random and statistically representative sample of the existing measurement devices as described in

Section 597.4(b)(1) and Section 597.4(b)(2). Field-testing shall be performed by individuals trained in the use of field-testing equipment, and documented in a report approved by an engineer.

Or,

(B) Field-inspections and analysis completed for every existing measurement device as described in Section 597.4(b)(3). Field-inspections and analysis

shall be performed by trained individuals in the use of field inspection and analysis, and documented in a report approved by an engineer.

(2) For new or replacement measurement devices, the device accuracy required in Section 597.3 (a)(2) shall be initially certified and documented by either:

(A) Laboratory Certification prior to installation of a measurement device as documented by the manufacturer or an entity, institution or individual that tested the device following industry-established protocols such as the National Institute for Standards and Testing (NIST) traceability standards.

Documentation shall include the manufacturer's literature or the results of laboratory testing of an individual device or type of device.

Or,

(B) Non-Laboratory Certification after the installation of a measurement device in the field, as documented by either:

(i) An affidavit approved by an engineer submitted to the agricultural water supplier of either (1) the design and installation of an individual device at a specified location, or (2) the standardized design and installation for a group of measurement devices for each type of device installed at specified locations. Or,

(ii) A report submitted to the agricultural water supplier and approved by an engineer documenting the field-testing performed on the installed measurement device or type of device, by individuals trained in the use of field testing equipment.

(b) Protocols for Field-Testing and Field-Inspection and Analysis of Existing Devices

(1) Field-testing shall be performed for a sample of existing measurement devices according to manufacturer's recommendations or design specifications and following best professional practices. It is recommended that the sample size be no less than 10% of existing devices, with a minimum of 5, and not to exceed 100 individual devices for any particular device type. Alternatively, the supplier may develop its own sampling plan using an accepted statistical methodology.

(2) If during the field-testing of existing measurement devices, more than one quarter of the samples for any particular device type do not meet the criteria pursuant to Section 597.3(a), the agricultural water supplier shall provide in its Agricultural Water Management Plan, a plan to test an additional 10% of its existing devices, with a minimum of 5, but not to exceed an additional 100 individual devices for the particular device type. This second round of field-testing and corrective actions shall be completed within three years of the initial field- testing.

(3) Field-inspections and analysis protocols shall be performed and the results shall be approved by an engineer for every existing measurement device to demonstrate that the design and installation standards used for the installation of existing measurement devices meet the accuracy standards of Section 597.3(a) and operation and maintenance protocols meet best professional practices.

(c) Records Retention

Records documenting compliance with the requirements in Section 597.3 and Section 597.4 shall be maintained by the agricultural water supplier for ten years or two Agricultural Water Management Plan cycles.

(d) Performance Requirements

(1) All measurement devices shall be correctly installed, maintained, operated, inspected, and monitored as described by the manufacturer, the laboratory or the registered Professional Engineer that has signed and stamped certification of the device, and pursuant to best professional practices.

(2) If an installed measurement device no longer meets the accuracy requirements of Section 597.3(a) based on either field-testing or field-inspections and analysis as defined in Section 597.4 (a) and (b) for either the initial accuracy certification or during operations and maintenance, then the agricultural water supplier shall take appropriate corrective action, including but not limited to, repair or replacement to achieve the requirements of this article.

(e) Reporting in Agricultural Water Management Plans

Agricultural water suppliers shall report the following information in their Agricultural Water Management Plan(s):

(1) Documentation as required to demonstrate compliance with Section 597.3 (b), as outlined in Section 597.3(b)(2), and Section 597.4(b)(2).

(2) A description of best professional practices about, but not limited to, the (1) collection of water measurement data, (2) frequency of measurements, (3) method for determining irrigated acres, and (4) quality control and quality assurance procedures.

(3) If a water measurement device measures flow rate, velocity or water elevation, and does not report the total volume of water delivered, the agricultural water supplier must document in its Agricultural Water Management Plan how it converted the measured value to volume. The protocols must follow best professional practices and include the following methods for determining volumetric deliveries:

(A) For devices that measure flow-rate, documentation shall describe protocols used to measure the duration of water delivery where volume is derived by the following formula: Volume = flow rate x duration of delivery.

(B) For devices that measure velocity only, the documentation shall describe protocols associated with the measurement of the cross-sectional area of flow and duration of water delivery, where volume is derived by the following formula: Volume = velocity x cross-section flow area x duration of delivery.

(C) For devices that measure water elevation at the device (e.g. flow over a weir or differential elevation on either side of a device), the documentation shall describe protocols associated with the measurement of elevation that was used to derive flow rate at the device. The documentation will also describe the method or formula used to derive volume from the measured elevation value(s).

(4) If an existing water measurement device is determined to be out of compliance with Section 597.3, and the agricultural water supplier is unable to bring it into compliance before submitting its Agricultural Water Management Plan in December 2012, the agricultural water supplier shall provide in its 2012 plan, a schedule, budget and finance plan for taking corrective action in three years or less.

Note: Authority cited: Section 10608.48, Water Code. Reference: Section 531.10, 10608.48 (i) (1), and 10826 Water Code.

B7. 2018 Aggregated Farm-gate Delivery Reporting Form

State of California | The Natural Resources Agency | Department of Water Resources

Agricultural Aggregated Farm-Gate[1] Delivery Reporting Form for Article 2

Title 23, Division 2, Chapter 5.1, Article 2 of the CCR requires water supplier subject to the regulation to report to DWR the previous calendar year's aggregated farm gate delivery by April 1 of the subsequent year

1. Water Supplier Information

Name:

Address:

Phone Number:

Fax:

Total Number of Farm-Gates:

Number of Measured Farm-Gates:

Irrigated Acreage for Reporting Period:

Total Service Area Acreage:

2. Contact information

Name:

Title:

Address:

Phone Number:

Fax:

E-mail:

Submittal date:

Reporting year:

3. Aggregated Farm-Gate Delivery Data[2]: (*provide monthly or bimonthly data,acre-feet,by one groundwater basin or sub-basin per row*)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	**Total**
Basin/SubBasin Number:													
TOTAL													

	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec	**Total**
Basin/SubBasin Number:							
TOTAL							

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4. Explanations, Comments and Best Professional Practices[3]:

Note: An agricultural water supplier's total water use may be different from Aggregated Farm-Gate deliveries because measurement at these points may not account for other practices (such as groundwater recharge/conjunctive use, water transfers, wheeling to other agencies, urban use, etc).

1. "Farm-gate" means the point at which water is delivered from the agricultural water supplier's distribution system to each of its individual customers as specified in the Agricultural Water Measurement Regulation (Title 23, Division 2, Chapter 5.1, Article 2 of the CCR).

2. "Aggregated farm-gate delivery data" means information reflecting the total volume of water an agricultural water supplier provides to its customers and is calculated by totaling its deliveries to customers. Data shall be organized by basin or sub-basin per Water Code Secion 531.10(a)(1). See DWR Bulletin 118 for list of groundwater basins and sub-basins.
3. "Best Professional Practices" is defined in Title 23, Division 2, Chapter 5.1, Article 2 of the CCR, Section 597.2.

Available at tiny.cc/AFGDR_Reporting_Form.

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Appendix C – Possible Approach to Demonstrate Reduced Delta Reliance

C1. Introduction

An agricultural water supplier that anticipates participating in or receiving water from a proposed project ("covered action"[3]), such as a multi-year water transfer, conveyance facility, or new diversion that involves transferring water through, exporting water from, or using water in the Sacramento-San Joaquin Delta (Delta) Delta should consider providing information in their AWMPs beginning in 2015 that can then be used in the covered action process to demonstrate consistency with the Delta Plan policy WR P1, Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance (23 CCR Section 5003).

Suppliers who provide water to more than 25,000 irrigated acres are required to describe their water management programs in an agricultural water management plan (AWMP), prepared every five years in conformance with SB X7-7 Water Conservation (Steinberg, Statute of 2009). Each AWMP must be adopted by the Supplier Governing Board and submitted to the California Department of Water Resources (DWR). The AWMPs must include reports on the implementation status of specific "Efficient Water Management Practices" (EWMPs) required under the Act.

As such, the AWMP has been identified by the Delta Stewardship Council (DSC) as a tool to demonstrate consistency with the Delta Plan's policy to reduce reliance on the Delta for a Supplier that carries out or takes part in a "covered action".

This appendix provides a possible approach for a Supplier to demonstrate a measurable reduction in reliance on Delta water supplies. Specific elements of this appendix include:

- Background: Delta Reform Act policy goal of "reduced reliance" and the role of water conservation and overview of the Delta Plan and Policy WR P1; and
- Example Approach to Demonstrating a Measurable Reduction in Reliance on the Delta: A description of a possible approach to demonstrate a measurable reduction in reliance on Delta water supplies including example data and results.

[3] Cal. Code Regs., tit. 23, 5001, subd. (j): A "Covered action" is defined as "an activity which may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment, or a reasonably foreseeable

indirect physical change in the environment … “directly undertaken by any public agency””(Pub. Resources Code, Section 21065) that (i) will occur, in whole or in part, within the boundaries of the Delta or Suisun Marsh, (ii) will be carried out, approved, or funded by the state or a local public agency, (iii) is covered by one or more provisions of the Delta Plan, and (iv) will have a significant impact on achievement of one or both of the coequal goals or the implementation of government-sponsored flood control programs to reduce risks to people, property, and state interest in the Delta.”

C2. Background

C2.1 The Delta Reform Act

In the Sacramento-San Joaquin Delta Reform Act of 2009 (Delta Reform Act), created by Senate Bill (SB) 1X7, the Legislature established the coequal goals for the Delta of "providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem" (California Public Resources Code, Section 29702; Water Code Section 85054). These coequal goals must be achieved "in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place" (Water Code Section 85054).

