State of California
The Natural Resources Agency DEPARTMENT OF WATER RESOURCES
Division of Statewide Integrated Water Management Water Use and Efficiency Branch

A Guidebook to Assist Agricultural Water Suppliers to Prepare a 2020 Agricultural Water Management Plan

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Tables and Figures

List of Acronyms, Abbreviations and Symbols

AB 1404	Assembly Bill 1404 (2007), 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
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act (1992)
CCR	California Code of Regulations
EWMP	Efficient Water Management Practices
DWR	Department of Water Resources
MOU	Memorandum of Understanding
RRA	Reclamation Reform Act (1982)
SB X7-7	Senate Bill X7-7, Water Conservation Act of 2009
SGMA	Sustainable Groundwater Management Act
SWP	State Water Project
SWRCB	State Water Resources Control Board
§	Code Section
USBR	United States Bureau of Reclamation
Water Code	California Water Code
WCP	Water Conservation Plan, per USBR requirements

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 make complying with the Water Code simpler for agricultural water suppliers and to assist these suppliers in creating a useful planning document. Its contents are not mandatory but are explanatory suggestions only. Agricultural water suppliers are free to use this Guidebook as they see fit.

1 Introduction

The California Legislature recognizes that water is a limited resource and it is important that this resource is managed to achieve long-term sustainability in all use sectors. The Agricultural Water Management Planning Acts of 1986 and 2009 were enacted to address the need to evaluate and improve the efficiency of agricultural water management. The 2018 Water Conservation Legislation (AB 1668 and SB 606) updated the 2009 Water Management Planning Act 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 in 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 were 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.

For future planning cycles, California Department of Water Resources (DWR) expects this Guidebook will be updated to assist in preparation of AWMPs that are more closely aligned with Sustainable Groundwater Management Plan Act Groundwater Sustainability Plans, where applicable.

A. Using this Guidebook

The document titled "A Guidebook to Assist Agricultural Water Suppliers to Prepare a 2020 Agricultural Water Management Plan" (Guidebook) was prepared by the DWR to assist agricultural water suppliers in understanding and complying with the requirements of the

SB X7-7- Water Conservation Act (Steinberg, Statute of 2009) (Section I, Part 2.55, Division 6 of the California Water Code), the associated Agricultural Water Management Planning Act (Section I, Part 2.8, Division 6 of the Water Code), the Agricultural Water Measurement Regulation (Title 23 California Code of Regulations), and AB 1668 Water Management Planning (Friedman, Statute of 2018).

The Guidebook is intended to clearly identify Water Code required information and elements, provide guidance on ways the Agricultural Water Supplier can address the requirements, as well as to identify potential additional information or details an Agricultural Water Supplier can consider in order to develop a plan that is useful for their own operations and management and to improve long-term system reliability.

This Guidebook also describes how water conservation plans submitted to the U.S. Bureau of Reclamation (USBR) can be supplemented to satisfy the Water Code and Agricultural Water Measurement Regulation requirements.

B. Guidebook Objectives

Specifically, the objectives of this guidebook are to:

- Support Agricultural Water Suppliers in preparing AWMPs that are useful planning documents.
- Inform water suppliers of AWMP required elements identified in the California Water Code (Water Code) and 2018 updates to 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 [CCR], §597 et seq.).
- Describe how to submit a completed 2020 AWMP to DWR.

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

C. 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 Form electronically to DWR.

April 1, 2021 Adopt 2020 AWMP. Submit 2020 AWMP electronically to DWR within 30 days of adoption.

> ***NEW:*** *All AWMPs must now be submitted electronically to DWR*

D. Agricultural Water Management Planning Background

1. Update on New Requirements

a. New AWMP Content Requirements pursuant to AB 1668:

- Annual water budget, on a water-year basis, based on quantification of all inflow and outflow components for the service area (includes six specified components) (Water Code §10826(c)).
- Identification of water management objectives based on the water budget to improve system efficiency or to meet other water management objectives (Water Code Section §10826(f)).
- Quantification of water use efficiency using the appropriate method(s) from DWR's 2012 Report to the Legislature, "A Proposed Methodology for Quantifying the Efficiency of Agricultural Water Use". In quantifying the efficiency of agricultural water use, aall

water uses must be accounted for including: crop water use, agronomic use, environmental use, and recoverable surface flows (Water Code §10826(h)).

- A Drought Plan for periods of limited water supplies describing actions for drought preparedness (resilience planning) and management and allocations of water supply during drought conditions (response planning) (Water Code §10826.2).

b. New Submittal and Compliance Requirements (Water Code § 10820)

- The AWMP due date has been changed to April 1, 2021 (and every five years following). Suppliers still have 30 days to submit to DWR after adoption.
- AWMPs must now be submitted electronically and include any standardized forms, tables, or displays specified by DWR.
- The AWMP still must comply with §10826 (plan contents), which now includes additional components.
- If an Agricultural Water Supplier is not compliant because they didn't submit an AWMP update on time (by May 1, 2021), they have 120 days to submit a completed plan before DWR may take action.
- If a submitted AWMP update is not complete, the Agricultural Water Supplier has 120 days after notice by DWR to submit a completed plan before DWR may take action.
- For non-compliance, DWR can take action in the following ways:
  - DWR may contract a third party to write an AWMP for the agricultural water supplier. The supplier will be responsible for all costs. 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 the 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.

- DWR can extend the timeline before taking action if DWR deems sufficient progress is being made towards completion.

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

Government Code §7405(a) requires State entities to comply with accessibility requirements of §508 of the federal Rehabilitation Act of 1973, as amended (29 U.S.C. §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 Internet Web site.

In accordance with Water Code §10844(a), the agricultural water supplier is still required to post their AWMP on their own website. If an agricultural water supplier does not have an Internet Web site, they may submit their plan to DWR to post. This means that:

- AWMPs submitted electronically to DWR for Water Code §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 agricultural water 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 with a statement of certification that the document is compliant.

2. California Water Code Requirements to Adopt and Submit a Plan

The Agriculture Water Management Planning Act (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 §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 and submits 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 the 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 (Part 2.8 of the Water Code).

Important note regarding water supplier loan and grant eligibility

AWMPs that meet the Water Code requirements and implementation of EWMPs are necessary for water loan and grant eligibility. If an agricultural water supplier doesn't implement all the EWMPs, the supplier can still be eligible if the following documentation is submitted to DWR:

- Schedule to implement EWMPs (Section 3.7 of this Guidebook)
- Documentation justifying EWMPs are not locally cost effective or technically feasible. (Section 3.7 of this Guidebook)

3. 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, §5003). Guidance on how to demonstrate consistency with the Delta Plan is included in this Guidebook as Appendix C.

E. Submittal Requirements - What to Submit

Agricultural water suppliers (defined above) are required by the Water Code to submit to DWR an AWMP that addresses the elements listed in Water Code §10826. Agricultural water suppliers who are USBR contractors can meet the water management planning requirements by submitting approved USBR plans. 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 §10826 lists the elements that are required to be discussed and addressed in an agricultural water management plan. Agricultural water suppliers are also required by the Water Code to report on Efficient Water Management Practices (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 3.7 of this Guidebook).

Agricultural water suppliers must also include any additional documentation necessary to comply with the Agricultural Water Measurement Regulation in

the AWMP (see Section 3.8 and Chapter 6 of this Guidebook). Per §10821(b) of the Water Code, amendments or changes to the AWMP shall be adopted and submitted per Article 3, §10840-10844.

Per §10829 of the Water Code, two or more water suppliers may participate in area wide, regional, watershed, or basin wide AWMP as a means of sharing the cost of preparing a plan.

> All agricultural water suppliers subject to SB X7-7 must implement the critical EWMPs (outlined in Water Code §10608.48 (b)) and conditional EWMPs (outlined in §10608.48 (c) if they are locally cost effective or technically feasible.

F. Alternative for agricultural water suppliers that submit plans to U.S. Bureau of Reclamation

Agricultural water suppliers that submit water conservation plans under the Central Valley Improvement Act of 1992 (CVPIA) or Reclamation Reform Act of 1982 (RRA) may submit these plans and any other required documentation to DWR to meet the water management planning requirements of Water Code Section 10820 if the following conditions are met:

1) The water management/conservation plan has been adopted by the agricultural water 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. The Water Code does not require these agricultural water suppliers to prepare and adopt water management/conservation plans on a schedule different from that required by the USBR.

Agricultural water suppliers that submit a plan to USBR may meet the requirements of Water Code §10608.48(d), (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

All Agricultural Water suppliers subject to the Agricultural Water Management Planning Act must provide:

Attachment A - Legal Certification and Apportionment Required for Water Measurement

Attachment B - Engineer Certification and Apportionment Required for Water Measurement

Attachment C - Description of Water Measurement Best Professional Practices

Attachment D - Documentation of Water Measurement Conversion to Volume

Attachment E - Device Corrective Action Plan Required for Water Measurement

(required by Water Code §10608.48(d); see Section 3.7 of this Guidebook). Additional documentation required by the Agricultural Water Measurement Regulation, can be submitted as Attachments A through E of the AWMP, (see Chapter 6 of this Guidebook). This documentation should be in the plan submitted to the USBR for plans that have not yet been accepted as adequate by the USBR. Documentation can also be directly submitted with the plans to DWR for those plans that have already been accepted by the USBR as adequate, no earlier than April 1, 2017. The plan's preparation, adoption, and submittal process should comply with Water Code Part 2.8 (see Chapter 4 of this Guidebook).

G. Aggregated Farm-Gate Delivery Report

The Aggregated Farm-Gate Delivery Report is **not** a 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 agricultural water 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.8 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 agricultural water supplier's service area.

Agricultural water 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:

https://water.ca.gov/Programs/Water-Use-And-Efficiency/Agricultural-Water-Use-Efficiency

NEW: *New due date and reporting requirements for Aggregated Farm-Gate Delivery Reports*

H. Guidebook Organization

This Guidebook is organized into seven parts:

- **Introduction** – includes background information, important dates, and submittal process.
- **Agricultural Water Management Plan Preparation** – includes a checklist that shows all requirements of the Water Code and a template that can be used to prepare an AWMP.
- **The Water Code Agricultural Water Management Plan Preparation Guidance** – includes specific guidance and suggestions for addressing the Water Code AWMP requirements
- **USBR CVPIA/RRA Process Guidance** - includes the 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.
- **Water Measurement Documentation** – includes Agricultural Water Measurement Regulation reporting documentation in the AWMP.
- **Appendix A: AWMP 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.

2 Agricultural Water Management Plan Preparation

This chapter identifies Water Code requirements for preparing an AWMP and the Agricultural Water Measurement Regulation reporting requirements in the AWMP. These requirements are listed in the Checklist below and in the AWMP Template (Appendix A1), which can be used to prepare the AWMP.

The following section, Chapter 3, details Water Code requirements, identifies what data could 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 §10820(a)(2)(B)). However, until a rulemaking process has been completed, DWR is not requiring any standardized tables or displays.

DWR does encourage agricultural water suppliers to use the tables that were developed for reporting, which are located in Appendix A1 and on the AWMP submittal portal at: https://wuedata.water.ca.gov/secure/login_auth.asp?msg=inactivity&referer=%2Fsecure%2FDefault%2Easp?. Use of these tables assists DWR in reviewing AWMPs and contributes to clarity and consistency for certain requirements.

Checklist

The following checklist can be used by the water supplier 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 water suppliers submitting plans to expedite review and to help ensure plans are complete. DWR will use this checklist while reviewing plans. The checklist has been updated with the new changes 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	**Added to the Water Code:** AWMP submitted to DWR no later than 30 days after adoption; AWMP submitted electronically	**New to the Water Code:** 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)
ser Input	1.6, 5.1	Adopted and submitted to USBR within the previous four years, AND	10828(a)(1)
Us	1.6, 5.1	The USBR has accepted the water management/conservation plan as adequate	10828(a)(2)
put	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

AWMP* Location	Guidebook Location	Description	Water Code Section (or as identified)
	3.1 A	Description of previous water management activities	10826(d)
	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
User	3.1 B.2	At least 5 days between publications? (not including publication date)	GC 6066
User	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 Internet Web site within 30 days of adoption?	10844(a)
	3.1 C.3	If no Internet Web site, 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

AWMP* Location	Guidebook Location	Description	Water Code Section (or as identified)
	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)
	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)
User Input	3.4 A	Agricultural.	10826(b)(5)(A)
Us	3.4 B	Environmental.	10826(b)(5)(B)
U	3.4 C	Recreational.	10826(b)(5)(C)
User	3.4 D	Municipal and industrial.	10826(b)(5)(D)
nput	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 agricultural water supplier's supplies as:	10826(b)

AWMP* Location	Guidebook Location	Description	Water Code Section (or as identified)
	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 A.4	Drainage from the water supplier's service area.	10826(b)(6)
	3.5 B	Description of the quality of agricultural waters suppliers supplies as:	10826(b)
	3.5 B.1	Surface water supply.	10826(b)(1)
	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	**Added to Water Code:** Annual water budget based on the quantification of all inflow and outflow components for the service area.	**Added to Water Code** 10826(c)
	3.7 C	**Added to Water Code:** Identify water management objectives based on water budget to improve water system efficiency	**Added to Water Code** 10826(f)
	3.8 D	**Added to Water Code** Quantify the efficiency of agricultural water use	**Added to Water Code** 10826(h)
	3.9	Analysis of climate change effect on future water supplies analysis	10826(d)
	4	Water use efficiency	10826(e)

AWMP* Location	Guidebook Location	Description	Water Code Section (or as identified)
		information required pursuant to § 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 § 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)
	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)

AWMP* Location	Guidebook Location	Description	Water Code Section (or as identified)
	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)
	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

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3 Agricultural Water Management Plan Preparation Guidance

This chapter of this Guidebook contains detailed information and instructions to assist agricultural water 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 §597)). It groups the requirements by topic and in an order that an agricultural water supplier can follow while preparing their AWMP. Each section includes the pertinent legislation and references the AWMP template in Appendix A that the water supplier can use. Additional information an agricultural water supplier can include in its AWMP is also suggested.

