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State of California
Natural Resources Agency
Department of Water Resources

**Guidebook to Assist
Agricultural Water Suppliers
to Prepare a
2012 Agricultural Water
Management Plan**

March 20, 2012

List of Acronyms and Abbreviations

AF	Acre foot
AWMC	Agricultural Water Management Council
AWMP	Agricultural Water Management Plan
AWS	Agricultural Water Suppliers
CVPIA	Central Valley Project Improved Act (1992)
CWC	California Water Code
EWMP	Efficient Water Management Practices
DWR	Department of Water Resources
MOU	Memorandum of Understanding
RRA	Reclamation Reform Act (1982)
SBx7-7	The Water Conservation Act of 2009
SWP	State Water Project
SWRCB	State Water Resources Control Board
§	Code or regulatory Section

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Guidebook Objectives and Use

The objective of this guidebook is to assist agricultural water suppliers in preparing their Agricultural Water Management Plans and to meet the new requirements of the Water Conservation Bill of 2009 (SBX7-7). This guidebook is not a rule. Use of this guidebook is not mandatory but is encouraged.

The Guidebook objectives focus on providing information on how to complete the required components for preparing an Agricultural Water Management Plan (referred to as AWMP or Plan). Part I focuses on preparation and completion of required components of the plan. Part II is background information to assist in completing the plan. Specifically, the objectives are:

- Inform water suppliers of AWMP requirements identified in the California Water Code (CWC).
- Describe the relationship between the new regulations (SBx7-7 Water Conservation Bill of 2009) and other existing regulations.
- Provide guidelines to demonstrate compliance with the Water Conservation Bill of 2009.
- Describe how to electronically submit a completed 2012 AWMP.

This guidebook provides a clear distinction between requirements in the Water Code (SBx7-7 and other regulations) and explanations and examples:

- **Bold and Underlined text (with Code §)** – required elements from CWC
- Plain text – explanation or suggested additional information

AWMP Review

DWR will need at least one hard copy of the plan, and preferably a digital copy (e.g., Adobe™ pdf or MS-Word™).

DWR will review each AWMP to determine whether each required element is fully addressed according to the California Water Code (CWC). DWR staff will complete the review using 2012 review sheets (*in preparation*), which will become part of the AWMP record after the review process is complete.

After finishing the plan review, DWR will inform the supplier as to how DWR will report on the status of its plan to the Legislature. For plans that have not addressed or met specific requirements, DWR will list the requirements that are missing or need to be revised. Missing or additional information can be added to a plan after it has been submitted to DWR. Amendments to a plan may require the plan to go through the formal approving public process. DWR will work with agricultural water suppliers to ensure that the plan contains all of the required elements. The water supplier will have an opportunity to amend their plan as needed before the review is complete.

DWR will report to the Legislature on or before December 31, 2013, on the status of all submitted plans.

California Water Code Requirement for Preparing an AWMP

- 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 **(§10820 (a))**
- An “Agricultural water supplier” is defined as a water supplier, either publicly 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 **(§10608.12)**.
- 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 **(§10820 (b))**.
- No agricultural water supplier that provides water to less than 25,000 irrigated acres, excluding recycled water, shall be required to adopt and implement an AWMP unless sufficient funding has specifically been provided to that water supplier for these purposes **(§10853)**.
- An agricultural water supplier is not eligible for a water grant or loan awarded or administered by the state unless the supplier adopts and implements an AWMP **(§10852)**.

How the SBx7-7 process overlaps the AWMC 1999 MOU Process (§10827)

Agricultural water suppliers that are members of the Agricultural Water Management Council (Council), and that are required to submit water management plans to the Council in accordance with the 1999 MOU (see:

<http://www.agwatercouncil.org/images/stories/pdfs/awmcmou.pdf>), may submit those water management plans to DWR to satisfy the requirements to adopt an AWMP as required by SBx7-7. Include efficient water management practices currently being implemented, or scheduled for implementation.

How the SBx7-7 process overlaps Reclamation's CVPIA or RRA process (§10828)

Agricultural water suppliers that are required to submit water conservation plans to the Bureau of Reclamation pursuant to the CVPIA or the RRA, or both, may submit those water conservation plans to DWR to satisfy the requirements to adopt an AWMP as required by SBx7-7 if the following apply:

- The agricultural water supplier has adopted and submitted the water conservation plan to the Bureau of Reclamation within the previous four years.
- The Bureau of Reclamation has accepted the water conservation plan as adequate.