The Delta Reform Act also includes a state policy to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation and water use efficiency:

The policy of the State of California is to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. Each region that depends on water from the Delta watershed shall improve its regional self-reliance for water through investment in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts (Water Code Section 85021).

Agricultural EWMPs can help save water, which in some cases can help reduce the amount of water needed from various water sources. The use of these water management measures, combined with alternative sources of supply, may help local water suppliers reduce their reliance on water from the Delta.

C2.2 The Delta Stewardship Council's Delta Plan

In addition to setting the coequal goals, the Delta Reform Act also created the DSC, which is tasked with furthering the state's coequal goals for the Delta through development of a Delta Plan (Water Code, Section 85300, subd. (a), 85302, subd. (a)). While the Delta Reform Act and the Delta Plan are often referred to interchangeably, the Delta Reform Act contains a variety of directives for multiple agencies, whereas the Delta Plan, as discussed in more detail below, established regulations which "covered actions" are subject to. The Delta Plan is a comprehensive, long-term resource management plan for the Delta, containing both regulatory policies and recommendations, aimed at furthering the coequal goals and promoting a healthy Delta ecosystem (Water Code Section 85059, 85300, subd. (a), 85302, subd. (a)).

The Delta Plan provides for a distinct regulatory process for activities that qualify as "covered actions." The Delta Reform Act established a self- certification process for demonstrating consistency of "covered actions" with the Delta Plan (Water Code Section 85225). State and local agencies proposing "covered actions," prior to initiating the implementation of that action, must prepare a written certification of consistency with detailed findings as to whether the covered action is consistent with applicable Delta Plan policies and must submit that certification to the DSC (Water Code Section 85225).

C2.3 Policy WR P1

Policy WR P1 of the Delta Plan is relevant to a Supplier that is participating in or carrying out a proposed covered action or receiving Delta water from a proposed covered action. Examples of such covered actions include multi-year water transfers, conveyance facilities, or new diversions that involve transferring water through, exporting water from, or using water in Delta. WR P1 states that water shall not be exported from, transferred through, or used in the Delta if all of the following apply:

(a) One or more water suppliers that would receive water as a result of the export, transfer, or use have failed to adequately contribute to reduced reliance on the Delta and improved regional self-reliance consistent with all of the requirements listed in paragraph (1) of subsection (c);

(b) That failure has significantly caused the need for the export, transfer, or use; and

(c) The export, transfer, or use would have a significant adverse environmental impact in the Delta.

Section (c)(1) of Policy WR P1 states that Suppliers that have (A) completed an agricultural water management plan, (B) implemented the efficiency measures in that plan, and (C) shown a measurable reduced reliance on Delta supplies in the plan, are consistent with the policy of reducing reliance on the Delta.

C3. Example Approach to Demonstrating a Measurable Reduction in Reliance on the Delta

Much of the information already reported in AWMPs may likely be used to support documentation of consistency with WR P1. However, water suppliers may want to consider the data requirements of Sections (c)(1)(A) and (c)(1)(B) and provide additional narrative to the information already provided in the AWMPs when addressing topics related to WR P1, such as implementation of efficiency measures. This appendix has been included to provide Suppliers an example approach that can be used to provide

documentation of a measurable reduction in Delta reliance in support of (c)(1)(C) of the policy. This example uses a comparison of historical Delta exports and projected annual exports, incorporating future climate conditions, to demonstrate how a supplier's reliance on waters supplies derived from the Delta has changed. Water suppliers that develop an alternative approach or elect to not provide the data described above should consider providing a narrative in their AWMPs explaining why that decision was made or how their alternative approach meets the requirements of the policy. Suppliers that would receive water from the Delta may provide information related specifically to reduced reliance on Delta water supplies in either a separate attachment or under Section 7 in their discussion of EWMP improvements achieved and planned.

If, by using this example approach or an alternative approach, a water supplier demonstrates a failure to reduce reliance on the Delta, a proposed covered action may still be able to demonstrate consistency with the Delta Plan in their certification if that failure did not cause the need for the project, the covered action would not result in significant adverse environmental impacts on the Delta, or if it is infeasible to demonstrate consistency with WR P1 but the covered action, on whole, is consistent with the coequal goals.

Available Data

A Supplier that prepares an AWMP is encouraged to annually inventory and summarize its irrigation water supplies. This inventory could generally include all water derived from different surface water and groundwater sources. To look at reduced Delta reliance, these data may include water supplies that have moved through the Delta. Delta supplies in this category may consist of water supplies (a) delivered under contract, (b) made available through surplus conditions, and/or (c) acquired through transfer or exchange. These deliveries would then form the baseline for assessing changes in Delta reliance.

Setting a Baseline

To demonstrate reduced reliance on the Delta, water suppliers could first calculate a baseline Delta water use. This baseline would be what the current and projected future Delta water use is compared against in order to demonstrate if Delta water use has increased, decreased, or remains the same.

Some factors to consider in selecting a baseline period:

- **Long Term Average.** A long-term average historic baseline is important because agricultural water use and deliveries are highly variable depending on annual climate, hydrology, crops grown, operational variability, and other factors.

Values for Delta Exports in Table 1, below, demonstrate the range of yearly Delta water use for the example water supplier. How long this baseline period is will depend upon the data available to water suppliers and if there were any substantial historic changes in operations suppliers may wish to eliminate from consideration (e.g., water delivery systems were not fully implemented during the first five years of records and do not reasonably reflect how much Delta water is used in the service area).

- **Consistent, Fixed Baseline Period.** As noted in 23 CCR Section 5003(c)(1)(C), demonstrating reduced reliance on Delta water was anticipated by the DSC to commence with the 2015 AWMPs and expected for each AWMP plan cycle thereafter for those agencies that take part or will take part in a covered action. Using the same, fixed baseline period in each AWMP allows water suppliers to have a consistent value with which current and future Delta water use can be compared. If a rolling average baseline is used (e.g., baseline period extended five years for each AWMP cycle), projected use would be compared against years that already implemented water saving actions for reduced reliance on the Delta; this would not accurately reflect overall reduction in Delta reliance.
- **Baseline Documentation.** It is important that Supplier clearly identify the baseline time period, data sources used, data used, and the rationale for the selected baseline period. Suppliers may also wish to report margins of error or range of variability in their baseline value.

Implementation of Efficient Water Management Practices

23 CCR Section 5003(c)(1)(B) requires that all programs and projects included in the AWMP that are locally cost-effective and technically feasible, which reduce reliance on the Delta, are identified, evaluated, and are being implemented. The required reporting on Efficient Water Management Practices (EWMPS) in the AWMP, pursuant to Water Code Section 10608.48(d), can be used to support this requirement.

However, in the Reduced Delta Reliance Analysis, Suppliers may wish to summarize the implemented or planned for implementation EWMPs and describe or demonstrate the relationship between the EWMPs and reduced Delta reliance. Alternatively, water suppliers may wish to describe or demonstrate the relationship between EWMPs and reduced Delta reliance in the AWMP section where EWMPs are addressed.

Change in Delivery of Delta Water: Current Conditions

Similar to determining the baseline, water suppliers may use their inventory of annual water supplies to calculate average water use from the end of the baseline period to current conditions in order to demonstrate reduced Delta reliance. However, in order to meet the requirements of WR P1, water suppliers will also have to show the expected,

or future projected, reliance on the Delta, especially if the covered action will be implemented at a future date.

Previous and Current AWMPs

If water suppliers did not include this information in their previous AWMPs, one potential approach to showing consistency with this aspect of WR P1 would be for water suppliers to amend their previous AWMPs to include the information that was originally expected by the DSC. The previous AWMP could be amended by adding the same addendum addressing the WR P1 consistency that was developed for the current AWMP. The example in this Appendix is designed to produce those data and information covering the year 2020, as well as subsequent years up to the most recent water management plan. In an effort to provide substantial evidence to demonstrate overall consistency with the Delta Plan's policy on reducing reliance, water suppliers could amend their previous AWMPs concurrent with adoption of their current AWMPs. When amending the previous AWMPs, water suppliers should clearly indicate that the addition of the optional reduced reliance addendum is the only reason for the amendment, and thus the amended current AWMP would not be subject to DWR review. A checklist has been included at the end of this Appendix to assist Suppliers in making sure amendment notifications have been completed in accordance with Water Code.

When amending the previous AWMPs, if the selected baseline was some historic period up to 2010, current conditions could be characterized by averaging the 2011 through 2015 data (see Figure 1). If the selected baseline period was some historic year through 2015, demonstrations of reduced reliance would only include future projections. The Supplier should be clear that they are amending their previous AWMPs only for WR P1 consistency, and this is separate from the adoption of the current AWMP. All public notifications, news publications (Gov Code 6066), and adoption procedures per the Water Code must be adhered to (Section 10821(a), 10841, 10843, 10844).

Current AWMPs

For current AWMPs, it is recommended that the same baseline be used as was used for previous AWMPs. If the selected baseline was some historic period up to 2010, current conditions could be characterized by averaging 2011 through the most current year data available (see Table 2). If the selected baseline was some historic year through 2015, current conditions could be characterized by the average of 2016 through the most current year of data available.

Change in Delivery of Delta Water: Future Water Use Projections Including Climate Change

In order to provide “the expected outcome for measurable reduction in Delta reliance”, the demonstration of reduced reliance will need to include projected future Delta water use. Although projecting future conditions may be replete with complicated variables, Suppliers may attain reasonably available information to address future long-term water use trends. As part of the Sustainable Groundwater Management Act Program, DWR published “Guidance for Climate Change Data Use During Groundwater Sustainability Plan Development” (Guidance).[12] Agriculture water suppliers may use these methodologies to assess future water use under changed climatic conditions.