In preparing an AWMP, the agricultural water 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, an agricultural water supplier has the discretion to present most of the information in whatever manner they choose. This allows the agricultural water supplier to present water management information in a manner 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 understand district history, operations, and characteristics.

It is suggested that neighboring agricultural water 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/MOU with other signatories or agencies and should meet or exceed the requirements of the Water Code.

Chapter 3 is organized consistent with the AWMP Template outline (Appendix A1) and DWR uses the general organizational outline,

below, to discuss the contents of an AWMP.

A. 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/when it was adopted, and submittal/availability of the AWMP. Although the Water Code does not require the agricultural water 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 A1).

All agricultural water suppliers, regardless of whether they submit plans following the Water Code requirements or the USBR CVPIAA/RRA process, must follow the Water Code plan adoption and submittal requirements. Adoption and submittal requirements for Water Code plans are discussed in Sections B and C, below. Refer to Chapter 4 for what to do under the USBR CVPIAA/RRA process.

1. Description of Previous Water Management Activities (Water Code §10826(d)).

> *"Describe previous water management activities." (*Water Code §10826(d)*)*.

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.

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

2. Coordination Activities

a. 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 §10821(a))

The agricultural water supplier is 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 agricultural water supplier chooses to also notify other agencies, a list of these agencies could be provided.

Involving relevant stakeholders in the planning and plan preparation process can help an agricultural water supplier coordinate activities and address potential issues in advance. If the agricultural water 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.

b. 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 § 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 §10841).

Government Code §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 agricultural water 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 agricultural water 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 requirement. 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 opportunity 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. AWMP Adoption, Submittal, Review and Availability

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

a. AWMP Adoption

> "*After the public hearing, the plan shall be adopted as prepared or as modified during or after the hearing." (Water Code §10841)*
>
> *"Amendments to, or changes in the plan shall be adopted and submitted in the manner set forth in Article 3 (commencing with § 10840)." (Water Code §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 §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 §10844 (b))

Agricultural water 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 agricultural water supplier does not have an Internet Web site, they can document compliance by the new electronic submittal requirement within 30 days of adoption.

DWR provides a portal through which plans can be submitted at their WUEdata website at:

https://wuedata.water.ca.gov/

The agricultural water supplier is encouraged to include a copy of the Resolution of Plan Adoption in AWMP Section VIII to show compliance with Water Code plan adoption requirements.

b. 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 §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 (b) of § 10820* (Water Code §10843(a))

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

> *"An agricultural water supplier shall submit a copy of its plan to each for 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.

c. Submission to DWR:

Send the AWMP and applicable documentation required by the Water Code and the Agricultural Water Measurement Regulation 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. Please see Section 3.1.F of this Guidebook for DWR posting of AWMPs.

The electronic copy can be sent by 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 (https://wuedata.water.ca.gov/).

CDs or thumb drives should be mailed to:

Agricultural Water Use Efficiency
Department of Water Resources
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
901 P Street, Room 313A Sacramento,
CA 95814

NEW: *DWR will no longer accept paper (hard) copies of AWMPs or Federal WMPs.*

CVPIA/RRA Water Suppliers

For CVPIA/RRA water suppliers whose plans have been accepted as adequate by the USBR, the water supplier is responsible for the timely submittal of the AWMP to DWR. These suppliers submit the plan and applicable documentation directly to DWR. **Reclamation will not forward plans to DWR**.

d. 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.

4. 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.

The Water Code also requires water supplier to implement its plan in accordance to the schedule presented in its AWMP. DWR encourages the agricultural water supplier to provide a general schedule for implementation of the AWMP.

DWR will inform water suppliers on the status of the review as follows:

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

- *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 §10820(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 §10820(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.*

- Per Water *Code* §*10820(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.*

This new addition to the Water Code describes four potential compliance situations:

a. Submitted on-time and addresses all Water Code Requirements;

An agricultural water supplier that submits their AWMP or CVPIAA/RRA WMP by May 1, 2021 and DWR review finds that the AWMP addresses all Water Code requirements is in compliance and no further action is 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 (refer to Section 4 of this Guidebook for details).

b. Non-Submittal by May 1, 2021:

DWR will send letters or emails to agricultural water suppliers that did not submit an AWMP by May 1, 2021 (30 days after required adoption date by April 1, 2021). **These agricultural water suppliers are not in compliance with the Water Code until they submit to DWR an**

AWMP (WMP for CVPIAA/ RRA water suppliers).

c. Submitted Plans Reviewed as Not Meeting Requirements:

Following review of submitted plans for meeting Water Code requirements, DWR will send a letter or email to those agricultural water suppliers who's AWMP does not address the Water Code requirements. This letter will specify deficiencies that need to be addressed. The agricultural water supplier:

- Must submit a corrective action plan
- Has120 days, from receipt of DWRs letter, to remedy the identified deficiencies.

Agricultural water suppliers that do not submit corrective actions/remediated AWMP 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 agricultural water supplier's best interest to work with DWR and keep DWR informed of their progress.

d. Continued Non-Compliance:

After 120 days, if no AWMP or corrective action has been submitted or insufficient progress is being made toward completing an AWMP that meets Water Code requirements, DWR will implement Water Code §10820(b)(3); **a third party will be contracted to complete the AWMP for the agricultural water supplier at the agricultural water supplier's expense**. Therefore, it is important that non-compliant agricultural water suppliers work with DWR towards remedying any deficiencies.

5. DWR AWMP Website

Water Code §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."

Government Code §7405(a) requires State entities to comply with accessibility requirements of §508 of the federal Rehabilitation Act of 1973, as amended (29 U.S.C. §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 §10844(a), the agricultural water supplier is still required to post their AWMP on their own website. AWMPs posted on the agricultural water supplier's own website must only meet their own website content requirements. If an agricultural water 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.

"*An agricultural water 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 agricultural water supplier*" (Water Code §10842).

B. DWR Report to California Legislature

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

In accordance with the Water Code (§10845(a)), DWR, in consultation with the State Water Resources Control Board, will report to the Legislature on or before April 30, 2022, on the status of all submittals. DWR will not approve, disapprove, or critique individual submittals in its report to the Legislature and will provide a copy to the agricultural water suppliers that submitted AWMPs.

The report will:

- Identify agricultural water suppliers that have submitted an AWMP that addresses the requirements of the Water Code,
- Identify agricultural water suppliers that have not met the requirements,
- Identify outstanding elements of the AWMPs,
- Include EWMPs that have been implemented and planned for implementation,
- Include an evaluation of the effectiveness of the Water Code in promoting efficient water management practices,
- Include an assessment of how the implementation of EWMPs has affected and will affect agricultural operations,
- Include an estimate of the water use efficiency improvements identified in the AWMPs, and
- Possibly make recommendations to the legislature on proposed changes to the Water Code.

C. Description of the Agricultural Water Supplier and Service Area

Water Code §10826 (a) requires a description of the agricultural water supplier and the service area:

> *"(a) Describe the agricultural water supplier and the service area, including all of the following:*
>
> *(5) Size of the service area.*
> *(6) Location of the service area and its water management facilities.*
> *(7) Terrain and soils.*
> *(8) Climate.*
> *(9) Operating rules and regulations.*
> *(10) Water delivery measurements or calculations.*
> *(11) Water rate schedules and billing.*
> *(12) Water shortage allocation policies."* (Water Code §10826(a))

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, this Guidebook suggests a reasonable level of detail to assist the agricultural water supplier in preparing an AWMP that can be used for water management planning and for providing information to address Water Code §10826(b) requirements. This Guidebook organizational outline 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.

Information in this section can provide a basis for evaluating structural or operational improvements, including basic information about physical and operational aspects that may affect water management.

This section is also an opportunity to provide some background information, such as the agricultural water supplier 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.

1. Physical Characteristics

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

While the water 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 water 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 sizes of these areas could assist the agricultural water 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 agricultural water 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.

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

A description of the location of the service area and water management facilities is required by the Water Code. However, how the water supplier describes these is at the discretion of the water 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 agricultural water supplier in planning, management, and operations.

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

- **Boundary Map(s)** of the service area showing county boundary, underlying groundwater basin/sub-basin boundaries, irrigated acres boundary, other pertinent boundaries, 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 agricultural water supplier.

When including maps, all maps should have a legend to identify the type of feature, be labeled with the agricultural water supplier's identifiers, and notes regarding source(s) of data. Maps can be combined if 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 webgis portal at:

https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#boundaries

c. Terrain and soils (Water Code §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 water supplier. It is suggested that the water supplier:

- **Information for Annual Water Budget.** Include data needed to determine the required annual water budget effective precipitation, outflows, and deep percolation if not using a model database (e.g., CalSIMETAW already includes soils data to help in these calculations).

- **Topography**. Describe the topography of the water 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, 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.

  It may also be useful to include a discussion on the potential for terrain and soil conditions to affect water operations and management within the service area.

  - What constraints may be present?
  - What opportunities may be present?

Resources:

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: https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx. The WebSoil Survey tool at this location can be used to delineate portions

of the service area and calculate summary information for soils within the area.

The SSURGO and STATSGO digital soil databases, along with other useful digital maps and databases, can be downloaded here: https://datagateway.nrcs.usda.gov/

d. Climate (Water Code §10826 (a)(4))

A description of the climate is required by the Water Code. However, the detailed description of the service area climate is at the discretion of the water supplier.
It is suggested that the water 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 (see Section A3);
- And, 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., CalSIMETAW), 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: http://www.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:
  https://cimiswater.ca.gov/
- Pertinent climate factors summaries used in developing the required annual water budgets (see Section 3.5.B) for each year covered under this AWMP.
- Potential future climate change conditions

Variability. For areas within the water 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.

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 water supplier.

Understanding and describing the operational characteristics could be a key component in identifying opportunities and constraints and assist in developing and implementing the water supplier's water management objectives (see Section 3.7), as well as for managing

water supplies during periods of limited supplies.

The agricultural water supplier is encouraged to include a description of how deliveries are fulfilled (e.g., on-demand deliveries, constant head flows, pressurized systems v. 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 agricultural water 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 Section B.4, below).

a. Operating rules and regulations (Water Code §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 water supplier. Agricultural water 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 water supplier's service area; restrictions on deliveries; and, other practices, as appropriate.

b. Water delivery measurements or calculations (Water Code §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 water supplier. In this section, the agricultural water 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 agricultural water 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 Chapter 5 of this Guidebook), can be included in Section VIII (Supporting Documentation) of the AWMP and referenced or summarized in this section.

c. Water rate schedules and billing (Water Code §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 agricultural water supplier. It is suggested that the AWMP describe:

- The basis for agricultural usage water charges and the adopted pricing structure. A copy of the water 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, crop, 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 §10826(e) and §10608.48(b). Refer to Section 3.7 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 agricultural water supplier is pursuing or may be 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.

d. Drought Plan (Water Code § 10826.2) and Water Shortage Allocation Policies (Water Code §10826(a)(8))

NEW

The previous 2015 AWMP required a Drought Plan per EO B-29-15. However, there were no details as to what should be included in the Drought Plan. The 2018 legislation added the Drought Plan requirement as part of the AWMP contents and includes details on

what must be included. The new requirements include both resilience planning and drought action/response planning.

While we have incorporated the Drought Plan guidance in the Operational Characteristics section discussion, the water supplier may wish to create the Drought Plan as a stand-alone document and include it in the AWMP as an attachment. A stand-alone document included as an attachment, may provide a more useful tool for drought preparation and management during drought conditions because it is easier to reference.

In accordance with previous AWMP plan content requirements, the agricultural water supplier must still also describe water shortage allocation policies. Because the water shortage allocation policies are a component of the Drought Plan, these two requirements have been combined in this section. The agricultural water supplier may wish to draw upon its experience during the 2012-2016 drought to address the following elements.

(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 § 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 § 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 this section or in the Drought Plan. If the supplier does not have such a policy, the agricultural water supplier can describe how water supplies will be allocated when supplies are limited.

(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 to make it easier to use and reference. The Drought Plan could then be included the AWMP as an attachment in Section VIII. Regardless of where it is located, all of 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 the following components (Water Code 10826.2).

Drought Resilience Planning

The drought plan shall contain both of the following:

(a) Resilience planning, including all of the following:

(a) Data and Indicators

(1) Data, indicators, and information needed to determine the water supply availability and levels of drought severity.

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.

Resources:

The State Water Project (https://water.ca.gov/Programs/State-Water-Project), and *Central Valley Operations Office* (https://www.usbr.gov/mp/cvo/index.html) 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, tthe California Statewide Groundwater Elevation Monitoring (CASGEM) Program provides seasonal and long-term groundwater elevation trends to assist in assessing groundwater availability (https://water.ca.gov/Programs/Groundwater-Management/Groundwater-Elevation-Monitoring--CASGEM)

The *National Integrated Drought Information System (NIDIS)* https://www.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.

(b) Drought Vulnerability

> *(2) Analyses and identification of potential vulnerability to drought.*

Resilience planning must also include an assessment of the agricultural water supplier's vulnerability to droughts. A varied water supply portfolio is typically more resilient; agricultural water 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 water supplier should assess their conditions and identify their potential vulnerability to drought.

The water 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.

(c) Opportunities and Constraints

(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 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.

(A) **Technology and Information**. Technology and information is ever expanding and improving. Agricultural water suppliers are encouraged to explore what new technology is currently available that might help prepare for periods of water shortage. Additionally, the water 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: https://cimis.water.ca.gov/SpatialData.aspx
- Cal Poly SLO ITRC: http://www.itrc.org/
- Fresno State CIT: https://www.fresnostate.edu/jcast/cit/

(B) **Additional Water Sources.** In assessing potential vulnerability and resilience, the agricultural water supplier can also identify long-term projects and actions that may help mitigate existing and potential future vulnerabilities. Agricultural water 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 water 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.