This does not require these agricultural water suppliers to prepare and adopt water conservation plans on a schedule different from that required by the Bureau of Reclamation (Table 1). Bureau of Reclamation (BOR) 2011 Criteria refers to the water conservation plans as Water Management Plans. The plans have evolved to more than just water conservation plans and have been submitted every five years to Reclamation as Water Management Plan. Agricultural water suppliers that submit these plans to the BOR may submit supplemental information with BOR water management plans to DWR to comply with DWR's 5-year plan submittal. This may be submitted as an addendum to the plans, or submitted as a separate document to DWR, to demonstrate their compliance with DWR's water measurement regulation. These agricultural water suppliers may submit the information in accordance with the schedule of submittals required by the Reclamation. Table 2 provides the supplemental information to be submitted as an addendum with a BOR approved plan. See Part II, Section H (FAQs 4 and 5) for further information.

Table 1: Comparison of Required Elements Among CA Water Code, AWMC MOU, and USBR CVPIA Processes

Required Element	CA Water Code §	AMWC 1999 MOU¹	USBR CVPIA²
Coordination	N/A	Step 1	N/A
Plan Adoption	10831	Step 7	Section 8
Previous Water Manag. Activities	10826 (d)	Step 4	N/A
Ag. Water Supplier Service Area	10826 (a)	Step 2	Section 1
Inventory of Water Supplies	10826 (b)	Step 3	Section 2
Water Balance	10826 (b) (5)	Step 3E	Section 2E
Drainage from the water supplier's surface area	10826 (b) (6)	Step 3F	Section 2F
Water accounting	10826 (b) (7)	Step 3G	Section 2G
Water Supply Reliability	10826 (b) (8)	Step 3H	N/A
Effects of Climate Change on Future Supply	10826 (c)	N/A	N/A
EWMPs	10608.48	Step 5	Section 3

¹ Step 6: "Develop schedules, budgets, and projected results" is unique to the MOU.

² Sections 4-7 are unique to USBR's process (Section 4: BMPs for Urban Contractors; Section 5: Plan Implementation; Section 6: Exemption Process; & Section 7: Regional Criteria)

Table 2: Supplemental Information that may be submitted to DWR as an addendum with a BOR approved plan.

Subject	State Regulation	Information that may be submitted
Requirements for Measuring at Upstream of Multiple Customers	Section 597.3(b) – Measurement at lateral permitted subject to conditions: lack of legal access (597.3(b)(1)(A)); water level or flow conditions (597.3(b)(1)((B)); Document and report on conditions and method to apportion deliveries (597.3(b)(2))	If water measurement device is installed upstream of multiple farm-gates provide information on lack of legal access or conditions as described in 597.3(b)(1)(A)) (597.3(b)(1)((B)), (597.3(b)(2)) of regulation
Initial Certification Requirements	Section 597.4(a) - Accuracy of an existing, new or replacement measurement device to be certified by an Engineer.	provide engineer certification
Record Retention Requirements	Section 597.4(c) – Records shall be retained for 10 years or 2 AMWP cycles.	state that the records will be maintained for 10 years or two water conservation plans cycles.
Performance Requirements	Section 597.4(d) – - Devices shall be correctly installed, maintained, operated, inspected, and monitored - Devices no longer meeting the accuracy requirements shall be repaired or replaced	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	Section 597.4(e)(4) – Schedule, budget and finance plan	if applicable, provide information for section 597.4(e)(4).

compliance		
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Part I: Preparing an AWMP

Section 1: Plan Preparation

It is recommended that copies of the proposed AWMP 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 allow opportunity for their input into the plan.

10821(a) Agency Notification

An agricultural water supplier is required to notify each city or county within which supplier provides water supplies that the agricultural water supplier will be preparing or amending a plan. The agricultural water supplier may consult with, and obtain comments from, each city or county that receives notice.

The law does not specify how much time in advance the proposed AWMPs are to be submitted to a city or county.

10841 Public Participation

Prior to adopting the plan (including updates), the agricultural water supplier shall make the proposed plan available for public inspection, and hold a public hearing on the plan. Prior to the hearing, notice of the time and place of hearing is to be published within the jurisdiction of the publically owned water supplier once a week for two successive weeks (see **§6066 of the Government Code**; <http://law.onecle.com/california/government/6066.html>).

A privately owned agricultural water supplier is to provide an equivalent opportunity that would otherwise be afforded through a public hearing process for interested parties to provide input on the plan.

Regional Coordination

It is recommended that agricultural water suppliers with mutual needs work together to develop agreements/MOUs to prepare and/or implement regional AWMPs. Regional agreements or AWMPs are not required. The AWMP could describe mutual agreements/MOU with other signatories or agencies.

Plan Adoption and Submittal (§10841)

After the public hearing, the plan can be adopted as prepared, or as modified during or after the hearing. The plan must then be submitted to DWR within 30 days of adoption.