In 2016, the California Water Commission and DWR published climate change datasets for the Water Storage Investment Program. The datasets allowed for climate change projections based upon numerous factors that projected future conditions in 2030 and 2070. These data were then incorporated into the California Water Resources Simulation Model (CALSIM II) and the Delta Simulation Model (DSM2) in order to project future State Water Project and Central Valley Project performance under changed climatic conditions. These datasets were then provided for future water supply assessments in Groundwater Sustainability Plans. Agriculture water suppliers may apply this same data set in projecting future Delta water use scenarios for inclusion in AWMPs.

Consistent with DWR Guidance, Suppliers may report the average annual volume of water projected to be received from Delta sources as reported in their Groundwater Sustainability Plan or the estimated average annual delivery of water from the Delta as reported in the California Water Commission CALSIM 2030 and 2070 climate change scenarios.

Projected deliveries from the Delta should include all water anticipated for delivery to the agriculture water purveyor from the Delta. More specifically, these deliveries should include contract water supplies (SWP and CVP), supplemental water under existing contracts (SWP Article 21 and CVP Section 215), and other supplies from projected deliveries through the Delta.

[12] DWR, “Guidance for Climate Change Data Use During Groundwater Sustainability Plan Development”, April 2018.

Example

Table 1, below, provides an example representation of an agricultural water supplier's measured water supplies from Delta Supplies, Other Surface Water Supplies, Other Sources, and Groundwater from 1995 through 2018. Delta Supplies, shown in Table 1, incorporate all sources of water that move through the Delta delivered to the agricultural water supplier. These are the values used for determining Delta reliance in this example.

Table 1 – Sample Agricultural Supplier Water Supplies 1995-2018

Water Year	Delta Supplies (Contract, surplus, transfers sources)	Other Surface Water (Local, regional sources)	Groundwater (Local, regional sources)	Other Sources (Reclaimed, reuse sources)	Total
1995	157,215	24,513	81,368	0	263,096
1996	127,894	15,554	154,104	0	297,552
1997	96,711	16,382	147,699	0	260,792
1998	125,926	7,305	83,782	0	217,013
1999	137,254	22,262	77,362	1,100	236,878
2000	153,278	80,331	66,253	982	299,862
2001	30,281	1,565	206,662	946	238,508
2002	108,126	7,638	120,163	1,023	235,927
2003	144,033	28,943	88,895	812	261,871
2004	115,524	9,473	136,867	1,250	261,864
2005	239,769	40,481	0	0	280,250
2006	217,735	29,416	0	523	247,151
2007	122,887	11,900	73,893	859	208,680
2008	54,250	4,686	130,513	1,023	189,449
2009	62,000	2,337	128,397	988	192,734

2010	77,500	22,515	96,103	1,103	196,118
2011	166,935	61,617	5,525	1,023	234,077
2012	100,750	12,777	112,641	986	226,168
2013	54,250	2,125	191,338	1,098	247,713
2014	7,750	4,063	205,590	1,120	217,403
2015	31,000	2,119	178,446	976	211,565
2016	93,000	8,467	128,161	1,089	229,628
2017	135,789	133,210	63,942	1,102	332,941
2018	54,250	219,000	166,911	987	440,161

The historic baseline period begins in 1995 for this example because it is consistent with the typical historic water budget-reporting period included in recently completed Groundwater Sustainability Plans. The baseline period ends in 2010 in order to provide a reasonable timeframe for assessing average current conditions and to demonstrate consistency with reduced Delta reliance after enactment of the Delta Reform Act (2009).

An agricultural water supplier's baseline period may be different than the period used above. For example, an agricultural water supplier may choose the entire 86-year CalSIM data record as the baseline period from which assess changes in Delta exports. An agricultural water supplier may also include the period of record through 2015 as its baseline and just use future projections to demonstrate reduced reliance. It is up to the individual water supplier to determine the appropriate baseline for their agency and to provide documentation supporting that decision.

Previous and Current AWMPs

Table 2 provides an example for reporting projected water supplies from the Delta and to demonstrate the change in level of reliance on the Delta for AWMPs beginning in 2015. This example is for the 2020 AWMP cycle. In subsequent AWMP cycles, the data construct would be updated to include the current year "Delta Supplies," while the "Baseline Delta Supplies" would remain in place. It is up to the water supplier to select appropriate future projections methods and scenarios for their analysis. This example analysis uses California Water Commission CALSIM 2030 and 2070 climate change scenarios to project future water supplies under 2030 and 2070 climate change scenarios.

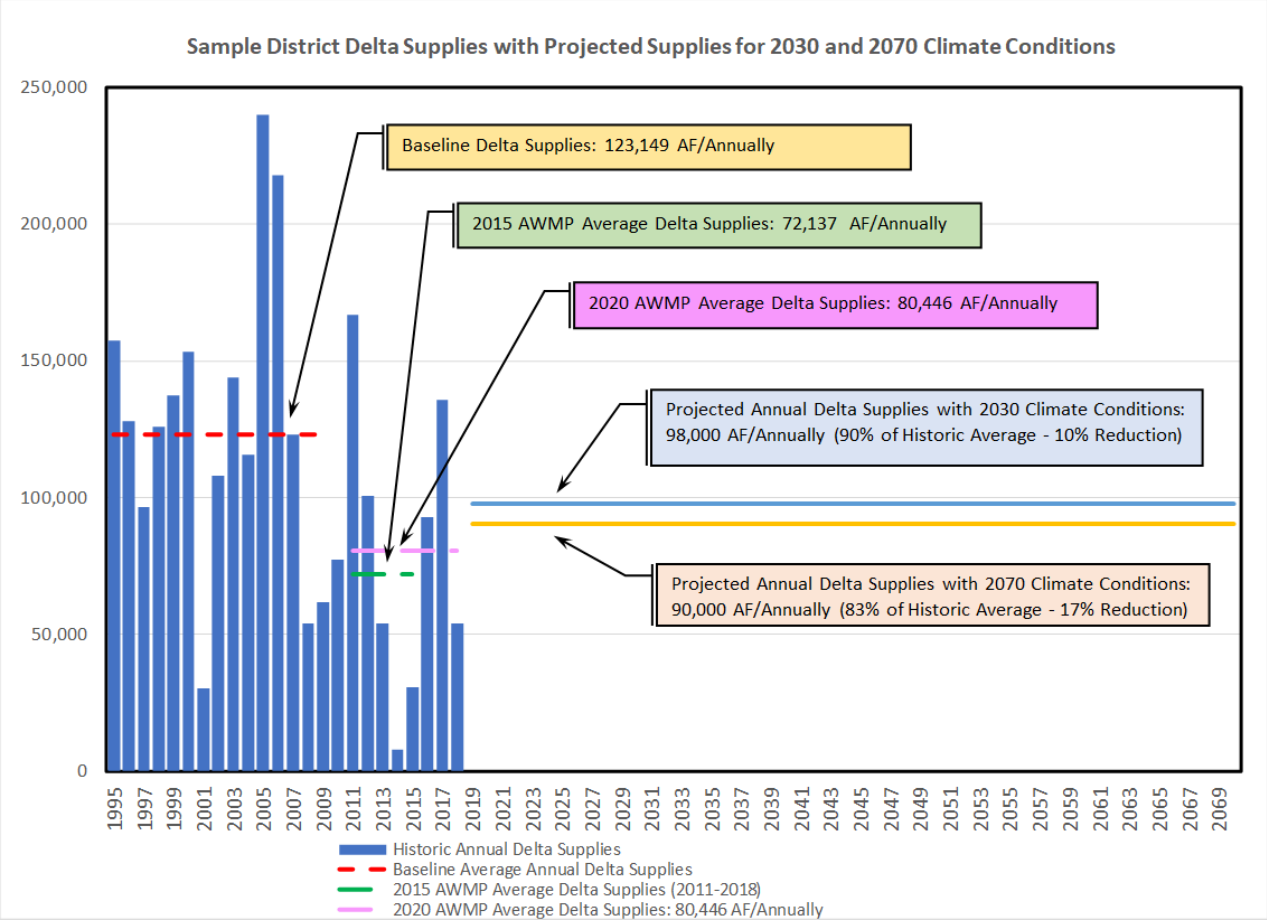
Table 2 – Example Comparison of Historic Average Annual Delta Supplies versus Projected Average Annual Delta Supplies.

Value	Baseline Delta Supplies (1995-2010)	2015 Climate Conditions Delta Supplies	2020 Climate Conditions Delta Supplies	2030 Climate Conditions Delta Supplies	2070 Climate Conditions Delta Supplies
Average Annual Supplies (acre-feet)	123,149	72,137	80,466	98,000	90,000
Percent of Baseline Supplies	N/A	56%	65%	80%	73%
Percent Reduction in Supplies	N/A	44%	35%	20%	27%

It should be noted that in this example, the current conditions calculation of Delta Supplies includes the 2012-2016 drought where surface water supplies were limited.

In order to demonstrate whether an agricultural water supplier has reduced its reliance on the Delta, the supplier may show how its reliance on water supplies derived from the Delta has changed relative to the baseline. This can be done by comparing Baseline Delta Supplies and Projected Annual Delta Supplies, incorporating future climate conditions as shown in Figure 1. This change in delivery of water from the Delta is one approach to demonstrating reduced reliance on Delta water supply sources.