(C) **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 agricultural water 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 time line also be included, along with potential funding mechanisms, if applicable.

Drought Response Planning

(b) Drought response planning, including all of the following:

(a) Water Shortage Policies Implementation

(1) Policies and a process for declaring a water shortage and for implementing water shortage allocations and related response actions.

The Drought Plan must also contain specific elements for response planning. In this section, the agricultural water 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 agricultural water 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 water 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.

(b) Enforcement and Appeals

(2) Methods and procedures for the enforcement or appeal of, or exemption from, triggered shortage response actions.

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 water 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 water 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.

(c) Monitoring and Evaluation

> *(3) Methods and procedures for monitoring and evaluation of the effectiveness of the drought plan.*

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 can 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).

(d) Communication Protocols

> *(4) Communication protocols and procedures to inform and coordinate customers, the*

public, interested parties, and local, regional, and state government.

Communication and coordination is 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 the agricultural water supplier coordinate in advance with other agencies and interest groups to develop an appropriate strategy and contacts.

(e) Financial Impacts

(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.

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 water 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 water supplier is encouraged to consider the

impacts from the 2012-2016 drought period 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:
http://www.fao.org/climate-smart-agriculture/knowledge/practices/drought/en/

National Integrated Drought Information System:
https://www.drought.gov/drought/resources/planning-preparedness

Lessons from California 2012-2016 Drought:
https://ascelibrary.org/doi/full/10.1061/%28ASCE%29WR.1943-5452.0000984

D. 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 agricultural water supplier's service area. Information in this section can be used to prepare the annual water budget as required by Water Code §10826 (c) and assist in determining the annual groundwater budget as required under SGMA. Information in this section may also be used to inform the agricultural water supplier's Drought Plan resilience planning and water management objectives. See Section III of the AWMP Template.

Water Code §10826 (b) requires a description of the quantity of all underlying items, including the water uses identified under §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 §10826 (c) (annual water budget) and to assist the agricultural water supplier in preparing an AWMP that is useful for water supply planning.

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

Annual Water Budget. The annual water budget, required by Water Code §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. The agricultural water supplier can assemble and report some of these components in this section to facilitate calculation of the annual water budget.

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 §10826 (c), it is suggested that:

1. 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 §10826 (b)(5).
2. Information be reported by groundwater basin or sub-basin to assist in or inform any GSP requirements.
3. 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.
4. Use the same water-years to report all quantities in all tables/descriptions in Sections III through IV of the AWMP (detailed in Sections 3.3 through 3.5 of this Guidebook).
5. 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 water supplier is encouraged to identity 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, agricultural water 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 water 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 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 agricultural water 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 agricultural water supplier is encouraged 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); and/or,
- Anticipated changes in land use (e.g., conversion of agricultural land to developed land, land fallowing).
- Potential changes in climate conditions that could affect water use.

1. Agricultural Water Use (Water Code §10826 (b)(5)(A))

A description of the quantity of agricultural water use within the service area is required by Water Code. In this section, how the water supplier describes the quantity of agricultural water use is at the discretion of the supplier. However, because an annual water budget is now also required by Water Code §10826(c) and Water Code §10826(h) requires calculation of water use efficiency fraction that accounts for agricultural water use, agricultural water use must be quantified for the past 5 plan-cycle years. Agricultural water suppliers are therefore encouraged to report information necessary for the annual water budget and water use efficiency calculations in this section.

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

- Quantification of water delivered to all of the water 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 agricultural water 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 (refer to Section 3.5.B and Section V of Appendix A2, in this Guidebook).

- **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).
- **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 agricultural water 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 agricultural water 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. Technical assistance for determining agricultural water use is available through DWR's Regional Offices who have personnel trained in the use of California Simulation of Evapotranspiration of Applied Water Model (CalSIMETAW). 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 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:http://wwwcimis.water.ca. gov/

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

> NEW: Some agricultural water suppliers required to prepare and submit an AWMP are also Groundwater Sustainability Agencies (GSA). Under SGMA, these agricultural water suppliers will need to submit annual water budget reports for each water year starting in 2020 or 2023, depending on whether they overlay critical or high priority basins, respectively. It may be helpful to begin collecting and reporting water budget data needed to meet SGMA requirements in their AWMP preparation process.

2. Environmental Water Use (Water Code §10826 (b)(5)(B) and §10826 (h))

A description of the quantity of environmental water use is required by the Water Code §10826(b)(5)(B). DWR encourages the agricultural water 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 environmental uses. It is up to the water supplier which water use is chosen for reporting and accounting, although

categorizing the water use by its primary function is recommended. In these situations, text can be used to describe the situation. However, the agricultural water 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. Recreational Water Use (Water Code §10826 (b)(5)(C))

A description of the quantity of recreational water use is required by the Water Code. DWR encourages the agricultural water supplier 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.

4. Municipal and Industrial Use (Water Code §10826 (b)(5)(D))

A description of the quantity of municipal and industrial uses is required by the Water Code. DWR encourages the agricultural water supplier to describe what municipal and industrial uses in the service area receive water from the agricultural water 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.

5. Groundwater Recharge Use (Water Code §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.

Agricultural water suppliers will need to describe and quantify the amount of water used annually for groundwater recharge. DWR encourages the agricultural water supplier to also provide this

quantification 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 agricultural water 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 agricultural water supplier contributes to groundwater recharge outside of the service area, this groundwater recharge use must also be identified and quantified in the AWMP.

> ***NEW:*** Groundwater recharge quantity description includes irrigation seepage and deep percolation.

E. Description of Quantity and Quality of the Water Resources of the Agricultural Water Supplier

The intent of this section is to describe the sources of water available to the agricultural water supplier. It describes the quantity and quality of each water source including surface water, groundwater, and other sources of water supplies. By understanding the water sources the water supplier can better identify opportunities and constraints to assist the agricultural water 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.

1. Water Supply Quantity

Water Code §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.

Water uses within the agricultural water supplier's service area.

[Note: Item (5) is addressed in Section 3.3 of this Guidebook.]

Although the legislation does not specify the mechanisms or level of detail that 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 §10826 (b), §10826(c), and §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 agricultural water 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 agricultural water 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 agricultural water 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

water supplier provides water to another water user, the AWMP should make note of this. For water obtained from wholesale sources, the agricultural water 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 §10826 (c)). To provide a meaningful and consistent basis for water budgeting, in accordance with Water Code §10826 (c), it is suggested that the water 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 (detailed in Sections 3.3 through 3.5 of this Guidebook).
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 agricultural water 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.

a. Surface Water Supply (Water Code §10826 (b)(1))

To address the legislative requirements for a description of surface water supply quantities, DWR is providing the AWMP Template for the agricultural water suppliers to include the following surface water supply information:

- A brief description of the total amounts and types of each of the water 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 agricultural water supplier to include in the AWMP:

- The annual amount of water received from each source for representative year or 2020 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 water 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.

b. Groundwater Supply (Water Code §10826 (b)(2))

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

- Identify the groundwater basin(s)/subbasin(s) directly pumped by the agricultural water 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 agricultural water supplier's wells and groundwater recharge areas.

- The annual quantity of groundwater pumped directly by the agricultural water supplier. Provide the rationale and documentation for the method used if groundwater water supplies are estimated from non-metered wells, whether owned by the water 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 agricultural water supplier provide a brief description of the groundwater basin and amount of groundwater supplies available to the agricultural water supplier.

If the water supplier operates a conjunctive use program, DWR encourages the agricultural water 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 §10826(b)(2), however, this quantity is required for calculating the annual water budget in Section V (§10826(c)). The agricultural water 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 water 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 water 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 §10826(c) but does not need to be reported in this section).

If private groundwater wells are metered and data are available, the agricultural water 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 agricultural water supplier may choos which model or calculation methods are.

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 agricultural water 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 agricultural water 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.

Resources

Helpful information necessary to describe ground water basins can be found in California DWR Bulletin 118 available at: https://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 sustainable groundwater management plans (SGMPs). DWR encourages agricultural water suppliers to identify the prioritization of groundwater basins or sub-basins underlying their service area. Information on basin prioritization can be found at: https://water.ca.gov/Programs/Groundwater-Management/Basin-Prioritization

If the agricultural water supplier is also a GSA tasked with preparing and implementing the GSP, careful completion of this section can assist the water 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: http://www.water.ca.gov/groundwater/casgem/

DWR is currently exploring additional methods to determine private groundwater pumping. Please visit the WUE website (www.water.ca.gov/Programs/Water-Use-And-Efficiency) for new methods or studies as they become available.

c. Other Water Supplies, including recycled water (Water Code §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 agricultural water 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 agricultural water supplier's 'portfolio', this quantity is required as part of the annual water budget and water use efficiency calculations (Water Code §10826(h)) and could be included either here or in the water budget section.

It is suggested that 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.

(1) 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 §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 §13050(n))*

The agricultural water 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 agricultural water supplier in long-term planning.

(2) Effective Precipitation

A description of effective precipitation is not required by §10826(b)(2). However, this quantity is required for calculating the annual water budget in Section V (§10826(c)) and is used in the required water use efficiency calculation ("Proposed Methodology for the Quantifying the Efficiency of Agricultural Water Use"), even though it may not be considered part of the water supplier's 'portfolio'. If the agricultural water 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 runoff during a rainfall event, some will percolate to 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.

- The type of soil can affect how quickly precipitation will infiltrate, runoff, or drain to deep percolation.
- Seasonal rainfall patterns can affect whether or not the soil is already saturated and can't hold any more water in the rootzone or if the soil is dry and can hold water.
- High intensity rainfall events may produce more water than the soil can infiltrate and the rest will runoff.
- Crop types use water at different rates and have different root zone depth and area. 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.
- Warm temperatures can often increase crop growth, thereby drying up the soil faster.

d. 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).

Resources

DWR provides direct technical assistance and tools to agricultural water 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:

https://cimis.water.ca.gov/.

- The CalSIMETW (California Simulation of Evapotranspiration of Applied Water) 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 CalSIMETAW. Agricultural water 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 (https://water.ca.gov/Programs/Water-Use-And-Efficiency/Land-And-Water-Use/Agricultural-Water-Use-Models)

If a model has been developed, the agricultural water supplier can contact the GSA for assistance in determining local effective precipitation. If a model has not yet been developed, the agricultural water supplier is encouraged to work with the local GSA or the SGMA Program if they are the GSA to develop the data and modules needed to determine effective precipitation and other water budget components for reporting in the AWMP. The agricultural water 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.

2. Water Supply Quality

As noted in the previous section, the Water Code §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 agricultural water supplier in preparing an AWMP that can be used for water management planning.

DWR encourages the agricultural water 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 agricultural water 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 3.3 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: https://www.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 agricultural water supplier or their wholesaler, the monitoring practices must also be described in the AWMP (Section IV.C).

a. Surface Water Supply Quality (Water Code §10826 (b)(1))

To address the legislative requirement for a description of the surface water supply quality, DWR encourages the agricultural water 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/TMDL Program for the 303(d) list at: https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2014_2016.shtml.
- If the surface water source is subject to a Total Maximum Daily Load (TMDL), and if so, for what pollutants (for applicable TMDLs within the agricultural water 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.

b. Groundwater Supply Quality (Water Code §10826 (b)(2))

To address the legislative requirement for a description of the groundwater supply quality, DWR encourages the agricultural water supplier to provide water quality information as described above (Section 3.4.B). If data is not available, it is suggested that the agricultural water 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 groundwater useful quality data may be available at:

- DWR's Water Data Library: http://wdl.water.ca.gov/waterdatalibrary/index.cfm
- GAMA – Groundwater Ambient Monitoring & Assessment

Program: https://www.waterboards.ca.gov/gama/

c. Other Water Supplies (Water Code §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 3.4.A (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 agricultural water 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 agricultural water 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 State Water Resources Control 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)

d. Source Water Quality Monitoring Practices (Water Code §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 agricultural water supplier. Monitoring allows the agricultural water supplier to assess water quality problems that may limit the use of available water sources.

DWR encourages the agricultural water 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

F. 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 §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 agricultural water 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 agricultural water supplier, although the Water Code does specifically identify three inflow components and three outflow components that must be quantified. The agricultural water supplier can quantify the component using measurements, calculations and data analysis, or models. The water supplier may also choose to hire a private consultant to perform this analysis for them. Agricultural water 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.

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

1. Quantifying the Inflows

The Water Code requires agricultural water 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 agricultural water supplier, however, agricultural water suppliers are encouraged to fill out the water budget tables (Tables B.1 & B.2) at the end of this section.

In the AMWP, the agricultural water 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):

a. 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 agricultural water 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 (https://www.waterboards.ca.gov/waterrights/water_issues/programs/diversion_use/water_measurement.html).

The agricultural water 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.

b. Groundwater pumping inflow (Specifically Required)

Groundwater pumping must be reported in the water budget. Groundwater pumping includes both groundwater pumped directly by the water 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-water supplier parties (e.g., private wells) within water 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.

c. 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 “A Proposed Methodology for Quantifying the Efficiency of Agricultural Water Use: A report to the Legislature, pursuant to §10608.64 of the California Water Code, May 8, 2012”, 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.

d. 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.

e. 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 agricultural water 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.

2. Quantifying the Outflows

The Water Code requires that agricultural water 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 agricultural water supplier. However, agricultural water suppliers are encouraged to fill out the water budget tables (Tables B.1 & B.2) at the end of this section.

In the AMWP, the agricultural water 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 water 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.

a. 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 agricultural water supplier may wish to calculate each surface water supply outflow component for their own planning purposes.

DWR encourages the agricultural water 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 agricultural water 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 SWRCB's Irrigated Lands Regulatory Program provides information regarding the protection of receiving waters from agricultural water discharges at: https://www.waterboards.ca.gov/water_issues/programs/agriculture/.

The agricultural water 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 §10826(h)).

b. 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 agricultural water supplier may wish to calculate each deep percolation outflow component for their own planning purposes.

It is recommended that the agricultural water 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 §10826(h)).

c. Evapotranspiration outflow (Specifically Required).

Evapotranspiration is considered equivalent to crop consumptive use

(refer to “A Proposed Methodology for Quantifying the Efficiency of Agricultural Water Use: A report to the Legislature, pursuant to §10608.64 of the California Water Code, May 8, 2012”, as a reference). This water budget outflow component is also required for all water use efficiency fraction determinations in accordance with Water Code §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 more directly measure the amount of crop consumptive use (ETa, or actual evapotranspiration).

d. 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 agricultural water 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.

e. 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 agricultural water supplier should consider all the pertinent outflows from their district.

3. Annual Water Budget

In the AMWP, the agricultural water supplier 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 agricultural water supplier to report the minimum required components along with a short description 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

BMP 4 Water Budget, developed by SGMA can help guide the AWMP water budget process and is available at: https://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.pdf

Data

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

DWR's Land and Water Use group is preparing up to date cropping information by remote sensing. Please visit the website for current status and datasets (https://water.ca.gov/Programs/Water-Use-And-Efficiency)

SGMA Data Viewer (available at: https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#gwlevels) provides downloadable GIS files for Central Valley inflows and outflows, groundwater elevation and storage data, and other information useful

in determining the water budget

Agricultural water suppliers can also search the State of California open data platform for other data, tools, and resources (https://data.cnra.ca.gov/)

For reference evapotranspiration, please visit the CIMIS website at: https://cimis.water.ca.gov/

SGMA Data Viewer provides downloadable GIS files for evapotranspiration https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#waterbudget

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 available at: http://www.itrc.org/reports/pdf/californiacrop.pdf

Basic Irrigation Scheduling (BIS), University of California 2000, revised March 2014 includes crop coefficient information available at: http://biomet.ucdavis.edu/irrigation_scheduling/bis/BIS.htm

Models

Water budget models developed by SGMA can be found at: https://water.ca.gov/Programs/Groundwater-Management/Data-and-Tools. Although intended primarily for groundwater budgeting, these models include components can be used to calculate AWMP required water balance components.

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. Supporting data sets are also available at: https://ca.water.usgs.gov/projects/central-valley/central-valley-hydrologic-model.html

Remote sensing

ITRC-METRIC. ITRC uses a modified Mapping of EvapoTranspiration

with Internal Calibration (METRICTM)) procedure to compute actual evapotranspiration using LandSAT Thematic Mapper data. More information is available at: http://www.itrc.org/projects/metric.htm

Table B.1. Water Budget Inflows

Groundwater Basin: [Input groundwater basin number] (Optional)

Inflow Component	AWMP Location for Supporting Calculations	How Quantified?	Uncertainty	How Quantified?	Water Year 14/15*	Water Year 15/16	Water Year 16/17	Water Year 17/18	Water Year 18/19	Water Year 19/20*
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 agricultural water supplier may select the first five columns years or the last five column years and can delete the non-relevant column. The WUEData portal (https://wuedata.water.ca.gov/secure/login_auth.asp?msg=inactivity&referer=%2Fsecure%2FDefault%2Easp) 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 User Input 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 B.2. Water Budget Outflows

Groundwater Basin: [Input groundwater basin number] (Optional)

Outflow Component	AWMP Location for Supporting Calculations	How Quantified ?	Uncertainty	How Quantified ?	Water Year 14/15*	Water Year 15/16	Water Year 16/17	Water Year 17/18	Water Year 18/19	Water Year 19/20*
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
Evapotranspir-ation (Crop Consumptive Use)										
Surface Outflows										
Deep Percolation										
Other – describe each**										
Total										

*Note for columns: 5 years of data is required. The agricultural water supplier may select the first five columns years or the last five column years and can delete the non-relevant column . The WUEData portal (https://wuedata.water.ca.gov/secure/login_auth.asp?msg=inactivity&referer=%2Fsecure%2FDefault%2Easp) 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 WB-1 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 User Input 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.

G. Water Management Objectives (Water Code §10826(f)

Per Water Code § 108026(f), agricultural water suppliers must now 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 agricultural water 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 agricultural water suppliers to tell the complete story of what it has achieved in the last five years and how it plans to improve water management in the coming five years (or longer).

The water 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 agricultural water supplier, DWR encourages water supplier to assess their whole system and select those EWMPs and Water Management Objectives that would best fit the district. 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 agricultural

water 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 water 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: https://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 https://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 https://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 https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/California-Water-Plan/Docs/RMS/2016/27_Economic_Incentives_July2016.pdf)

H. Quantify the Efficiency of Agricultural Water Use (Water Code §10826(h)

Per Water Code § 108026(h), agricultural water 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.

An agricultural water supplier must choose one of the methods[1] identified in Section 3.8 B to calculate their water use efficiency. The method chosen must account for all of the applicable water uses below:

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

1. Water Uses

Crop Water Use. Crop water use, or crop consumptive use, is a component of the annual water budget. As defined in, "A Proposed Methodology for Quantifying the Efficiency of Agricultural Water Use" (Methodology), this value is equivalent to actual evapotranspiration, which is described above in Section 3.3 A.

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

[1] https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Water-Use-And-Efficiency/Agricultural-Water-Use-Efficiency/Files/Publications/A-Proposed-Methodology-for-Quantifying-the-Efficiency-of-Agricultural-Water-Use.pdf

support instream flows, water used to maintain wetlands, or other environmental uses the agricultural water supplier supports, but is not legally required to. For districts with significant acreage of winter flooded rice fields, the agricultural water supplier may have to decide how much should be attributed to environmental water use and how much to agronomic water use. When multiple uses are possible, the amount of water should be allocated to the primary use component.

Recoverable Flows. Maximizing use of recoverable flows and minimizing irrecoverable flows improves water use efficiency. It is suggested that the agricultural water 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 (1) plus subsurface outflows (4). 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 agricultural water supplier must account for any other water uses that are applicable to their situation.

2. Water Use Efficiency Methods

There are four methods for calculating water use efficiency. These methods can be used to inform the agricultural water 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 agricultural water supplier where improvements can be made.

Agricultural water suppliers must use at least one to satisfy the requirements of the Water Code; water 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 agricultural water supplier may also choose to report Method 1.

The water 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 agricultural water 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.

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 (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.

Table D.1 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 D.2 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 D.3 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 D.4 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

I. 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 §10826 (c))

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 agricultural water supplier. However, agricultural water 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. Snowpack in the Sierra Nevada provides 65 percent of California's water supply and 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. Agricultural water 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.

DWR suggests the agricultural water supplier consider the following climate change impacts on water resources, many of which have already been documented in California (CalEPA 2013 Indicators Report) 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** — Agricultural water 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.

DWR also encourages the agricultural water supplier to participate in their

Integrated Regional Water Management (IRWM) planning effort. The Water Code allows for the AWMP requirements to be satisfied through participation in area-wide, regional, watershed, or basin-wide water management planning (Part 2.8, §10829 of the Water Code). Many IRWM groups have already completed a climate change vulnerability analysis for their region which could be utilized by the local agricultural water suppliers. To locate your Integrated Regional Water Management collaboration or for more information please visit: https://water.ca.gov/Programs/Integrated-Regional-Water-Management or see the *Climate Change Handbook for Regional Water Planning* (2012) for additional details: https://cawaterlibrary.net/wp-content/uploads/2017/05/Climate_Change_IRWM_CA.pdf

Agricultural water suppliers can find additional information and guidance on completing their analysis of regional vulnerabilities in the *California Adaptation Planning Guide* http://resources.ca.gov/docs/climate/01APG_Planning_for_Adaptive_Communities.pdf , including steps for assessing vulnerabilities and developing adaptation strategies. In addition, the website, http://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.

Additional points to consider:

1. Irrigation demand is likely to increase as temperatures rise and rainfall becomes more variable.
2. Permanent crops such as fruit and nut trees will 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.
3. Flooding risk is expected to increase because of more severe rainfall patterns and warmer winter rains. Flooding could inundate crops, as well as affect water supply and conveyance.
4. 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 agricultural water suppliers that rely on this source of water. A water supply source that depends upon snow-melt and barely meets water demands under existing conditions is more likely to be vulnerable to climate change.

5. 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.

Resources:

Indicators of Climate Change in California: http://oehha.ca.gov/multimedia/epic/pdf/climatechangeindicatorsreport2013.pdf

DWR Climate Change Webpage:

https://water.ca.gov/Programs/All-Programs/Climate-Change-Program

California State University Center for Irrigation Technology: https://www.fresnostate.edu/jcast/cit/

Cal Poly Irrigation Training and Research Center: http://www.itrc.org/

University of California Cooperative Extension: http://ucanr.edu/

USDA: Climate Change Program Office: http://www.usda.gov/oce/climate_change/index.htm

California Agricultural Water Stewardship Initiative: http://agwaterstewards.org/

Cal-adapt: http: http://cal-adapt.org/

California Adaptation Planning Guide: Planning for Adaptive Communities: http://resources.ca.gov/docs/climate/01APG_Planning_for_Adaptive_Communities.pdf

Sustainable Conservation: http://www.suscon.org/

California Water Plan Update 2018:

Climate Change Impacts on Water Supply and Agricultural Water Management in California's Western San Joaquin Valley, and Potential Adaptation Strategies [August 2009]: http://www.energy.ca.gov/2009publications/CEC-500-2009-051/CEC-500-2009-051-F.PDF

Robust analysis of future climate change impacts on water for agriculture and other sectors: a case study in the Sacramento Valley: http://meteora.ucsd.edu/cap/pdffiles/Purkey_sacvalley_jan2008.pdf

4 Efficient Water Management Practices Information

This section of the Guidebook lists the AWMP reporting and EWMPs implementation requirements.

Efficient water management practices (EWMPs) are best management practices that agricultural water supplier can implement to improve water use efficiency. The Water Code mandates that AWMPs address a specific list of EWMPs. Agricultural water 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.

Where possible, it is recommended that the water supplier report the quantify of water use efficiency that occurred (either water conserved or water used more efficiently) for each EWMPs in order to prioritize where and which improvements can be made. Quantification of EWMP effectiveness may also enable the agricultural water supplier to demonstrate improved regional self-reliance.

Water Code §10826 (e) requires that certain water use efficiency information be included in the AWMP per §10608.48. Sections 10608.48 (a) through 10608.48(f) are related to the Efficient Water Management Practices (EWMPs) of the AWMP. Sections 10608.48 (a) to 10608.48 (c) require implementation of EWMPs. Section 10608.48 (d) requires a report of which EWMPs have been implemented, an estimate of efficiency improvements, and documentation that non-implemented EWMPs were either not locally cost-effective or technically feasible. § 10608.48 (e) specifies how to report the information. DWR also encourages agricultural water suppliers to report on how implementation of EWMPs may have affected or is anticipated to affect operations. See Section VII of the AWMP Template (Appendix A1).

Implementation of critical EWMPs (Water Code §10608.48 (b)) are required of all agricultural water suppliers. Other EWMPs (Conditional) are listed in Water Code §10608.48 (c). These Conditional EWMPs are required only if they are locally cost-effective and technically feasible.

A. EWMP Implementation and Reporting

The Water Code requires that the AWMP 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 §10608.48 (d)).*

As such, the AWMP needs to include:

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

B. An estimate of the water use efficiency improvements since the previous report and estimated to occur in five and ten years.

Water use efficiency improvements can be quantitative or descriptive, depending upon the nature of the EWMP and information available to the agricultural water 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 assessing the water use efficiency improvements that have occurred since the previous plan, the agricultural water 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 "A Proposed Methodology for Quantifying the Efficiency of Agricultural Water Use" (DWR, 2012) [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 agricultural water suppliers. This can be determined using data from the supplier's water budget as shown below:

> Delivery Fraction (DF) [2] = Aggregated Farm Gate Delivery / Water Supply

Although the Water Code requires agricultural water suppliers to report which EWMP's have and are planned to be implemented, inclusion in the AWMP of a plan, schedule, finance plan, and budget to implement EWMPs that have not yet been implemented is suggested because this information is required, since July 1, 2013, for obtaining any State water loans or grants (Water Code §10608.48 (b) and (c)). (Refer to Table VII.A.3 of the AWMP Template)

For those agricultural water suppliers with at least 10,000 and less than 25,000 irrigated acres, implementation of the Agricultural Water Measurement Regulation for measuring water deliveries is only required if sufficient funding has been provided specifically for that purpose (CCR §597.1 (e)). For agricultural water suppliers without the funding and meeting this size criteria, implementation of water measurement is still required, however, water measurements do not have to be conducted in accordance with CCR §597 et seq.