Figure 1 – Sample 2020 and 2025 AWMP District Delta Supplies and Projected Supplies



Appendix D – UWMP to AWMP Crosswalk

Comparison of California Water Code AWMP Preparation and Submittal Requirements and UWMP Preparation and Submittal Requirements:

AWMP Required Element	Water Code Section	UWMP Required Element	Water Code Section
At least 25,000 irrigated acres, OR 10,000 to 25,000 irrigated acres and funding provided	10853	At least 3,000 service connections or acre feet of water provided	10617
5 year cycle update	10820	5 year cycle update	10621
Regional AWMP	10829	Regional UWMP	10620
Plan Adoption, Submittal, and Availability		Plan Adoption, Submittal, and Availability	10632(c)
Coordination and Outreach	10821(a), 10841, 10840, 10821(b)	Coordination and Outreach	10631
N/R		Coordination with Other Agencies and Community	10620(d)(3) 10642
Notification to Cities and Counties	10821(a)	Notice to Cities and Counties - 60 Days Prior	10621(b) 10642
Notice of Public Hearing	GC 6066	Notice of Public Hearing	GC 7291
Notice to the Public	10841	Notice to the Public	10642 GC 6066
Plan Adoption	10841	Plan Adoption	10642 10608.26(a)

AWMP Required Element	Water Code Section	UWMP Required Element	Water Code Section
Plan Submittal	10820(a)(2)(B)	Plan Submittal	10621(e) 10644(a)(1) 10635(c)
Public Availability	10844	Public Availability	10645(a) and (b)
Submittal to DWR	10843(b)(1)	Submittal to DWR	
Submittal to Cities and Counties	10843(b)(2)	N/R	
Submittal to Groundwater Management Entities	10843(b)(3)	N/R	
Submittal to California State Library	10843(b)(4)	Submittal to California State Library	10644(a)(1)

Comparison of California Water Code AWMP Required Plan Contents and UWMP Required Plan Contents:

AWMP Required Element	Water Code/23 CCR Section	UWMP Required Element	Water Code Section
Description of Agricultural Water Supplier and Service Area, including all of the following:	10826(a)	Description of the service area	10631(a)
Size of the service area	10826(a)(1)	N/R	
Location of the service area and its water management facilities	10826(a)(2)	N/R	
Terrain and soils	10826(a)(3)	N/R	

AWMP Required Element	Water Code/23 CCR Section	UWMP Required Element	Water Code Section
Climate	10826(a)(4)	Climate	10631(a)
Operating Rules and Regulations	10826(a)(5)	N/R	
Water delivery measurements or calculations	10826(a)(6)	N/R	
Water rate schedules and billing	10826(a)(7)	N/R	
Water shortage allocation policies	10826(a)(8)	Standardized Shortage Levels for the Water Shortage Contingency Plan (WSCP)	10632(a)(3)
Description of the quantity and quality of water uses of the Agricultural Water Supplier, including all of the following:	10826(b)	Water Use Sectors	10631(d)(1)
Surface Water Supply	10826(b)(1)	Surface Water Supply	
Groundwater Supply	10826(b)(2)	Groundwater Supply and Basin Descriptions	10631(b)(4)
Other water supplies, including recycled water	10826(b)(3)	N/R	
Source water quality monitoring practices	10826(b)(4)	N/R	
Water uses within the Agricultural Water Supplier's service	10826(b)(5)	Water Supply Characterization	10631(b), (h)

AWMP Required Element	Water Code/23 CCR Section	UWMP Required Element	Water Code Section
area, including all of the following:			
Agricultural	10826(b)(5)(A)	Agricultural	10631(d)(1)(I)
Environmental	10826(b)(5)(B)	N/R	
Recreational	10826(b)(5)(C)	N/R	
Municipal and industrial	10826(b)(5)(D)	Industrial	10631(d)(1)(D)
Groundwater recharge, including estimated flows from deep percolation from irrigation and seepage	10826(b)(5)(E)	N/R	
Annual water budget based on the quantification of all inflow and outflow components for the service area of the Agricultural Water Supplier. Components of inflow shall include surface inflow, groundwater pumping in the service area, and effective precipitation. Components of outflow shall include surface outflow, deep percolation, and evapotranspiration. Annual water budget	10826(c)	N/R	

AWMP Required Element	Water Code/23 CCR Section	UWMP Required Element	Water Code Section
shall be reported on a water-year basis.			
Analysis of the effect of climate change on future water supplies	10826(d)	Climate Change	10631(a) 10630 10635(b)(4)
Description of previous water management activities	10826(e)	Implementation Over the Past Five Years	10631(e), (1)(A)
Identify water management objectives based on the water budget to improve water system efficiency or to meet other water management objectives. The agricultural water supplier shall identify, prioritize, and implement actions to reduce water loss, improve water system management, and meet other water management objectives identified in the plan	10826(f)	Report targets on individual or regional basis and fiscal/calendar year basis	10608.20(a)(1)

AWMP Required Element	Water Code/23 CCR Section	UWMP Required Element	Water Code Section
Information regarding efficient water management practices required pursuant to Section 10608.48	10826(g)	Demand Management Measures	10631(e), (1)
Quantification of the efficiency of agricultural water use within the service area of the agricultural water supplier using the appropriate method or methods and accounting for all water uses, including crop water use, agronomic water use, environmental water use, and recoverable surface flows	10826(h)	N/R	
Drought plan for periods of limited water supply describing the actions of the agricultural water supplier for drought preparedness and management of water supplies and allocations during drought conditions. The drought plan shall contain both of the following:	10826.2	Water Shortage Contingency Plan	10632.3 Response Actions: 10632(a)(4)

AWMP Required Element	Water Code/23 CCR Section	UWMP Required Element	Water Code Section
Resilience planning, including data, indicators, and information needed to determine the water supply availability and levels of drought severity, analyses and identification of potential vulnerability to drought, and a description of opportunities and constraints for improving drought resilience planning	10826.2(a)	N/R	
Drought response planning, including all of the following:	10826.2(b)	Shortage Response Actions	10632(a)(4)
Policies and a process for declaring a water shortage and for implementing water shortage allocations and related response actions	10826.2(b)(1)	Shortage Response Actions	10632(a)(4)
Methods and procedures for the enforcement or appeal of, or exemption from, triggered shortage response actions.	10826.2(b)(2)	Compliance and Enforcement	10632(a)(6)

AWMP Required Element	Water Code/23 CCR Section	UWMP Required Element	Water Code Section
Monitoring and reporting procedures to assure appropriate data is collected to monitor customer compliance and to respond to any state reporting requirements	10826.2(b)(3)	Monitoring and reporting procedures to assure appropriate data is collected to monitor customer compliance and to respond to any state reporting requirements	10632(a)(9)
Communication protocols and procedures to inform customers, the public, and govt entities of any current or predicted water shortages and associated response actions	10826.2(b)(4)	Communication protocols and procedures to inform customers, the public, and govt entities of any current or predicted water shortages and associated response actions	10632(a)(5)
A description of the potential impacts on the revenues, financial condition, and planned expenditures of the agricultural water supplier during drought conditions that reduce water allocations, and proposed measures to overcome those impacts, including reserve-level policies.	10826.2(b)(5)	Financial Consequences of WSCP	10632(a)(8)
Report on which efficient water management	10608.48(d)	N/R	

AWMP Required Element	Water Code/23 CCR Section	UWMP Required Element	Water Code Section
practices have been implemented and are planned to be implemented, an estimate of the water use efficiency improvements that have occurred since the last report, and an estimate of the water use efficiency improvements estimated to occur five and 10 years in the future. If an agricultural water supplier determines that an efficient water management practice is not locally cost effective or technically feasible, the supplier shall submit information documenting that determination.			
Information about the implementation of efficient water management practices to be reported using a standardized form developed pursuant to Section 10608.52.	10608.48(e)	N/R	
Amendments to, or changes in, the plan shall be adopted and	10821(b)	Amendments to, or changes in, the plan (UWMP or WSCP) shall be adopted and	10621(d) 10644(b)

AWMP Required Element	Water Code/23 CCR Section	UWMP Required Element	Water Code Section
submitted in the appropriate manner		filed in the appropriate manner	
Lack of legal access certification (if water measuring not at farm gate or delivery point)	CCR Section 597.3(b)(2)(A)	N/R	
Lack of technical feasibility (if water measuring not at farm gate or delivery point)	CCR Section 597.3(b)(1)(B), Section 597.3(b)(2)(B)	N/R	
Delivery apportioning methodology (if water measuring not at farm gate or delivery point)	CCR Section 597.3.b(2)(C),	N/R	
Description of water measurement BPP	CCR Section 597.4(e)(2)	N/R	
Conversion to measurement to volume	CCR Section 597.4(e)(3)	N/R	
Existing water measurement device corrective action plan? (if applicable, including schedule, budget and finance plan)	CCR Section 597.4(e)(4))	N/R	
N/R		Description of the legal authorities that empower the urban water supplier to implement and	10632(a)(7)

AWMP Required Element	Water Code/23 CCR Section	UWMP Required Element	Water Code Section
		enforce its shortage response actions	
N/R		Population, Social, Economic, and Demographic Factors	10631(a)
N/R		Land Uses within Service Area	10631(a)
N/R		Calculate Population and Gross Water Use	10608.20(e) and (f) 10644(a)(2)
N/R		Description on how retail suppliers meet targets	10608.28(a)(1)-(6), (b)
N/R		Implementation to Achieve Water Use Targets; Water Use Objectives	10631(e)(1)(A), 10608.20
N/R		Past, Current, and Projected Water Use by Sector	10635(a) 10631(d)(1) 10631(d)(2) 10631(4)(A) and (B)
N/R		Single-Family Residential	10631(d)(1)(A)
N/R		Multifamily	10631(d)(1)(B)
N/R		Commercial	10631(d)(1)(C)
N/R		Institutional and governmental	10631(d)(1)(E)
N/R		Landscape	10631(d)(1)(F)

AWMP Required Element	Water Code/23 CCR Section	UWMP Required Element	Water Code Section
N/R		Sales to other agencies	10631(d)(1)(G)
N/R		Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof	10631(d)(1)(H)
N/R		Distribution system water loss	10631(d)(1)(J) 10631(d)(3)(A)-(C)
N/R		Past Water Use	10631(d)
N/R		Current Water Use	10631(d) 10608.24(b)
N/R		Projected Water Use	10631(d) 10635(a) 10631(h),(f) 10631(d)(4)(A)-(B)
N/R		Water Use for Lower Income Households	10631.1(a)
N/R		SB X7-7, Targets, and 2020 Compliance	10608.16(a) 10608.24(d)(1) and (2)
N/R		Daily Per-Capita Water Use (GPCD)	10608.20(e)
N/R		Coordination of Groundwater Supply Reporting	10609.42
N/R		Potential, Current, and Projected Recycled Water Uses	10633(b), (d), (e)