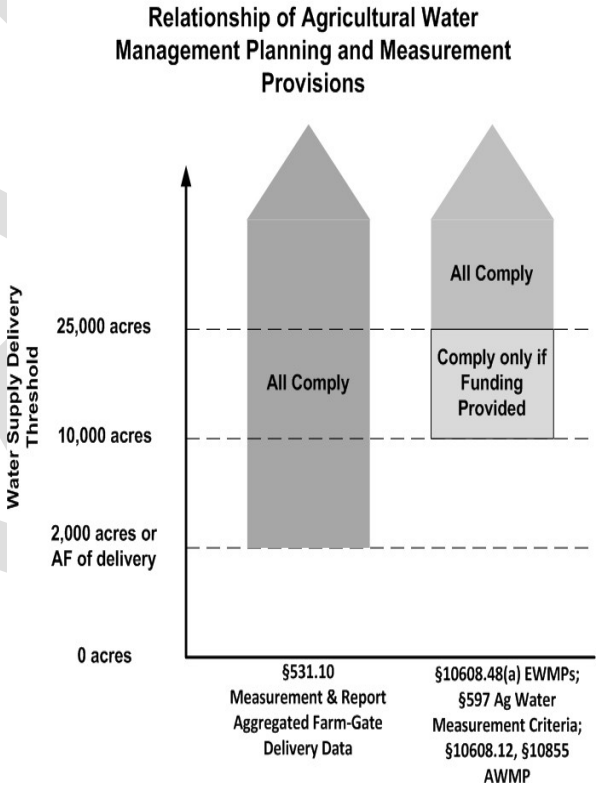
[2] A Proposed Methodology for Quantifying the Efficiency of Agricultural Water Use (2012)

1. Critical EMWPs

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

1. *Measure the volume of water delivered to customers with sufficient accuracy to comply with subdivision (a) of § 531.10 and to implement paragraph (2).*
2. *Adopt a pricing structure for water customers based at least in part on quantity delivered.*

The California Code of Regulations (CCR) requires agricultural water suppliers, as defined in the CCR §597 et seq., to measure water delivered with devices that comply with the accuracy standards of the Agricultural Water Measurement Regulation (included in Appendix B-2).



Specific documentation required by CCR, to be included in the AWMP and as described in Chapter 6, may be included in Section VIII of the AWMP. This documentation includes:

a. Documentation for Water Measured at the Lateral.

If the water supplier is not measuring water at the farm-gate (i.e., measuring water use at the lateral), the water supplier must provide specific documentation in the AWMP as required by CCR and outlined in Chapter 6 (Appendix B.8 contains the relevant regulation).

b. Lateral Measured Water Compliance With Volumetric Pricing.

It is also required that the AWMP 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.

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 CCR at the farm-gate, number of laterals, and number of laterals complying with the CCR accuracy standards in the AWMP.

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

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 agriculture water suppliers providing water to at least 25,000 irrigated acres and water suppliers providing water to 10,000 to 25,000 irrigated acres if funding is provided (Water Code §10608.48 (c)).

All Conditional EWMPs that are implemented or planned to be implemented need be reported in the AWMP.

a. 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 §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. Water supplier can facilitate alternative land uses by offering financial incentives, education, assistance in helping apply for grants or loans, or other methods.

If there are no high water-duty or problem drainage conditions in the service area, the water supplier can simply 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: https://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/regulatory_information/#outreach).

b. 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"* (§10608.48 (c)(2)).

The water 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 water 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 water 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.

c. Facilitate Financing of On-Farm Irrigation Systems

> (3) ***"****Facilitate the financing of capital improvements for*

on-farm irrigation systems" (Water Code §10608.48 (c)(3)).

The water supplier can facilitate financing capital improvements for on-farm irrigation systems by providing financial assistance or by providing technical assistance to land owners 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 water supplier can document this by an assessment of the irrigation systems in their district. If only water supplier funds are available, water suppliers can perform a cost-benefit analysis to document if implementation of this EWMP is locally cost-effective.

d. Incentive Pricing Structure

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

Water suppliers only need to promote one or more of the following goals to implement this EWMP. Water suppliers may choose to implement more for increased on-farm water use efficiency.

Because this EWMP likely requires changing the pricing structure, the water 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.

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

Explanation: Water suppliers could implement tiered water rates or water budget-based rates to incentivize 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"* (§10608.48 (c)(4)(B)).

Explanation: In dry years, water suppliers may encourage pumping more groundwater through higher prices for surface water. Conversely, water 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"* (§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 water 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 http://agwaterstewards.org/

D. *"Reduction in problem drainage"* (§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 water supplier conveyance system, the water 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 http://agwaterstewards.org/

E. *"Improved management of* environmental *resources"* (§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, water supplier 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"* (§10608.48 (c)(4)(F)).

Explanation: In California, surface water resources can be in excess 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 and seasons could encourage less water use, which make use of recycled water (Conditional EWMP 4), deficit irrigation, or other conservation measures more acceptable.

e. 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"* (§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 water 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 water supplier's WMOs, which may consider canal seepage an important component of groundwater recharge for implementation of conjunctive use of groundwater (Conditional EWMP 8).

f. Water Ordering Flexibility

> (6) *"Increase flexibility in water ordering by, and delivered to, water customers within operational limits"* (§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.

g. Spill and Tail-Water Recovery

(7) *"Construct and operate supplier spill and tail-water systems"* (§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 water 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.

h. Conjunctive Use of Groundwater

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

i. Automation

(9) *"Automate canal control devices"* (§10608.48 (c)(9)).

Automation of canal control devices may increase flexibility in water deliveries (Conditional EWMP 6) and increase the water 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 water supplier's distribution system is entirely piped and/or automated could be used to support the determination that this EWMP is not be technically feasible.

j. Facilitate Customer Pump Testing

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

k. Water Conservation Coordinator

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

A Water Conservation Coordinator (WCC) may be anyone employed or contracted by the water 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.

I. 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"* (§10608.48 (c)(12)):

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

A. *"On-farm irrigation and drainage system evaluations"* (§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"* (§10608.48 (c)(12)(B)).

Explanation: Efficient irrigation makes use of knowing how much water is really 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 many customers may lack the 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 cheap 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: https://cimis.water.ca.gov/.

C. *"Surface water, groundwater, and drainage water quantity and quality data"*(§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"* (§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 water 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.

m.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."* (§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 water supplier can identifying the policies and rules associated with all of their water supplies to conduct an analysis of the potential for change.

n. Water Supplier Pump Efficiency

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

Inefficient water 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.

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 §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 non-implemented EWMP rationale.

- 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 technical infeasible.

DWR encourages the agricultural 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 (see Section 3.8 for details).

Not Locally Cost-Effective. The agricultural water supplier may use documented and referenced approaches to determine local cost-effectiveness, such as the USBR's Mid Pacific Region's Standard Criteria (see inset box). Water suppliers should clearly identify the methodology used, calculations, and sources of data.

Locally cost effective is defined in the Water Code as:

> ""*Locally cost effective" means that 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 §10608.12 (k))

> The USBR's Mid Pacific Region 2014 Standard Criteria, Addendum A, provides a method for assessing local cost-effectiveness and certain aspects of technical non-feasibility: https://www.usbr.gov/mp/watershare/docs/2014-standard-criteria.pdf

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 agricultural water 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.

B. Supporting Documentation

For water suppliers serving more than 25,000 acres (excluding recycled water), supporting documentation as required by CCR 23 §597 et seq. for compliance with the Agricultural Water Measurement Regulation, described in Chapter 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 agricultural water supplier to include in this section:

1. Agricultural Water Measurement Regulation Supporting Documentation (as applicable):

(Refer to Chapter 5 for details on this documentation)

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

2. Other Documents (as applicable):

1. 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
2. Resolution of Plan Adoption
3. Water supplier maps
4. Water Supplier Operating Rules and Regulations

5. Additional Agricultural Water Measurement Regulation compliance documentation
6. Water Shortage Allocation Policy
7. Water Shortage Contingency Plan
8. Agricultural supplier groundwater wells and recharge locations maps
9. Groundwater Management Plan
10. Detailed water quality information
11. Cost-benefit analysis/ technical infeasibility documentation
12. Additional information/data/calculations as applicable.
13. Agricultural Water Supplier's Completed Checklist
14. Water Budget Model description, input, and output data
15. Groundwater Sustainability Plan
16. Demonstrating Compliance with the Delta Plan

5 USBR CVPIA/RRA Process Guidance

Agricultural water suppliers that submit Water Conservation/Management Plans to USBR may submit those plans as their AWMP (see section 4.1) with the additional documentation identified here (see sections 4.2 and 4.3) for compliance with Water Code Part 2.8. Additional documentation includes Agricultural Water Measurement Regulation AWMP documentation required by CCR 597.4(e) identified in Section 4.2 below. To be compliant with Water Code Part 2.8, Article 1 (notification of preparation) and Article 3 (public participation and submittal sections), the water supplier should comply with requirements identified in section 4.3 below. To the extent federal review process includes the requirements specified in Part 2.8 Article 1 and Article 3, the AWMPs meet the requirements of the Water Code Part 2.8.

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 Coder requirements, including those changes in AB 1668.

A. USBR- CVPIA/RRA Water Management/ Conservation Plans That Are Accepted as Adequate

The Water Code §10828 allows agricultural water suppliers subject to the USBR CVPIA/RRA water management/ conservation plan process to submit those plans for compliance with Water Code §10826 provided that: 1) the water management/conservation plan has been adopted by the agricultural water 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, 2017 for 2021 plans. These agricultural water 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 5.

"(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 § 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 §10828)

B. 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 (CCR §597.4 (e)). For 2020 compliance, submit to DWR the documentation identified below as an attachment with the USBR-accepted water management/ conservation plan. Refer to Chapter 5 for details regarding the Agricultural Water Measurement Regulation reporting and documentation requirements. This documentation must also be approved by the water supplier following the adoption process identified in Section 4.3. DWR encourages the use and submittal of the checklist (Chapter 2) along with all other documentation.

C. Agricultural Water Measurement Regulation Documentation (as applicable3)

Attachment A: Legal Certification and Apportionment Required for Water Measurement

Attachment B: Engineer Certification and Apportionment Required for Water Measurement Attachment C: Description of Water Measurement Best Professional Practices

Attachment D: Documentation of Water Measurement Conversion to Volume Attachment E: Device Corrective Action Plan Required for Water Measurement

D. Documentation Required for Loan and Grant Eligibility only

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

Therefore, it is suggested that this documentation be included as an attachment to the water management/conservation plan.

Table 4.1 provides an example reporting format that can be used to provide this information with the water management/conservation plan, if applicable.

Table 5.1 Schedule to Implement EWMPs (Water Code §10608.56 (d))				
EWMP	**Implementation Schedule**	**Finance Plan**	**Budget Allotment**	**USBR 2017 Criteria**
Critical				
1 – Water Measurement				Critical 1
2 - Volume-Based Pricing				Critical 4
Conditional				
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				Exemptible

Use				9
9 – Automated Canal Controls				Exemptible 10
10 – Customer Pump Test/Eval.				Exemptible 11
11 – Water Conservation Coordinator				Critical 2
12 – Water Management Services to Customers				Critical 3
13 – Identify Institutional Changes				No equivalent
14 – Supplier Pump Improved Efficiency				Critical 5
Grand Total all EWMPs				
Note: There is no equivalent USBR Conditional EWMP #13 or #14				

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

All agricultural water suppliers required to prepare new agricultural water management/conservation plans must prepare and complete their plan in accordance with Water Code Part 2.8, 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 Part 2.8, Articles 1 and 3, and therefore, may meet the requirements of Part 2.8. If it does not, the agricultural water supplier would have to complete those requirements in Part 2.8, Articles 1 and 3 that are not already a part of the federal review process. Part 2.8 requirements are discussed below.

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 § 10840)."* (Water Code §10821).

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 § 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 § 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 §10841)

Refer to Section 3.1.B.2 for details on the public hearing process.

3. AWMP Adoption, Submittal, and Availability

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

a. AWMP Adoption

> *"After the public hearing, the plan shall be adopted as prepared or as modified during or after the hearing."* (Water Code §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 §10820(b))

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

b. AWMP Submittal

Within 30 days of adoption, the agricultural water 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 §10843(a)and §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 submittal of the water management to DWR and the California State Library.

c. AWMP Availability

Within 30 days after plan adoption by the agricultural water supplier's governing entity, the water management plan must be made available for public review on the agricultural water supplier's website or an electronic copy submitted to DWR if the supplier does not have an internet website (Water Code §10844). Electronic copies sent to the DWR should preferably be in Adobe™ pdf or MS-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 §10844)

6 Water Measurement Documentation

The Agricultural Water Measurement Regulation applies to water suppliers that serve more than 25,000 acres (excluding recycled water) and 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 CCR §597.3(b)(2), §597.4(b)(2) and §597.4 (e). This chapter describes the pertinent Agricultural Water Measurement Regulation documentation that must be included in the AWMP, if applicable. The pertinent text of this regulation is included in Appendix B.7.

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 agricultural water 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. The criteria for allowing upstream measurements are specified in CCR §597.3(b)(1). The criteria for measurement device accuracy and certification are specified in CCR §597.3(a), §597.4(a), and §597.4(b).

The following information is required in the AWMP to document that this criterion was satisfied, if applicable (and see Table 5.1 for summarized detail):

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

If a water 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 (CCR §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 water supplier legal counsel (CCR §597.3(b)(2)(A))

1. Documentation on apportionment of volume of water delivered to customers (CCR §597.3(b)(2)(C)).

Under CCR §597.4.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 agricultural water 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 agricultural water supplier's governing board or body.

2. Engineer Certification and Apportionment Required for Water Measurement – Technically Infeasible

If a water 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 water supplier must provide the following in the AWMP or CVPIA/RRA plans:

(1) Engineer determination that accuracy standards of CCR §597.3(a) cannot be met at the farm- gate (CCR §597.3(b)(1)(B) and §597.3(b)(2)(B)),

(2) Documentation on apportionment of volume of water delivered to customers as described above (Guidebook Section 6.A.2) (CCR §597.3(b)(2)(C)).

B. Description of Water Measurement Best Professional Practices

All water suppliers required to implement agricultural water measurement in accordance with CCR §597 must include a description of Best Professional Practices about, but not limited to: (CCR §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 USBR plan/ attachment(s) submitted to DWR.

C. Documentation of Water Measurement Conversion to Volume

If water measurement device(s) are not measuring water volume, the water supplier must provide documentation on how measurements are converted to volume (CCR §597.4(b)(2)(e)). Specific flow- rate, velocity, and water elevation measurement conversions are identified in CCR §597.4(b)(2)(e(3)). Include this description in the AWMP, USBR plan/attachment(s) submitted to DWR.