AWMP Required Element	Water Code/23 CCR Section	UWMP Required Element	Water Code Section
N/R		Actions to Encourage and Optimize Future Recycled Water Use	10633(g)
N/R		Desalinated Water Opportunities	10631(g)
N/R		Water Exchanges and Transfers	10631(c)
N/R		Future Water Projects	10631(f)
N/R		Summary of Existing and Planned Sources of Water	10631(b),(b)(2), (h)
N/R		Service Reliability - Constraints on Water Sources	10631(b)(1)
N/R		WSCP Refinement Procedures	10632(a)(10)
N/R		Five Consecutive Dry-Year Water Reliability Assessment	10635(a)
N/R		Drought Risk Assessment	10635(b)
N/R		Seismic Risk	10632.5
N/R		Energy Use Information	10631.2(a)
N/R		Water Loss Reporting for Five Years	10631(d)(3)

AWMP Required Element	Water Code/23 CCR Section	UWMP Required Element	Water Code Section
N/R		Lay-Person Description	10630.5
N/R		Distribution system water loss calculations	CCR Sect 638.1

Appendix E – GSP to AWMP Connections

A traditional crosswalk between Agricultural Water Management Plans (AWMPs) and Groundwater Sustainability Plans (GSPs) is not feasible, as GSPs have extensive and detailed requirements that do not align with AWMPs. However, there are connections between the AWMP and GSP where planning and response measures can align with each other.

Preparation and Submittal Requirements

AWMP Required Element	Water Code Section	GSP Required Element	Water Code/23 CCR Section
At least 25,000 irrigated acres, OR 10,000 to 25,000 irrigated acres and funding provided	10853	Medium- or high-priority basin	10727
5-year cycle update	10820	5-year cycle update, dependent on State assessment	10733.8
N/R		Groundwater sustainability agencies intending to develop and implement multiple groundwater sustainability plans pursuant to Section 10727(3)(b) shall coordinate with other agencies preparing a groundwater sustainability plan within the basin to ensure that the plans utilize the	10727.6

AWMP Required Element	Water Code Section	GSP Required Element	Water Code/23 CCR Section
		same data and methodologies for the following assumptions in developing the plan	
N/R	N/R	Executive Summary	CCR Section 354.4
Plan Adoption, Submittal, and Availability		Plan Adoption, Submittal, and Availability	
Coordination and Outreach	10821(a), 10841, 10840, 10821(b)	Coordination and Outreach	10732.2, 10727.4(j), CCR Section 354.10
N/R	N/R	Advisory Committee for GSP Development	10727.8
Notification to Cities and Counties	10821(a)	Notification to Cities and Counties	10727.8 CCR Section 354.10
Notice of Public Hearing	GC 6066	Notice of Public Hearing	
Notice to the Public	10841	Notice to the Public and DWR	10727.8
Plan Adoption	10841	Plan Adoption	10728.4
Plan Submittal, Submittal to DWR	10820(a)(2)(B), 10843(b)(1)	Plan Submittal, Submittal to DWR	10733.4, 10733.4(a) CCR Section 354.4

AWMP Required Element	Water Code Section	GSP Required Element	Water Code/23 CCR Section
Public Availability	10844	Public Availability	10733.4(c)
Submittal to Cities and Counties	10843(b)(2)	90-day notice period to cities and counties before GSP adoption, and general plan process provisions	
Submittal to Groundwater Management Entities	10843(b)(3)	N/R	
Submittal to California State Library	10843(b)(4)	N/R	
DWR reviews AWMPs for compliance with the California Water Code and to ensure eligibility for water loans and grants.		DWR Two-Year Review Period and Notice for Recommended Corrective Actions	10733.4(d)

Note: “N/R” = Not Required

Description of Service Area and Water Supplies

AWMP Required Element	Water Code Section	GSP Required Element	Water Code/23 CCR Section
Description of Agricultural Water Supplier and Service Area	10826(a)	Description of the physical setting and characteristics of the aquifer system underlying the basin	10727.2(a)

AWMP Required Element	Water Code Section	GSP Required Element	Water Code/23 CCR Section
Size of the service area	10826(a)(1)	Description of the geographic areas covered	CCR Section 354.8
Groundwater recharge, including estimated flows from deep percolation from irrigation and seepage	10826(b)(5)(E)	Description of surface water supply used or available for use for groundwater recharge or in-lieu use	10727.2(d)(5)

Both plans are required to describe the supplier's service area and physical characteristics, such as water sources, water supplies, climate, terrain, and soils. The service areas for both Groundwater Sustainability Agencies (GSAs) and Suppliers can span various jurisdictional boundaries, however GSP maps are required to delineate these boundaries, such as adjudicated areas, existing land use designations, and density of wells per square mile. Additionally, GSA service areas tend to be much larger than Supplier service areas. AWMPs do not consider well locations, but rather farm gates where water is delivered to a grower.

Per Water Code Section 10727.2(a), the GSP shall describe the physical setting and characteristics of the aquifer systems underlying the basin, including historical data, groundwater levels, groundwater quality, subsidence, and groundwater-surface water interaction, historical and projected water demand and supplies, and maps of the current area and areas of potential recharge. Alternately, the AWMP requires that the surface and groundwater supply be described but does not require an analysis on historical water supply and quality conditions (Water Code Section 10826(b)(1)-(2)). Although the AWMP Water Code doesn't require a discussion on interaction between these surface and groundwater, Suppliers may find a GSP's analysis useful for drought planning and management strategies. Both plans evaluate water supplies outside of an agricultural setting, such as municipal, environmental, and recycled water.

The GSP requires a discussion on subsidence, and thresholds should be determined for monitoring purposes (23 CCR Section 354.28(c)(5)). Although subsidence is not an AWMP requirement, in the Central Valley are likely to be impacted by subsidence and this section may be an opportunity to explore its effects on water supplies.

GSPs must also include a hydrogeologic conceptual model that evaluates the groundwater conditions within a basin with respect to topographic and soil conditions (23 CCR 23, Section 354.14). AWMPs do not require modelling analyses, however Suppliers can refer to GSP models, where applicable, to better understand groundwater conditions and formulate drought response and monitoring practices for a particular area. Such practices could align with those proposed in the corresponding GSP.

Water Budget

AWMP Required Element	Water Code/23 CCR Section	GSP Required Element	Water Code/23 CCR Section
Annual water budget based on the quantification of all inflow and outflow components for the service area of the Agricultural Water Supplier. Components of inflow shall include surface inflow, groundwater pumping in the service area, and effective precipitation. Components of outflow shall include surface outflow, deep percolation, and evapotranspiration. Annual water budget shall be reported on a water-year basis.	10826(c)	Water budget for the basin that provides an accounting and assessment of the total annual volume of groundwater and surface water entering and leaving the basin, including historical, current, and projected water budget conditions, and the change in volume of water stored. Water budget information shall be reported in tabular and graphical form.	CCR Section 354.18(a)

AWMPs and GSPs shall describe the water budget for their service area, analyzing both surface and groundwater inflows and outflows. Considerations for the budget should include water year type and land use. GSPs require more detailed information than AWMPs, such as seasonal conditions, overdraft levels, and sustainable yield estimates. The level of detail included in the water budget of an AWMP may be determined by the Supplier. A GSP should rely on the best available data and DWR must provide models for use by the GSAs. GSPs are also required to provide graphs estimating the changes in groundwater storage.

As part of the water budget, a GSP must evaluate population, population growth, climate change, and sea level rise, while the AWMP shall assess current and future climatic conditions and their impact on the water supply. New for this guidebook, Appendix H contains guidance on how to incorporate climate change planning into the AWMP and incorporating historical weather trends into their analysis.

Water Monitoring Practices

AWMP Required Element	Water Code Section	GSP Required Element	Water Code Section
Source water quality monitoring practices	10826(b)(4)	Identification of existing water resource monitoring and management programs, and description of any such programs the Agency plans to incorporate in its monitoring network or in development of its Plan. The Agency may coordinate with existing water resource monitoring and management programs to incorporate and adopt that program as part of the Plan	CCR Section 354.8(c)
Monitoring and reporting procedures to assure appropriate data is collected to monitor customer compliance and to respond to any state reporting requirements	10826.2(b)(3)	Summary of the type of monitoring sites, type of measurements, and the frequency of monitoring for each location monitoring groundwater levels, groundwater quality, subsidence, streamflow,	10727.2(e)

AWMP Required Element	Water Code Section	GSP Required Element	Water Code Section
		precipitation, evaporation, and tidal influence. The plan shall include a summary of monitoring information such as well depth, screened intervals, and aquifer zones monitored, and a summary of the type of well relied on for the information, including public, irrigation, domestic, industrial, and monitoring wells	
		Monitoring protocols that are designed to detect changes in groundwater levels, groundwater quality, inelastic surface subsidence for basins for which subsidence has been identified as a potential problem, and flow and quality of surface water that directly affect groundwater levels or quality or are caused by groundwater extraction in the basin. The monitoring protocols shall be designed to	10727.2(f)

AWMP Required Element	Water Code Section	GSP Required Element	Water Code Section
		generate information that promotes efficient and effective groundwater management.	

As part of 23 CCR Section 354.8(c)-(d), the GSP is required to identify existing water resource monitoring and management programs, implementation, and how they may limit operational flexibility in the basin. GSP monitoring practices should be evaluated on a regional basis and appropriate for that particular area (23 CCR Section 354.20(b)(3)). The AWMP requires water monitoring practices for surface water supplies (Water Code Section 10826(c)). The AWMP Water Code does not indicate whether the water quality monitoring practices are existing nor whether the practices cause limitations. Per Water Code Section 10826(e), the AWMP must describe previous water management activities and could be an opportunity to explore where limitations could exist.