D. Device Corrective Action Plan Required for Water Measurement

All existing water measurement devices must measure water delivered at the Delivery Point or Farm-gate of a single customer with the following accuracy: (CCR §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

CCR §597.4(a) describes the initial certification of device accuracy protocols and CCR §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. If this was not accomplished by submittal of the 2012 plan, a corrective action plan was required to bring devices into compliance by 2015 (CCR §597.4 (b)(2) and §597.4 (e). Agricultural Water Measurement Regulation requires that the corrective action plan was to be included in the 2012 Plan submittal to DWR and must include a schedule, budget, and finance plan for taking corrective action in three years or less (CCR §597.4 (e)(4)).

Include this description in the AWMP or USBR plans/attachments submitted to DWR.

Table 6.1 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 (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.
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.

Information on what the agricultural water supplier may consider submitting in the AWMP Template are provided in Chapter 3, following the same outline as the AWMP Template (e.g., guidance for AWMP Template Section IV.A.3 is found in Section 3.4 A.3).

Agricultural Water Management Plan

Prepared Pursuant to Water Code Section 10826

[Insert Agricultural Water Supplier's Name]

[Insert Representative Name]

[Insert Complete Address]

Adopted on [Insert Date of Plan Adoption]

Section I: Introduction

A. Description of Previous Water Management Activities

Insert description of previous water management activities

1. Coordination Activities

a. Notification of AWMP Preparation

Insert description

b. Public Participation

Describe public participation activities or complete the table below:

Potential Interested Parties *[Provide names(s)]*	**Notified of AWMP Preparation**	**Notified of Public Meetings**	**Attended Public Meetings** ***(Optional)***	**Copy of Adopted AWMP/ Amendment Sent**
Local City(s)	[Insert Date]			[Insert Date]
Local County(s)	[Insert Date]			[Insert Date]
Groundwater Management Entity				[Insert Date]
DWR				[Insert Date]
Local Newspaper/ Equivalent Process [*Identify which*]		[Insert Dates]		
California State Library				
Other [*Identify*]				
Website				[Insert Date Posted or Sent to DWR for Posting]

2. AWMP Adoption and Submittal

a. AWMP Adoption

A copy of the water supplier signed Resolution of the AWMP Adoption may be attached. Revisions or amendments must follow the same procedure

b. AWMP Submittal

Insert description. Submit electronically to DWR

c. AWMP Availability

Insert description

3. AWMP Implementation Schedule

Insert description or provide AWMP implementation schedule

B. Section II: Description of the Agricultural Water Supplier and Service Area

1. Physical Characteristics

a. Size of the service area

Insert description of the size of the service area

b. Location of the service area and water management facilities

Insert description of the location of the service area and water management facilities

c. Terrain and soils

Insert description of the service area terrain and soils

d. Climate

Insert description of the service area climate

2. Operational Characteristics

a. Operating rules and regulations

Insert description of the agricultural water supplier's operating rules and regulations. A copy of your Operating Rules and Regulations may be attached

b. Water delivery measurements or calculations

Insert description of the agricultural water supplier's water delivery measurements or calculations

c. Water rate schedules and billing

Insert description of your water rate schedules and billing

d. Water shortage allocation policies and Drought Plan

Insert description of your water shortage allocation policies. You may attach a copy of your Water Shortage Allocation Policy

Drought Plan

(a) The drought plan shall contain 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.

C. Section III: Description of Quantity of Water Uses

1. Agricultural Water Use

Insert description of quantity water used for agriculture uses within your service area

2. Environmental Water Use

Insert description of quantity water used for environmental uses within your service area.

3. Recreational Water Use

Insert description of quantity water used for recreational uses within your service area

4. Municipal and Industrial Use

Insert description of quantity of water used for municipal and industrial uses within your service area.

5. Groundwater Recharge Use

Insert description of quantity of water used for groundwater recharge within your service area, including estimated flows from deep percolation from irrigation and seepage.

D. Section IV: Description of Quantity and Quality of the Water Resources of the Agricultural Water Supplier

1. Water Supply Quantity

a. Surface Water Supply

Insert description of quantity of your surface water supplies

b. Groundwater Supply

Insert description of quantity of your groundwater supplies

c. Other Water Supplies, including recycled water

Identify any other water supply(s) you may have and insert description of its (their) quantity(s).

2. Water Supply Quality

a. Surface Water Supply

Insert description of the quality of your surface water supplies

b. Groundwater Supply

Insert description of the quality of groundwater supplies

c. Other Water Supplies, including recycled water

Insert description of the quality of your other water supplies.

d. Source Water Quality Monitoring Practices

Insert description of your source water quality monitoring practices. Include all source water types including any drainage water considered part of your water supplies.

E. Section V: Water Budget

1. Quantifying the Water Supplier's Water Supplies

a. Agricultural Water Supplier Water Quantities:

Insert description of water supply quantification

b. Other Water Sources Quantities:

Insert description of water supply quantification.

2. Quantification of Water Uses

Insert description of tabulation of water uses.

3. Annual Water Budget

Insert description quantifying overall water budget based on the quantification of all inflow and outflow components for the service area. See following tables.

Table V-1 Inflows

(Optional) Groundwater Basin: [Input groundwater basin number]

Inflow Component	AWMP Location for Supporting Calculations	How Quantified?	Uncertainty	How Quantified?	Water Year 14/15*	Water Year 15/16	Water Year 16/17	Water Year 17/18	Water Year 18/19	Water Year 19/20*
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 agricultural water supplier may select the first five columns years or the last five column years and can delete the non-relevant column in their hard copy. The WUEData portal 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 User Input cells must be filled in. Use '0' for non-applicable components.

Table V-2 Ouflows

(Optional) Groundwater Basin: [Input groundwater basin number]

Outflow Component	AWMP Location for Supporting Calculations	How Quantified?	Uncertainty	How Quantified?	Water Year 14/15*	Water Year 15/16	Water Year 16/17	Water Year 17/18	Water Year 18/19	Water Year 19/20*
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
Evapotranspir-ation (Crop Consumptive Use)										
Surface Outflows										
Deep Percolation										
Other – describe each**										
Total										

*Note for columns: 5 years of data is required. The agricultural water supplier may select the first five columns years or the last five column years and can delete the non-relevant column in their hard copy.

The WUEData portal 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 WB-1 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 User Input cells must be filled in. Use '0' for non-applicable components.

4. Identify Water Management Objectives

Identify water management objectives based on water budget to improve water system efficiency.

5. Quantify the Efficiency of Agricultural Water Use

Quantify the efficiency of agricultural water use with one of the 4 methods

Please complete one or more of the following tables. The WUEData Portal will allow the user to select which table(s) to fill out. At least one table must be completed.

Table V.D.1 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 V.D.2 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 V.D.3 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

Evapotranspiration of Applied Water (ETAW)	Applied Water (AW)	Agronomic Use (AU)	Environmental Water Use (EU)	Total Water Use Fraction

Table V.D.4 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

F. Section VI: Climate Change

Insert description of the analysis the effects climate change would have on future water supplies

G. Section VII: Water Use Efficiency Information

DWR encourages the agricultural water supplier to briefly describe EWMP implementation effects on operations that may have been experienced or that are anticipated.

1. EWMP Implementation and Reporting

Insert report on which efficient water management practices have been implemented or planned to be implemented, an estimate of the water use efficiency improvements that have occurred since the last report (for 2020 AWMP, any previous effort), and an estimate of the water use efficiency improvements estimated to occur five and 10 years in the future.

Complete Table VII.A.1 and VII.A.2, below. DWR encourages completing Table VII.A.3 if grant funding is pursued.

Table VII.A.1 Report of EWMPs Implemented/Planned
(Water Code §10608.48(d), §10608.48 (e), and §10826 (e))

EWMP No.*	Description of EWMP Implemented	Description of EWMPs Planned
Critical EWMPs		
1		
2		
Conditionally Required EWMPs (locally cost-effective and technically feasible EWMPs)		

Table VII.A.1 Report of EWMPs Implemented/Planned
(Water Code §10608.48(d), §10608.48 (e), and §10826 (e))

EWMP No.*	Description of EWMP Implemented	Description of EWMPs Planned
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
Other Optional EWMPs (as applicable)		

Notes:
*EWMP numbers correspond to (Water Code §10608.48(c)

Table VII.A.2 Report of EWMPs Efficiency Improvements
(Water Code §10608.48(d), §10608.48 (e), and §10826 (e))

Corresponding EWMP No.(s)*	Estimate of Water Use Efficiency Improvements That Occurred Since Last Report *(Quantitative or Descriptive)*	Estimated Water Use Efficiency Improvements 5 and 10 years in future *(Quantitative or Descriptive)*

Notes:
*EWMP numbers correspond to (Water Code §10608.48(c).

Table VII.A.3 Schedule to Implement EWMPs
((Water Code §10608.56 (d))

EWMP	Implementation Schedule	Finance Plan	Budget Allotment
Critical			
1 – Water Measurement			
2 - Volume-Based Pricing			
Conditional			
1 – Alternate Land Use			
2 – Recycled Water Use			
3 – On-Farm Irrigation Capital Improvements			
4 – Incentive Pricing Structure			
5 – Infrastructure Improvements			
6 – Order/Delivery Flexibility			
7 – Supplier Spill and Tailwater Systems			
8 – Conjunctive Use			
9 – Automated Canal Controls			
10 – Customer Pump Test/Eval.			
11 – Water Conservation Coordinator			
12 – Water Management Services to Customers			
13 – Identify Institutional Changes			
14 – Supplier Pump Improved Efficiency			

Table VII.A.3 Schedule to Implement EWMPs ((Water Code §10608.56 (d))			
EWMP	**Implementation Schedule**	**Finance Plan**	**Budget Allotment**
Other EWMPs:			
Grand Total all EWMPs			

2. Documentation for Non-Implemented EWMPs

Submit information documenting not-technically feasible and/or not locally cost-effective EWMPs. Complete Table VII.B., below. Details on calculations, technical reports, and other associated documents may be included in an Attachment and referenced here for simplicity

Table VII.B Non-Implemented EWMP Documentation (Water Code §10608.48(d), §10608.48 (e), and §10826 (e))				
EWMP #	**Description**	***(check one or both)***		**Justification/Documentation***
		Technically Infeasible	**Not Locally Cost-Effective**	
Notes: *Justification/Documentation can include summary cost-benefit analysis or engineering determination with reference to the specific study/agency/engineer responsible for making that determination.				

H. Section VIII: Supporting Documentation

1. Agricultural Water Measurement Regulation Documentation (as applicable for water suppliers >25,000 irrigated acres)

a. Legal Certification and Apportionment Required for Water Measuremen

Insert Legal Certification and apportionment methodology, if applicable. Refer to Chapter 6.

b. Engineer Certification and Apportionment Required for Water Measurement

Insert Engineer Certification and apportionment methodology, if applicable. Refer to Chapter 6.

c. Description of Water Measurement Best Professional Practices

Insert description of Water Measurement Best Professional Practices. Refer to Chapter 6.

d. Documentation of Water Measurement Conversion to Volume

Insert documentation of flow, velocity, or water level conversions to water volume, if applicable. Refer to Chapter 6.

e. Device Corrective Action Plan Required for Water Measurement

Insert device repair plan, schedule, budget, and finance plan, if applicable. Refer to Chapter 6

2. Delta Plan Consistency (if applicable)

Attach documentation of consistency with the Delta Plan, if applicable. Refer to Appendix B.7.

3. Other Documents (as applicable)

Attach other supporting documentation, as applicable. Water supplier can also attach their completed checklist here

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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 A3B 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 agricultural water 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 §*	USBR CVPIA 2017 Criteria[1]
Coordination	***N/A***	**N/A**
Plan Adoption	*10821*	Section 8
Previous Water Management Activities	*10826 (d)*	**N/A**
Agricultural Water Supplier Service Area	*10826 (a)*	Section 1
Inventory of Water Supplies	*10826 (b)*	Section 2
Source Water Quality Monitoring Practices	*10826 (b) (4)*	Section 2D
Water Uses	*10826 (b) (5)*	Section 2E
Drainage from the water supplier's surface area	*10826 (b) (6)*	Section 2F
Water accounting	*10826 (b) (7)*	Section 2G
Effects of Climate Change on Future Supply	*10826 (c)*	**N/A**
EWMPs	*10826(e) & 10608.48(b)-(c)*	Section 3
Regional Plan	*10829*	Section 7

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 AWMPs			
Required by	**Requirement details**	**Water Code AWMP**	**CVPIA 2017 Criteria Alternative for USBR Contractors**
Documentation Required as a Part of the Plan			
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 CVPIA/RRA Water Conservation Plan
	Table VII.B: Non-Implemented 10608.48 EWMPs Documentation	Required	
Required by Agricultural Water Measurement Regulation, where applicable (see Chapter 6)	Attachment A- Legal Certification	Required	
	Attachment B- Engineer Certification	Required	
	Attachment C- Description of Best Professional Practices	Required	
	Attachment D- Water Measurement Conversion	Required	
	Attachment E- Correction Action	Required	
Documentation Required, If Water Supplier Has Not implemented All EWMPs, for Loan and Grant Eligibility			
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.	

Appendix B: Supporting Information

B.1 Frequently Asked Questions (FAQs)

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

A1: The law specifies agricultural water 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 an agricultural water supplier doesn't submit a plan?

A2: Water Code 10820(b) specifies that DWR shall notify an agricultural water supplier this is not incompliance and the water 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 an agricultural water 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.

Q4: Do U.S. Bureau of Reclamation contractor suppliers submit AWMPs to DWR?

A4: Agricultural water suppliers that are required to submit water conservation plans (also known as water management plans) every five years to the U.S. Bureau of Reclamation, 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 agricultural water supplier has adopted and submitted the plan to the Bureau of Reclamation within the previous four years (Water Code §10828(a)(1)).
- The Bureau of Reclamation has accepted the plan as adequate (Water Code §10828(a)(2)).

Q5: Do U.S. Bureau of Reclamation contractor suppliers comply with the state's Agricultural Water Measurement Regulation?

A5: All agricultural water suppliers as described in the Agricultural Water Measurement Regulation are subject to the Regulation. Federal water suppliers that currently comply with USBR 2014 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 at upstream of multiple customers farm-gates due to lack of legal access or water level or flow conditions, the supplier should provide needed information that includes a water supplier's legal counsel document for lack of legal access or documents for existence of fluctuating water flow conditions as described in CCR § 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 by 2015.

Q6: Is there anything in the Water Conservation Act of 2009 that requires tiered water pricing for agricultural water suppliers?

A6: 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 §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

Q7: Explain the condition of "sufficient funding provided to a water supplier" that would make the implementation of the requirements of the Water Code mandatory (e.g., adoption and submission to DWR of an AWMP).

A7: 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.

Q8: When an agricultural water 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?

A8: 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.

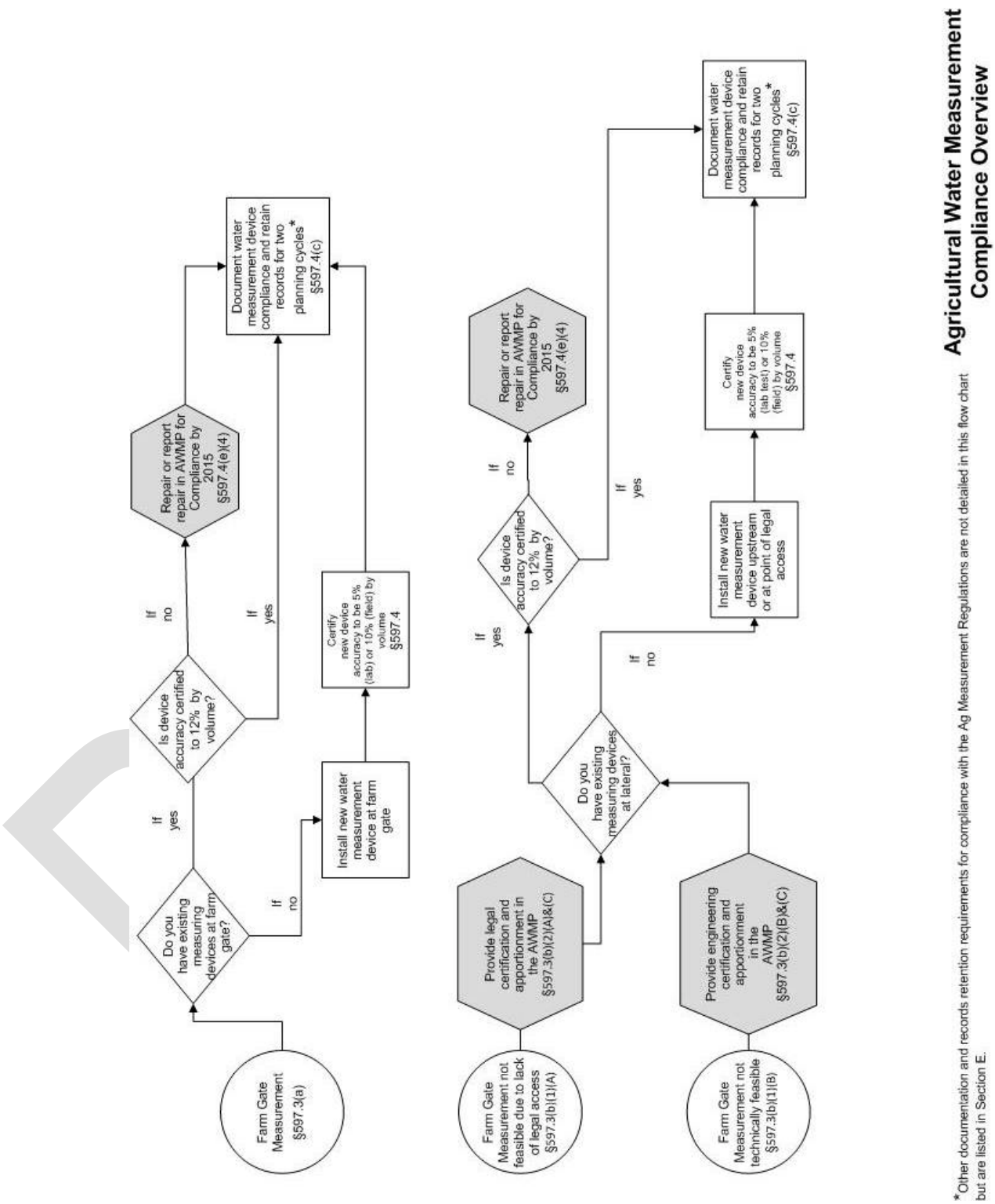
Q9: The Water Code states that federal water suppliers' plans accepted by Reclamation can be submitted to satisfy the requirements of § 10826 if they are submitted to Reclamation within the previous four years. Are federal plans accepted by Reclamation within the four years prior to the passage of SB X7-7 (November 10 2009) acceptable?

A9: No. Only federal plans accepted by Reclamation within the four years prior to the adoption due date of the agricultural water management plans are acceptable. For AWMPs due to be adopted by April 1, 2021, federal plans accepted by Reclamation on or after April 1, 2017, are acceptable.

Q10: 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?

A10: It depends on the total irrigated acres served by the water supplier's water. If agricultural water supplier A routinely transfers a portion of its water to agricultural water supplier B (receiving water supplier), supplier A is a wholesale water supplier and its irrigated acreage is determined by the irrigated area of its direct customers and the irrigated area of the receiving water supplier customers served by the transfer.

B-2 Agricultural Water Measurement Compliance Flow Chart



B-3 Detailed Comparison of the Water Code, and USBR CVPIA Processes

	Water Code	USBR CVPIA 2017 Criteria
1	**Not Required (N/R)**	**N/R**
2	**§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 1** Description of the District
3	(1) Size of the service area.	**Section 1A** History
4	(2) Location of the service area and its water management facilities	**Section 1B** Location and facilities
5	(3) Terrain and soils	**Section 1C** Topography and Soils
6	(4) Climate	**Section 1D** Climate
7	**N/R**	**Section 1E** Natural and Cultural Resources
8	(5) Operating rules and regulations	**Section 1F** Operating Rules and Regulations
9	(6) Water delivery measurements or calculations	**Section 1G** Water Measurement, Pricing and Billing
10	(7) Water rate schedules and billing	**Section 1G** Water Measurement, Pricing and Billing
	er shortage allocation policies	**Section 1H** Water Shortage Allocation Policies
12	(b) Describe the quantity and quality of water resources of the agricultural water supplier, including all of the following:	**Section 2** Inventory water resources
13	(1) Surface water supply	**Section 2A** Surface Water Supply
14	(2) Groundwater supply	**Section 2B** Groundwater Supply
15	(3) Other water supplies	**Section 2C** Other Water Supplies
16	(4) Source water quality monitoring practices	**Section 2D** Source Water Quality Monitoring Practices
17	(5) Water uses within the agricultural water supplier's service area, including all of the following:	**Section 2E** Water Uses with the District
18	(A) Agricultural	**Section 2E1** Agricultural
19	(B) Environmental	**N/R**
20	(C) Recreational	**N/R**
21	(D) Municipal and industrial	**Section 2E2** Urban
22	(E) Groundwater recharge	**Section 2E3** Groundwater Management Plan/Banking Programs
23	(F) Transfers and exchanges	**Section 2E4** Transfers, Exchanges, Rescheduling, Purchases, or Sales
24	(G) Other water uses	**Section 2E5** Other
25	(6) Drainage from the water supplier's service area	**Section 2F** Outflow from the District
26	(7) Water accounting, including all of the following:	**Section 2G** Water Accounting

	Water Code	USBR CVPIA 2017 Criteria
27	(A) Quantifying the water supplier's water supplies	**Section 2G1** Quantify Contractor's Water Supplies
28	(B) Tabulating water uses	**Section 2G2** Quantify Water Used
29	(C) Overall water budget	**Section 2G3** Overall Water Budget
30		
31	(c) Include an analysis, based on available information, of the effect of climate change on future water supplies	**N/R**
32	(d) Describe previous water management activities	**N/R**
33	(e) Include in the plan the water use efficiency information required pursuant to Section 10608.48	**Section 3A** Critical BMPs for Agricultural Contractors
34	**§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 3A** Critical BMPs for Agricultural Contractors
35	**Chapter 3, Article 1, §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
36	**§10608.48 (a)(1)** Measure the volume of water delivered to customers with sufficient accuracy to comply with subdivision (a) of § 531.10 and to implement paragraph (2)	**Section 3A1** Water Measurement
37	(2) Adopt a pricing structure for water customers based at least in part on quantity delivered	**Section 3A4** 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 3B** 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 3B1** 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 3B2** 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 3B3** Facilitate the Financing of Capital Improvements for On-Farm Irrigation Systems.

	Water Code	USBR CVPIA 2017 Criteria
42	**N/A**	**N/R**
43	(4) Implement an incentive pricing structure that promotes one or more of the following goals:	**Section 3B4** Incentive Pricing
	(A) More efficient water use at the farm level	**N/R**
44		
45	(B) Conjunctive use of groundwater	**Section 3B9** Optimize Conjunctive Use
46	(C) Appropriate increase of groundwater recharge	(see above)
47	(D) Reduction in problem drainage	**N/R**
48	(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**
50	(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**
51	(6) Increase flexibility in water ordering by, and delivery to, water customers within operational limits	**Section 3B6** Increase Flexibility in Water Ordering By, and Delivery To, Water Users
52	(7) Construct and operate supplier spill and tailwater recovery systems	**Section 3B7** Construct and Operate Spill and Tailwater Recovery Systems
53	**N/R**	**Section 3B8** Plan to Measure Outflow
54	(8) Increase planned conjunctive use of surface water and groundwater within the supplier service area	**Section 3B9** Optimize Conjunctive Use
55	(9) Automate canal control structures.	**Section 3B10** Automate Distribution and/or Drainage System Structures
56	(10) Facilitate or promote customer pump testing and evaluation	**Section 3B11** Facilitate or Promote Water User Pump Testing and Evaluation
57	**N/R**	**Section 3B12** Mapping (GIS)
58	(11) Designate a water conservation coordinator who will develop and implement the water management plan and prepare progress reports	**Section 3A2** Designate the Water Conservation Coordinator
59	(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 3A3** Provide or Support the Availability of Water Management Services to Water Users
60	(A) On-farm irrigation and drainage system evaluations	**Section 3A3a** On-farm evaluations
61	(B) Normal year and real-time irrigation scheduling and crop evapotranspiration information	**Section 3A3b** Normal year and real-time irrigation scheduling and crop ET information
62	(C) Surface water, groundwater, and drainage water quantity and quality data	**Section 3A3c** Surface, ground, and drainage water quantity and quality data.

	Water Code	USBR CVPIA 2017 Criteria
63	(D) Agricultural water management educational programs and materials for farmers, staff, and the public	**Section 3A3d** Agricultural water management educational programs and material for farmers and staff, and the public.
64	**N/R**	**N/R**
	(13) Evaluate the policies of agencies that provide the supplier with water to identify the	**Section 1I** Evaluate Polices of Regulatory Agencies Affecting the Contractor and Identify
65	potential for institutional changes to allow more flexible water deliveries and storage	Policies that Inhibit Good Water Management
66	(14) Evaluate and improve the efficiencies of the supplier's pumps.	**Section 3A5** Evaluate and Improve Efficiencies of Contractor's Pumps
67	**N/R**	**N/R**
68	**§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 3B 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.
69	**§10608(e)** The data shall be reported using a standardized form developed pursuant to §10608.52	**N/R**
70	**§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.
71	**N/R**	**N/R**

	Water Code	USBR CVPIA 2017 Criteria
72	**§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.
	§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.	
73	**§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 (2011 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.

B-4 Annual Aggregated Farm-Gate Delivery Report

The annual Agricultural Aggregated Farm-Gate Delivery Report to DWR is required under the AB 1404 (Water Code §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 DWR's web site at:

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

1. Agricultural water suppliers (defined by Water Code §10608.12(a) as water 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 water 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 §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.

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

1. Agricultural Water Supplier:

For the purpose of AB1404 requirements, Water Code **§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 **§531.b**)

For the purpose of SB X7-7 requirements (Article 2), Water Code **§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."

2. 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 **§531.a**)

3. 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 **§531.f**).

4. Best Professional Practices:

AB 1404: *""Best professional practices" means practices*

attaining and maintaining accuracy of measurement and reporting devices and methods" (Water Code **§531.d**). This definition applies to agricultural water suppliers <10,000 acres (and less than 25,000 acres if no funding is made available to the water supplier).

CCR **§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"* (CCR 23 **§597.2(a)(4)**). This definition applies to agricultural water suppliers ≥10,000 acres.

5. 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 **§10631.5 (a)(4)(B)**).

C. What Must an Agricultural Water Supplier do to be Compliant with Water Measurement Reporting?

For those agricultural water 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:
    i. 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.

ii. 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.

iii. 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 agricultural water 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.

D. Reporting Required Information

Agricultural water 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 water supplier.
- Report the water 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.

E. Information on "Best Professional Practices" and "Not Locally Cost-Effective" for purpose of water 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 water suppliers to use any specific water measurement methods. The Water Code does not require DWR to evaluate or review any information provided by agricultural water suppliers.

As a technical assistance to water suppliers, DWR is providing different sources of information on "Best Professional Practices" and "Not Locally Cost-Effective" to water 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 water 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 in the Calfed Library under Water Use Efficiency at: http://calwater.ca.gov/.