Additionally, GSP monitoring practices are dependent on groundwater levels, use, and aquifer characteristics (23 CCR Section 354.34). These practices are necessary for determining minimum thresholds and whether undesirable results may occur.

Water Measurable Objectives

AWMP Required Element	Water Code/23 CCR Section	GSP Required Element	Water Code/23 CCR Section
Identify water management objectives based on the water budget to improve water system efficiency or to meet other water management objectives. The agricultural water supplier shall identify, prioritize, and implement	10826(f)	Measurable objectives, as well as interim milestones in increments of five years, to achieve the sustainability goal in the basin within 20 years of the implementation of the plan	10727.2(b)(1)

AWMP Required Element	Water Code/23 CCR Section	GSP Required Element	Water Code/23 CCR Section
actions to reduce water loss, improve water system management, and meet other water management objectives identified in the plan			

The AWMP and GSP must develop water management objectives (WMOs) and pathways for implementation. The GSP must describe how the plan will help meet each objective and how each objective is intended to meet a sustainability goal for long-term beneficial uses, per 23 CCR Section 354.24. The GSP WMOs shall include interim milestones in five-year increments, to achieve the sustainability goal for the basin within 20 years of GSP implementation. Each WMO should be associated with a sustainability indicator, for which a minimum threshold will be developed. It is possible to align the WMOs between the AWMP and GSP if their boundaries overlap and create consistency in planning objectives.

Efficient Water Management Practices (EWMPs)

AWMP Required Element	Water Code/23 CCR Section	GSP Required Element	Water Code/23 CCR Section
Information regarding efficient water management practices required pursuant to Section 10608.48	10826(g)	Efficient water management practices, as defined in Section 10902, for the delivery of water and water conservation methods to improve the efficiency of water use	10727.4(i)

AWMP Required Element	Water Code/23 CCR Section	GSP Required Element	Water Code/23 CCR Section
Report on which efficient water management practices have been implemented and are planned to be implemented, an estimate of the water use efficiency improvements that have occurred since the last report, and an estimate of the water use efficiency improvements estimated to occur five and 10 years in the future. If an agricultural water supplier determines that an efficient water management practice is not locally cost effective or technically feasible, the supplier shall submit information documenting that determination.	10608.48(d)	Description of the projects and management actions the Agency has determined will achieve the sustainability goal for the basin, including projects and management actions to respond to changing conditions in the basin	CCR Section 354.44(a)

For the GSP, Water Code Section 10902 refers to efficient water management practices that improve water conservation but does not reference the specific practices described in Water Code Section 10608.48. However, the GSP could refer to Water Code Section 10608.48 to fulfill this requirement. For instance, Water Code Section 10608.48(4)(B) refers to implementing conjunctive use of groundwater, while Water Code Section 10727.4(f) and 23 CCR Section 354.8(e) also include planning for conjunctive use programs.

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Appendix F – Drought Plan Checklist

As part of its AWMP, each Supplier shall develop a drought plan for periods of limited water supply describing the actions of the agricultural water supplier for drought preparedness and management of water supplies and allocations during drought conditions. The drought plan shall contain both of the following (Water Code Section 10826.2):

Resilience planning, including all of the following:

- ☐ Data, indicators, and information needed to determine the water supply availability and levels of drought severity.
- ☐ Analyses and identification of potential vulnerability to drought.
- ☐ A description of the opportunities and constraints for improving drought resilience planning, including all of the following:
    - ☐ The availability of new technology or information.
    - ☐ The ability of the agricultural water supplier to obtain or use additional water supplies during drought conditions.
    - ☐ A description of other actions planned for implementation to improve drought resilience.

Drought response planning, including all of the following:

- ☐ Policies and a process for declaring a water shortage and for implementing water shortage allocations and related response actions.
- ☐ Methods and procedures for the enforcement or appeal of, or exemption from, triggered shortage response actions.
- ☐ Methods and procedures for monitoring and evaluation of the effectiveness of the drought plan.
- ☐ Communication protocols and procedures to inform and coordinate customers, the public, interested parties, and local, regional, and state government.
- ☐ A description of the potential impacts on the revenues, financial condition, and planned expenditures of the agricultural water supplier during drought conditions

that reduce water allocations, and proposed measures to overcome those impacts, including reserve-level policies.

Appendix G – 2025 AWMP Amendment Checklist

Notification	Water Code Section	Checkbox
Was each city or county within which supplier provides water supplies notified that the agricultural water supplier will be preparing or amending a plan?	10821(a)	
Was the proposed plan available for public inspection prior to plan adoption?	10841	
Publicly-owned supplier: Prior to the hearing, was the notice of the time and place of hearing published within the jurisdiction of the publicly owned agricultural water supplier in accordance with Government Code 6066?	10841	
14 days notification for public hearing	GC 6066	
Two publications in newspaper within those 14 days	GC 6066	
At least 5 days between publications? (not including publication date)	GC 6066	
Privately-owned supplier: was equivalent notice within its service area and reasonably equivalent opportunity that would otherwise be afforded through a public hearing process provided?	10841	
After hearing/equivalent notice, was the plan adopted as prepared or as modified during or after the hearing?	10841	
Was a copy of the AWMP, amendments, or changes, submitted to the entities below, no later than 30 days after the adoption?	10843(a)	
The department.	10843(b)(1)	
Any city, county, or city and county within which the agricultural water supplier provides water supplies.	10843(b)(2)	

Notification	Water Code Section	Checkbox
Any groundwater management entity within which jurisdiction the agricultural water supplier extracts or provides water supplies.	10843(b)(3)	
Adopted AWMP availability	10844	
Was the AWMP available for public review on the agricultural water supplier's Internet Web site within 30 days of adoption?	10844(a)	
If no Internet Web site, was an electronic copy of the AWMP submitted to DWR within 30 days of adoption?	10844(b)	

Appendix H – Considering Climate Change Impacts

H1. Background: Climate Change and Agricultural Water Management Planning

Water resource management in California has historically planned for substantial climatic and seasonal variability. Projections of climate change in California indicates a further intensification of wet and dry extremes and shifting temperatures that can impact both water uses and supplies. Extreme and higher temperatures can lead to increases in water use. A declining snowpack and earlier runoff patterns could result in changes in stream flows and reservoir operations. Projections of more frequent, severe, and prolonged droughts could lead to not only less surface water available but also exacerbate ongoing stressors in groundwater basins across the state. Without implementing preparedness and other strategies to adapt to or mitigate these impacts, the changing climate can jeopardize a supplier's reliability.

How a Supplier can best prepare for climate change differs according to several supplier conditions including water infrastructure, rights, sources, and demands, as well as across the variety of tools available to assess the impacts of climate change on water supply reliability. The information below is provided as a guide to assist in selecting a climate change analysis approach.

This appendix provides a discussion of the decision-making process helpful in determining which tools and analytical approach will work best for a given Supplier's particular needs. This process is determined by each supplier's needs and capacity, which range widely by geography, water sources, human and ecological demands, and infrastructural and organizational arrangements. This section lays out the factors that are appropriate for a Supplier to consider when selecting an analytical approach and tools.

Analysis options vary greatly with respect to complexity and sophistication. The various methods described here are intended to give a representative overview of the most common options. It is not possible to include every method, as climate change science is frequently advancing. The options below do not establish prescriptive recommendations or requirements.

Guidance for Selecting a Climate Change Analysis Approach

This guidance provides a two-step decision-making process useful in determining which tools and approaches will work best for a Supplier for climate change analysis. The process is sensitive to supplier need and capacity, which range widely by geography, water sources, human and ecological demands, and infrastructural and organizational arrangements.

Step 1 involves conducting a vulnerability checklist for each water supply source. The Step 1 exercise assists the planner in self-identifying areas where they water supply reliability may be at risk to the impacts of climate change. Information gathered in Step 1 guides selection of an analysis approach in Step 2. This guidance is based on DWR's *Climate Action Plan: Phase 2* (DWR 2018) and the *Climate Change Handbook for Regional Water Management* (DWR 2011). Regional climate change studies may use different scenarios and approaches to analyze the impacts of climate and could obtain varying results.

H2. Common Steps to Considering Climate Change

This is a different approach and includes three main steps to conduct a climate change analysis. First, a screening process determines what assets and other aspects of the supplier's system may be exposed and sensitive to climate. Assets and other aspects of the system may include water supply source, demand and/or use projections, infrastructure, operations of the infrastructure, timing and volumes of supplies, customers and other users, existing preparations for extreme conditions and events and capacity to activate those more frequently, among others. The second step involves selecting and conducting an analysis on those assets and other system aspects at risk, which tends to require more staff time and technical capacity. The third step involves developing strategies and actions to mitigate the impacts to climate change on water uses, supplies, and reliability.

Step 1: Climate Change Risk Determination Screening

The first step in conducting a climate change analysis is to assess exposure and sensitivity to changing climatic conditions. In the absence of quantifiable likelihoods and impacts (an absence of which is common in assessing a range of future conditions), risk is evaluated by combining how exposed a supplier is to climate change, and the sensitivity of the supply system to those exposures. Exposure refers to the degree to which the water systems (and demand) may be impacted by climate change. Sensitivity of a supplier to exposure often involves a system assessment, tolerance changes to factors such as temperature, precipitation, and other key processes. Not all water source will be exposed to impacts of climate change. Even if risk to changing climate

conditions is low, understanding the risks of each water supply source can better inform planning decisions and reliability outcomes. Completing the “Climate Change Vulnerability Screening Form for Agricultural Water Management Planning” can help a Supplier understand if aspects of their water supply source may be at risk to climate change impacts.

In addition to the screening form, a Supplier may choose to conduct a stand-alone in-depth climate risk assessment, as it may have multiple benefits for the Supplier. The assessment may also be useful for policy makers for the supplier, other decision-markers, operators, customers, identifying critical infrastructure needs, and personnel training budgets over the long-term.

Step 2: Selecting the Climate Change Analysis Approach

After completing the screening form, the next step includes a thorough analysis of assets identified in Step 1. This process should include decision-markers and interested parties relevant to the Supplier system’s long-term reliability and viability. Including the appropriate parties can help identify climate change analyses that may have been completed by others and are relevant and applicable to the Supplier, as well as methods and tools that may be useful should a new analysis be completed.

If possible, research for analyses completed by a wholesaler, raw water supplier, research institution, or consulting firm, as completing a climate change assessment can be resource intensive. In these cases, using existing data creates planning consistency by using the same set of climate projections.

Conducting a New Climate Change Analysis

There are multiple approaches for analyzing the impact of climate change, such as bottom-up (starting with system characteristics and capabilities), top-down (starting with characterizations of future climate), sensitivity analysis, and stress tests. Whatever approach is selected, it should adhere to the best available scientific guidance on climate change analysis.

Determining what type of climate change analysis is appropriate for a Supplier depends on several considerations. Some of which are listed below:

- **Data Sources.** The following factors are considered in assessing future climate change in a region: historical changes, changes projected by global climate models (GCMs) and their downscaled products, and climatic process-based changes such as intensification of atmospheric rivers or increases in the climatic water deficit. This means that the climate change analysis should incorporate

information from historical observations, GCMs, downscaled GCM projections, and other relevant information about historical and projected changes.

- **Purpose and Uncertainty.** Climate change impact assessments are made for multiple reasons and employ different methodological approaches. Depending on the purpose, some impact studies explore the variations in models and in what is referred to as the “uncertainty space”, more thoroughly than others. Some studies may legitimately reach a specific conclusion by using a single GCM or downscaled product. For policy-relevant impact studies, it is desirable to sample the “uncertainty space” by evaluating global and regional climate model ensembles and downscaling techniques.
- **Other Forcings.** It should be recognized that additional forcings and feedbacks, which may not be fully represented in global models, may be important for regional climate change (e.g. land use change, heat island effect, or the influence of atmospheric pollutants). Climate forcings refer to those physical factors outside the climate itself that affect the Earth’s climate, such as human-induced changes in greenhouse gas emissions, surface reflectivity, and atmospheric aerosols, the latter two of which can impact regional climate change.
- **Qualitative Information.** Where quantitative data is limited or missing, qualitative information can fill in the gaps of climate projections (e.g. storylines, local knowledge). They can be an alternative to maps, averages, ranges, scatter plots, or formal statistical frameworks for the representation of uncertainty.
- **Communicate Uncertainties.** Limits to the information content of climate model outputs for regional projections need to be communicated clearly. The relative importance of uncertainties typically increases for small scares and affects relevant quantities due to limitations in model resolution, local feedbacks and forcings, low error tolerance of observed trends, and possibly other confounding factors relevant for local effects.
- **Model Selection.** For regional applications, some climate models may not be considered because of their poor performance for some regional metric or relevant process. Selection criteria for model assessment should be based, among other factors, on availability of specific parameters and the spatial and temporal resolution within the model.
- **Downscaling.** The usefulness and applicability of downscaling methods strongly depend on the purpose of the assessment (e.g. for the analysis of extreme events or assessments in complex terrain). If only a subsample of the uncertainty space of the available global climate model is used for the downscaling, this should be noted explicitly.
- **Time Horizon and Emissions Scenarios.** The GHG emission scenario selected and the time horizon of analysis can significantly influence projected climate change impacts. In the near term (*e.g.*, through the 2030s), differences among

emission scenarios tend to be relatively small. However, by mid- to late-century (*e.g.*, 2050s to 2100), the scenarios diverge substantially, leading to greater differences in projected temperature, precipitation, and extremes events. For this reason, it is important to clearly state both the emission scenario(s) used and the specific time periods evaluated when interpreting or comparing study outcomes.

Suppliers can also consider these factors into their analysis approach:

A. Climate sensitive parameters
B. Spatial scale/watershed area
C. Infrastructure/systems and operational activities
D. Legal and institutional issues
E. Continuity with previous work/studies.

A. Climate-sensitive Parameters

Assessing the climate sensitivity of the water supply and water use can assist in determining the type and scope of the climate change analysis to use. Climate-sensitive parameters should indicate if the water supply or use type if sensitive to climactic events, how sensitive and in what ways. Analytical considerations may include climate-sensitive parameters, climate-driven parameters, and how definite the assessment of these parameters can be. Analytical considerations include:

- What are the key climate-sensitive parameters that effect performance of the supply or water use (e.g. average precipitation, summer high daily temperatures, extended heat waves, atmospheric river driven precipitation)?
- What are they key climate-driven parameters that affect vulnerability of the supply (e.g. average annual streamflow; September streamflow; 3-, 5-, 7-day streamflow; stream temperatures; minimum flows; wildfire; sea level rise)?
- Does adequate data exist to explore how climate change could affect the supply?
- Do extreme events (floods, droughts, heat waves, wildfires) significantly impact the performance of the water source of the water use?
- How skillfully do downscaled GCMs simulate historical observed climate parameters of interest? How will the observed historical record of climate parameters of interest be used? How will (downscaled) GCM data for climate parameters of interest be used? Is low-frequency variability in the climate parameters of interest an important consideration?
- What is the optimal temporal scale to adequately analyze the climate conditions (e.g. hourly, 6-hourly, daily, weekly, monthly, annually, multi-year averages)?

Common climate-sensitive parameters include:

- Average monthly temperature and precipitation
- Average monthly streamflow
- Inter-annual and low frequency hydrologic variability in terms of how it could affect recurrence, length, and severity of droughts and wet periods.

GCMs and their downscaled results may not adequately simulate the variance and cyclical nature of California's observe hydrological variability. Because of this, hydrologic modeling of future conditions has often, though not always, used the historical precipitation or streamflow records as the basis for future conditions modeling, with the climate change trend data mapped onto that historical record in a way that allows comparisons of historical experience with potential future conditions. This type of analysis has strengths and weaknesses that planners should critically evaluate before deciding on an approach.

Flood-protection analyses within the context of UWMP focuses on flooding that could possibly disrupt the water supply, most likely through damage to infrastructure. When analyzing potential flood impacts daily and, in some cases, hourly temperature and precipitation will be the key climate-sensitive parameters of interest, while 1-, 3-, 5-, and 7-day peak streamflow and antecedent watershed conditions (such as snowpack and soil moisture) will be key climate-driven parameters of interest. GCMs are not designed to provide climate information at these temporal scales and do not have the spatial resolution to adequately simulate orographic precipitation patterns and other acute spatial characteristics. Downscaling approaches have been used in the past to address these issues, but concerns remain about the ability of downscaling methods to adequately translate important large-scale phenomena to smaller scale impacts. Again, planners should evaluate past efforts and the unique characteristics of the water supply source before deciding on an approach.

B. Spatial Scale/Watershed Area

In selecting the climate change analysis approach, suppliers will want to assess analytical considerations relevant to the spatial scale/watershed area. These issues may include the following:

- Is the analysis being conducted for a small, localized water source or broad statewide/regional scale water source?
- Is the analysis, whether localized or statewide, consistent with other previously used datasets and analysis?
- Is the analysis consistent with other plans or analyses conducted over the same, similar, or overlapping areas?

- Does the analysis require simulation of multiple systems in a consistent manner? For example, if the local water supply is fed by local streams, groundwater, and other inter-basin water, can all those sources be analyzed in a consistent manner?

Some analysis can be done at localized scales and are not influenced by conditions outside of the watershed in question; but, in many cases, conditions outside of the watershed will have important ramifications for the analysis.

C. Infrastructure, Systems, and Operational Activities

Infrastructure, systems, and operational considerations include the following:

- Does the analysis consider multiple infrastructure or system changes? Or is the existing system (without changes) being analyzed under modified climate conditions?
- Is there an existing operations model (e.g. flood protection or water supply) that can be run with different climate conditions to simulate performance under differing climate conditions?
- What are the climate-sensitive inputs to the existing system model? What is the time step of the existing system model? Do these system model characteristics align with available climate datasets?
- Does the system model allow all important conditions to vary over time (land use, population, sea level, water demand, etc.)?

Often the models used to evaluate climate impacts, such as a water system operations model, are configured so that certain conditions remain fixed throughout the simulation. This constraint may have important ramifications for how the simulation is configured and the type of climate dataset and tools used. For example, California Water Resources Simulation Model (CalSim) is designed to run with land use, sea level, and water demand characteristics that remain static throughout the simulation. This configuration means that CalSim-II and III are often run in a “climate period” analysis mode, as opposed to a transient analysis mode.

Previously, CalSim simulations were typically run using the historical sequence of wet and dry years, modified by applying monthly and annual perturbations from climate change studies. While this method captured long-term trends, it had limited ability to simulate evolving climate dynamics such as interannual variability, increasing drought duration, or shifts in seasonality. The 2023 SWP Delivery Capability Report introduces two major improvements in its treatment of climate change. First, it updates the baseline hydrology by detrending historical runoff to reflect California’s current climate, thereby avoiding bias from cooler 20th-century conditions. Second, it applies a risk-informed climate analysis that leverages a broad ensemble of GCM projections and emissions

pathways to assess delivery reliability across a wide range of plausible futures. These advances improve the realism and robustness of the SWP's climate planning framework.

D. Legal and Institutional Issues

Analytical considerations relevant to identifying the legal and institutional issues and constraints include the following:

- Is there a statute, regulation, or policy that requires a specific approach or the use of specific tools or datasets?
- Are there partnership agreements for the water supply that require or constrain the selection of approaches, tools, or data for climate change analysis?
- Who will be performing the analysis?