F. Submitting the Annual Report

The completed form must be submitted electronically to DWR annually on

April 1. The completed forms should be submitted to DWR on-line submittal tool:

https://wuedata.water.ca.gov/secure/login_auth.asp?msg=inactivity&referer=%2Fsecure%2FDefault%2Easp

The completed electronic form may be submitted y e-mail to agWUE@water.ca.gov Any future submittal updates may be found on DWR's website at:

https://water.ca.gov/Programs/Water-Use-And-Efficiency/Agricultural-Water-Use-Efficiency

B-5 Legislative History, Current Legislation and Regulations, and Related Programs

A. Legislative History

1. Agricultural Water Management Planning Act of 1986 (AB 1658)

AB 1658 (1986) required all agricultural water 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 agricultural water 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 water suppliers to prepare informational reports and for the preparation of water management plans. This legislation was required to sunset on January 1, 1993.

2. 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 agricultural water 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.

3. Water Code §531.1 - AB 1404 (2007) Water Measurement Information

The AB 1404 requires agricultural water 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 agricultural water supplier may provide supporting documentation to DWR.

B. Current Legislation and Regulations

1. **AB 1668 (Friedman, Statute of 2018)** – amended Water Code §531.10 *et seq.* and Water Code §10820 *et seq.* https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB1668

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

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

C. Related Programs

4. **California Water Plan 2018 Update**
   https://water.ca.gov/Programs/California-Water-Plan/Update-2018

5. **SGMA Groundwater Management**
   https://water.ca.gov/Programs/Groundwater-Management/SGMA-Groundwater-Management

6. **Integrated Regional Water Management Plans**
   https://water.ca.gov/Programs/Integrated-Regional-Water-Management

7. **Bureau of Reclamation Water Central Valley Project**
   https://www.usbr.gov/mp/cvp-water/

8. **Bureau of Reclamation RRA Plans**
   http://www.usbr.gov/rra/

9. **Bureau of Reclamation 2008 Conservation Efficiency Standards (PL 102-575)**
   https://www.usbr.gov/mp/cvpia/title_34/public_law_complete.html

B-6 Code Pertaining to Agricultural Water Suppliers

A. Water Code

AB 1668, Friedman (2018). Water management planning.

SECTION 1. Section 531.10 of the Water Code is amended to read:

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.

SEC. 6. Section 10608.48 of the Water Code is amended to read:

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.

SEC. 9. Section 10801 of the Water Code is amended to read:

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.

SEC. 10. Section 10802 of the Water Code is amended to read:

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.

SEC. 11. Section 10814 of the Water Code is amended to read:

10814. "Person" has the same meaning as defined in Section 10614.

SEC. 12. Section 10817 of the Water Code is amended to read:

10817. "Water use efficiency" means the efficient management of water resources for beneficial uses, preventing waste, or accomplishing additional benefits with the same amount of water.

SEC. 13. Section 10820 of the Water Code is amended to read:

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.

SEC. 14. Section 10825 of the Water Code is amended to read:

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.

SEC. 15. Section 10826 of the Water Code is amended to read:

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.

SEC. 16. Section 10826.2 is added to the Water Code, to read:

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.

SEC. 17. Section 10843 of the Water Code is amended to read:

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.

SEC. 18. Section 10845 of the Water Code is amended to read:

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.

B. California Code of Regulations, Title 23, §597 et seq. Agricultural Water Measurement

§597. Agricultural Water Measurement

Under the authority included under California Water Code §10608.48(i)(1), the Department of Water Resources (Department) is required to adopt regulations that provide for a range of options that agricultural water suppliers may use or implement to comply with the measurement requirements in paragraph (1) of subdivision (b) of §10608.48.

For reference, §10608.48(b) of the California Water Code states that:

Agricultural water suppliers shall implement all 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, §531.10(a) of the California Water Code requires that:

(a) An agricultural water supplier shall submit an annual report to the department that summarizes aggregated farm-gate delivery data, on a monthly or bi-monthly basis, using best professional practices.

Notes:

(1) Paragraphs (1) and (2) of §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 §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.

§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 §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 §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 §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 §10608.12(a), the Department is not subject to this article.

Note: Authority cited: Section 10608.48, Water Code. Reference: Sections 10608.12 (a), 10608.48 (d), 10608.48 (f), 10828, and 10853 Water Code.

§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 §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 §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 §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: Sections 10608.12 (a), 10608.12 (m), 10608.48, and 10813 Water Code.

§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 §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 §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 §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 §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 §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 §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 §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 §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: Sections 531.10, 10608.48 *(i)* (1), and 10826 Water Code.

§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 §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 §597.4(b)(1) and§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 §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 sections 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

(2) 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.

(3) 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 §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.

(4) 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 §597.3(a) and operation and maintenance protocols meet best professional practices.

(c) Records Retention

Records documenting compliance with the requirements in §597.3 and §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 §597.3(a) based on either field-testing or field-inspections and analysis as defined in sections 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 §597.3 (b), as outlined in section §597.3(b)(2), and §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 §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: Sections 531.10, 10608.48 *(i)* (1), and 10826 Water Code.

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B-7. 2018 Aggregated Farm-gate Delivery Reporting Form

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							

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 Section 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.

APPENDIX C

Possible Approach to Demonstrate Reduced Delta Reliance

C. Possible Approach to Demonstrate Reduced Delta Reliance

A. 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 2015 and 2020 AWMPs 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 (Cal.Code Reg., tit. 23, § 5003).

Agricultural water 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 the Water Conservation Act of 2009. Each AWMP must be adopted by the agricultural water 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 an agricultural water supplier that carries out or takes part in a "covered action".

This appendix provides a possible approach for an agricultural water supplier to demonstrate a measurable reduction in reliance on Delta water supplies. Specific elements of this appendix include:

[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, § 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."

- 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.

B. Background

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."[4] 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."[5]

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.[6]

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.

[4] Pub. Resources Code, § 29702; Wat. Code, § 85054.
[5] Wat. Code, § 85054.
[6] Wat. Code, § 85021.

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.[7] 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.[8]

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.[9] 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.[10]

3. Policy WR P1

Policy WR P1 of the Delta Plan is relevant to an agricultural water 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

[7] Wat. Code, §§ 85300, subd. (a), 85302, subd. (a).
[8] Wat. Code, §§ 85059, 85300, subd. (a), 85302, subd. (a).
[9] Wat. Code, § 85225.
[10] Wat. Code, § 85225.

(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 agricultural water 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.[11]

C. 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

[11] California Code of Regulations, Title 23 § 5003(c)(1) states:

Water suppliers that have done all of the following are contributing to reduced reliance on the Delta and improved regional self-reliance and are therefore consistent with this policy:

> (A) Completed a current Urban or Agricultural Water Management Plan (Plan) which has been reviewed by the California Department of Water Resources for compliance with the applicable requirements of Water Code Division 6, Parts 2.55, 2.6, and 2.8;
>
> (B) Identified, evaluated, and commenced implementation, consistent with the implementation schedule set forth in the Plan, of all programs and projects included in the Plan that are locally cost effective and technically feasible which reduce reliance on the Delta; and
>
> (C) Included in the Plan, commencing in 2015, the expected outcome for measurable reduction in Delta reliance and improvement in regional self-reliance. The expected outcome for measurable reduction in Delta reliance and improvement in regional self-reliance shall be reported in the Plan as the reduction in the amount of water used, or in the percentage of water used, from the Delta watershed. For the purposes of reporting, water efficiency is considered a new source of water supply, consistent with Water Code section 1011(a).

provide agricultural water suppliers an example approach that can be used to provide for 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. Agricultural water suppliers that would receive water from the Delta may provide the 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.

1. Available Data

An agricultural water 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.

2. 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 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 agricultural water 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.

3. Implementation of Efficient Water Management Practices

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, agricultural water 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.

4. 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.

2015 and 2020 AWMPs. If water suppliers did not include this information in their 2015 AWMPs, one potential approach to showing consistency with this aspect of WR P1 would be for water suppliers to amend their 2015 AWMPs to include the information that was originally expected by the DSC. The 2015 AWMP could be amended by adding the same addendum addressing the WR P1 consistency that was developed for the 2020 AWMP. The example in this Appendix is designed to produce those data and information covering the year 2015, 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 2015 AWMPs concurrent with adoption of their 2020 AWMPs. When amending the 2015 AWMPs water supplier should clearly indicate that the addition of the optional reduced reliance addendum is the only reason for the amendment, and thus the amended 2015 AWMP would not be subject to DWR review. A checklist has been included at the end of this Appendix to assist agricultural water suppliers in making sure amendment notifications have been completed in accordance with Water Code.

When amending the2015 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 agricultural water supplier should be clear that they are amending their 2015 AWMP only for WR P1 consistency, and this is separate from the adoption of the 2020 AWMP. All public notifications, news publications (Gov Code 6066), and adoption procedures per the Water Code must be adhered to (§§10821(a), 10841, 10843, 10844).

2020 AWMPs. For 2020 AWMPs, it is recommended that the same baseline be used as was used for 2015 AWMPs. If the selected baseline was some historic period up to 2010, current conditions could be characterized by averaging 2011 through 2020 or most current year data available (see Figure 2). If the selected baseline was some historic year through 2015, current conditions could be characterized by the average of 2016 through 2020 or most current year data available.

5. 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, agricultural water 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, agricultural water 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

[12] DWR, "Guidance for Climate Change Data Use During Groundwater Sustainability Plan Development", April 2018.

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.

6. 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 time-frame 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.

2015 and 2020 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 2015 and 2020 AWMPs. 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.

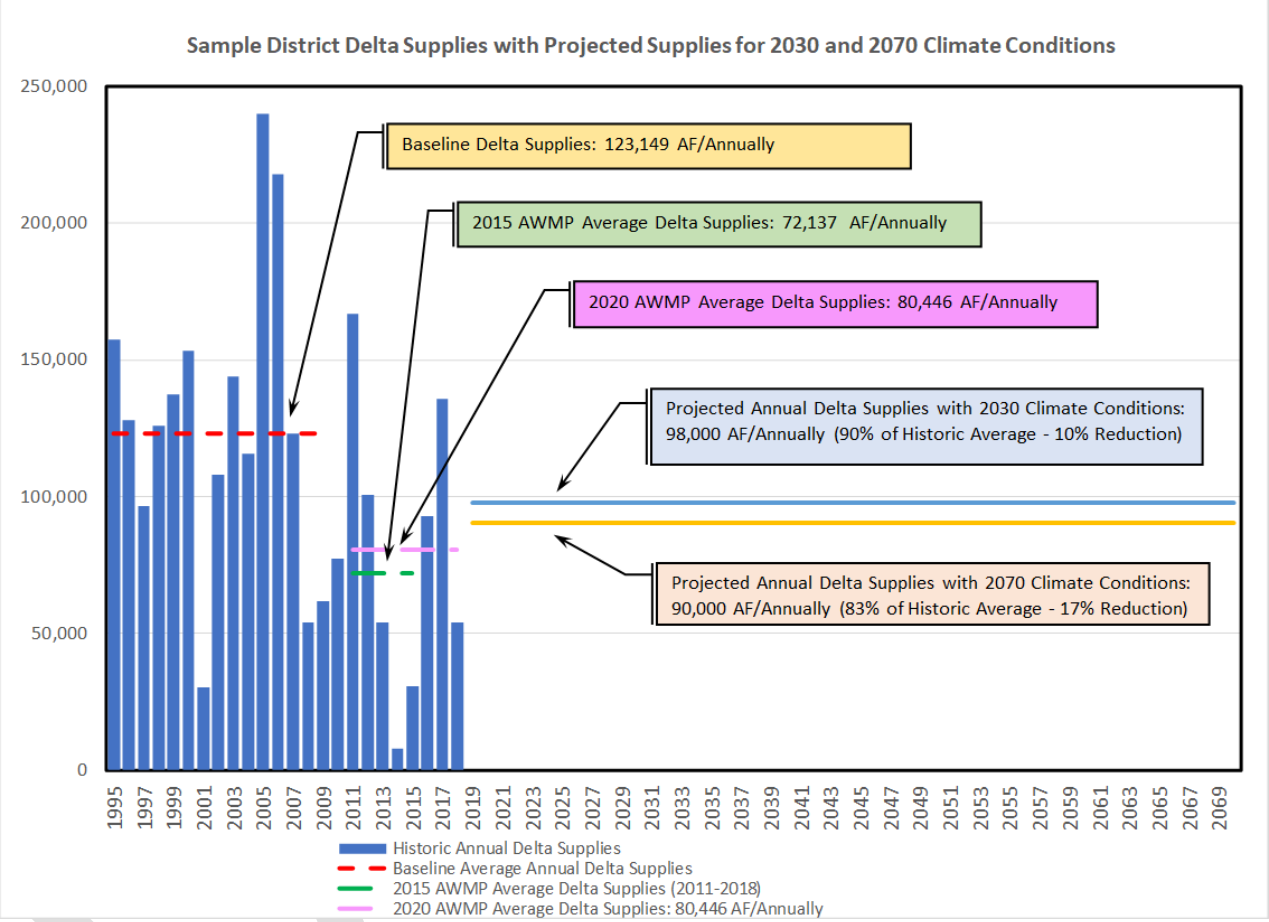
Value	Baseline Delta Supplies (1995-2010)	2015 Conditions Delta Supplies	2020 Conditions Delta Supplies	2030 Climate Conditions Delta Supplies	2070 Climate Conditions Delta Supplies
Average Annual Supplies (acre-feet)	123,149	72,137	80,466	98,000	90,000
Percent of Baseline Supplies	N/A	56%	65%	80%	73%
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 2015 and 2020 AWMP District Delta Supplies and Projected Supplies



2015 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)	
• 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)	

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