Developing new tools and datasets or deploying existing tools and datasets to be used for planning often involves additional considerations because of the range of technical capacities and data needs at local levels. For example, in 2016, DWR developed tools and data for climate change analysis to be used for the Water Storage Investment Program (WSIP). DWR provided applicants with all the tools, data, and guidance needed to facilitate successful completion of the analysis. An important consideration in WSIP was that the datasets and tools had to cover the entire state (because projects under the program could be located anywhere in the state) and provide temporally and spatially consistent information for temperature, precipitation, runoff, and State Water Project/Central Valley Project (SWP/CVP) water deliveries. Because of these considerations, a novel approach had to be developed specifically for the program. Some water supply sources may be similar in the sense that they have not yet been analyzed for impacts from climate change, and they are complicated by their source, topography, legal obligations, infrastructure, or stakeholder goals and objectives, as well as other challenges.

E. Continuity with Previous Work/Studies

The following considerations are useful to ensure continuity with previous analyses to the greatest ability possible:

- Does the analysis/plan need to be consistent with previously performed work?
- Does this analysis fit within an existing framework or larger/programmatic plan that was already analyzed using a specific approach and dataset?
- Does the analysis build upon or update previously completed analysis or planning work?
- Has a similar analysis been completed previously?

When a new analysis connected to previous work is being performed, additional considerations are useful to maintain alignment with the previous work. In these situations, it is important to maintain coherence and alignment between previous work and new work while also addressing the need to evolve and incorporate scientific, analytical, and management improvements. This stresses the importance of beginning this process with a thorough examination of existing climate change analysis at the local/regional level up to the watershed and statewide levels.

Step 3: Developing Adaptation Strategies, Planning, and Implementation

Analyzing how a changing climate can impact the supplier's water reliability helps reveal what needs to be mitigated for and otherwise planned or implemented to decrease the increasing risks. Often the supplier's vulnerabilities to climate change are also vulnerabilities to existing extreme conditions. Climate change can create an added risk that raises some existing challenges to become higher priority. For example, if a supplier relies on groundwater in a basin that is already periodically affected by saltwater intrusion, it will likely need to take further actions to mitigate additional intrusion as sea level rises or seek new water sources.

The actions, infrastructure, and social processes of developing ways to mitigate climate change impacts is referred to as "climate adaptation." Adaptation strategies range widely depending on the needs of the supplier. They may include adding an additional water source as a back-up in case the existing sources decrease under climate change. This may involve both engineered infrastructure and legal actions to secure water rights. A supplier that identifies sea level rise as a threat to its coastal aquifer may decide to increase groundwater recharge to act as a barrier to saltwater intrusion. In the case where a supplier identifies increased risks of shortage in late summer months, the supplier might promote customer behavioral changes to reduce water usage during peak periods. How a supplier adapts to climate change varies widely and will depend on what types of projected impacts supplies and uses are exposed to as well as existing capacity to cope or otherwise mitigate those impacts. More information on developing climate change adaptation strategies can be found at resilientca.org/apg.

Additional resources to explore include:

- Watershed Resilience Framework and Toolkit — A Guide to Accelerate Resiliency in California's Watersheds (https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/California-Water-Plan/Docs/Update2023/Supporting-Documents/Watershed-Resilience-Framework-and-Toolkit.pdf)
- California Watershed Resilience Assessment (https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/California-Water-

Plan/Docs/Update2023/Supporting-Documents/California-Watershed-Resilience-Assessment.pdf)

H3. Climate Change Vulnerability Screening Form for Agricultural Water Management Planning

This screening exercise is intended to guide agricultural water management planners in identifying climate change vulnerabilities in their water supply source. The information gathered here can help guide the climate change analysis.

I. Water Supply and Demand

Q1: Are the water supply diversions sensitive to climate change?

A1: Both streamflows and water demands are likely to be affected by climate change. Any water supply source that involves long-term water diversions may be subject to conditions that differ from current or historical conditions. As average temperatures increase, water demands from agriculture, industrial, urban, and municipal users may increase resulting in changes to water availability. Droughts are also expected to become more frequent and more severe in the future potentially leading to increased restrictions on water diversions.

Q2: Is the water supply source affected by urban or agricultural water demand that might be climate sensitive?

A2: Would shifts in daily heat patterns, such as long heat lingers before night-time cooling, potentially change cropping patterns, landscaping, or water demand in other ways?

Q3: Is groundwater a major supply source?

A3: Climate change may affect natural recharge to aquifers. Droughts are expected to become more frequent and more severe in the future. In times of drought, California water users tend to rely more heavily on groundwater. These changing conditions would likely affect future groundwater conditions.

Q4: Does the water supply source rely on or could it be affected by snowmelt?

A4: As climate warming occurs a greater percentage of precipitation falls as rain instead of snow resulting in smaller snowpack. Also, higher temperatures result in remaining snowpack melting earlier. (All water diverted from the Sacramento River, San Joaquin River, Colorado River, or the Delta would be affected by changes in snowmelt.)

Q5: Does the water supply source come from or could it be affected by coastal aquifers? Has saltwater intrusion been a problem in the past?

A5: Coastal aquifers are susceptible to saltwater intrusion as sea levels rise and many have already observed salt intrusion as a result of groundwater overdraft.

Q6: Does the water supply source rely on or could it be affected by changes in stored water supplies?

A6: Changes in hydrology and water demand are likely to have significant effects on the amount of water stored in reservoirs, particularly water storage for carryover from one year to the next. Droughts are expected to become more frequent and more severe in the future potentially leading to changes in stored water supplies.

II. Extreme Heat

Q1: Could extreme heat impact operations of the water supply project or diversions?

A1: Climate change is altering seasonal patterns in California, making hot days hotter, and increasing the duration of heat waves. This change could increase usage and evaporative-related water losses.

Q2: Does the supply source rely on equipment or infrastructure that could be impacted by extreme or prolonged heat?

A2: Infrastructure impacts from extreme or prolonged heat can include things such as increased corrosion, wear from heat expansion, and difficulties operating cooling systems.

III. Water Quality

Q1: Could reduction in assimilative capacity of a receiving water body affect the water supply source?

A1: In the future, low flow conditions are projected to be more extreme and last longer. This may result in higher pollutant concentrations where loadings increase or remain constant, including potentially in groundwater as observed in the 2012-2016 Drought.

Q2: Could the water supply source be affected by water quality shifts during rainfall/runoff events?

Q2: Although it is unclear how average precipitation will change with temperature changes, it is generally agreed that storm severity likely will increase. Areas that already observe water quality responses to rainstorm intensity may be especially vulnerable.

IV. Sea Level Rise

Q1: Is any of the water supply source infrastructure located in area that could be exposed to rising tides?

A1: Sea level rise and storm surge coinciding with high tide could pose risks to low lying water supply sources.

Q2: Could coastal erosion affect the water supply source?

A2: Higher sea levels and more severe storms in the future are expected to result in higher rates of coastal erosion.

Q3: Is the water supply source dependent on coastal structures, such as levees or breakwaters, for protection from flooding?

A3: Coastal structures designed for a specific mean sea level may be impacted by sea level rise.

V. Flooding

Q1: Is the water supply source or any of its associated infrastructure located within the 200-year floodplain? Does the water supply source rely on flood protection infrastructure such as levees or dams?

A1: DWR's best available floodplain maps are available for download.

Although it is unclear how average precipitation will change, it is generally agreed that storm severity will increase. More intense, severe storms may lead to higher peak flows and more severe floods.

VI. Wildfire

Q1: Is the water supply source located in an area that is expected to experience an increase in wildfire activity or severity? Would a wildfire result in damage to the water supply source infrastructure or interruption of its ability to perform as designed? Could the water supply source be affected by an increase in wildfire activity or severity in an upstream watershed or other adjacent area?

A1: Wildfires alter the landscape and soil conditions, increasing the risk of flooding with the burn and downstream areas. Some areas are expected to become more vulnerable to wildfires over time.

Appendix I – References

Cal Poly San Luis Obispo. Irrigation Training and Research Center. Flow Measurement. itrc.org/projects/flow.htm

California Roundtable on Water and Food Supply. 2011. Agricultural Water Stewardship. Recommendations to Optimize Outcomes for Specialty Crop Growers and the Public in California. A project of Ag Innovations Network, Sebastopol, CA. oaec.org/publications/agricultural-water-stewardship

Department of Water Resources California Irrigation Management Information System (CIMIS) Database. cimis.water.ca.gov

Department of Water Resources. 1975. Vegetative Water Use in California, 1974. Bulletin 113-3. Available from: waterboards.ca.gov/waterrights/water_issues/ programs/hearings/ elsur_ranch/docs/exhbts/blltn113_3.pdf

Department of Water Resources. California's Groundwater: Bulletin 118 Update. 2020. water.ca.gov/Programs/Groundwater-Management/Bulletin-118

Department of Water Resources. 2008. Managing an Uncertain Future: Climate Change Adaptation Strategies for California's Water. Available from: cawaterlibrary.net/wp-content/uploads/2017/05/Climate_Adaptation_Strategies.pdf

Department of Water Resources. California Water Plan Update 2023. water.ca.gov/Programs/California-Water-Plan/Update-2023

Department of Water Resources. 2012. A Proposed Methodology for Quantifying the Efficiency of Agricultural Water Use. wuedata.water.ca.gov/public/public_resources/ 3461454093/A%20Proposed%20Methodology%20for%20Quantifying%20the%20Efficiency%20of%20Agricultural%20Water%20Use.pdf

USBR Water Management Planner. 2020. usbr.gov/mp/watershare/docs/2020-watermanagment-planner-2020-08-18-final.pdf

USBR Water Measurement Manual. 2001. usbr.gov/tsc/techreferences/mands/ wmm/WMM_3rd_2001.pdf