Submission of copy of an adopted AWMP to entities identified below (§10843 (a)&(b))

- The Department **(§10843 (b)(1))** (One hard copy, and an electronic copy, preferably in Adobe™ pdf or MS-Word™)
- Any city, county, or city and county within which the agricultural water supplier extracts or 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))**
- Any urban water supplier within which jurisdiction the agricultural water supplier provides water supplies **(§10843 (b)(4))**
- Any city or county library within the jurisdiction the agricultural water supplier provides water supplies **(§10843 (b)(5))**
- The California State Library **(§10843 (b)(6))**
- Any local agency formation commission serving a county within which the agricultural water supplier provides water supplies **(§10843 (b)(7))**

Previous water management activities (§10826 (d))

Describe previous water management activities, such as previous plans submitted to USBR or AWMC.

Section 2: Agricultural water supplier and service area (§10826 (a))

The intent of this section is to describe the general physical information about the water supplier in order to form a basis for evaluating structural or operational improvements by, and within, the service area, as well as to provide the basic information about physical aspects of the water supplier that may affect the potential water management.

This section is also an opportunity to provide some background information such as the agricultural water supplier date of formation, sources of water supply such as CVPIA, SWP, local surface or groundwater or any other pertinent information.

Size of the Service Area (§10826 (a)(1))

- Gross acreage (district boundary)
- Average irrigated acres per year. If irrigated acreage widely varies from year to year, provide an estimated range.

Location of the Service Area and its water management facilities (§10826 (a)(2))

- Provide a map of the service area showing, where possible, existing water diversion(s), distribution and drainage facilities, and water measurement devices.
- Describe the water conveyance and delivery system within the service area such as canals, pipelines, drains, and reservoirs.
- Is the water supplier delivery system on demand, modified demand, or rotation?

Terrain and Soils (§10826 (a)(3))

Terrain and soils are factors that can affect the amount of water used for irrigation. Describe the topography of the water supplier's service area (i.e., hilly, flat, sloping to a water course). Indicate the effect of topography and soil conditions on water operations and management within the water supplier service area.

Natural Resources Conservation Service (NRCS) provides general soils maps of the district service area and may be a useful tool. Soil classification information can be obtained at: <http://soils.usda.gov/> and the web soil survey tool is available at: <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>

Climate (§10826 (a)(4))

Provide a description of the historical climate in the water district.. Include average precipitation, maximum and minimum temperatures, and evapotranspiration rate. If

areas within the water supplier's service are known to have significantly different microclimates, describe how they affect water management decisions and operations.

The National Weather Service provides weather data from climatological stations throughout California and is a useful tool to describe historical climates:

<http://www.wrcc.dri.edu/climsum.html>

Operating rules and regulations (§10826 (a)(5))

Describe or attach a copy of the water supplier's operating rules and regulations, including water allocation policy, 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, as appropriate.

Water delivery measurements or calculations (§10826 (a)(6))

- Describe how water deliveries to customers are currently measured or calculated.
- Describe the frequency and types of measurements (meters, calibrated weirs, meter gates, other), levels of accuracy, frequency of calibration, and frequency of maintenance.
- Describe how the volumetric accuracy of water delivered to customers is measured to comply with the Agricultural Water Measurement regulations (See Section D, §597 *et seq.*).

Water rate schedules and billing (§10826 (a)(7))

- Describe the basis for agricultural usage water charges. A copy of the water supplier's written operating rules and regulations will suffice if they describe the basis for water charges (i.e., by quantity, acre, crop, land assessment, or other charges).
- If water use is billed by quantity, describe the rate structure (i.e., allocation-based, uniform, or increasing block rate). Include the billing frequency (i.e., monthly, bimonthly, annually).

Water shortage allocation policies (§10826(a)(8))

- If the water supplier has a Water Shortage Allocation Policy, attach a copy of the policy.
- If the supplier does not have such a policy, describe how reduced water supplies, including hardship water, are allocated.

Policies Addressing Wasteful Use of Agricultural Water

- Describe any water supplier policies that address wasteful use of agricultural water and describe enforcement methods.

Water Shortage Contingency Plan

- Does the water supplier have a water shortage contingency plan? If yes, attach a copy of the plan.
- If no, describe what actions will be taken by the agricultural water supplier if there is a catastrophic reduction in water suppliers. Assess how responding to water shortages affects revenues and expenditures. Indicate how the water supplier will address these potential impacts.

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Section 3: Inventory of Water Supplies

Describe the quantity and quality of water resources (§10826 (b))

The intent of this section is to describe the quantity and quality of water resources (such as sources, uses, return flows, and drainage) of the water supplier. The description may include the quantity and quality descriptions of the water supplier's surface water supply, groundwater supply (estimate if not quantified), other water supplies, source water quality monitoring programs, water uses within the water supplier's service area, drainage from the water supplier's service area, and a water budget.

Surface water supply (§10826 (b)(1))

Briefly describe the amounts and types of each of the water supplier's source water supplies (i.e., pre-1914 water rights, CVP Class I water contract for agriculture, SWP water contract for agriculture, exchange contract).

- Provide the amount of water received from each source for each of the last five years.
- Describe any restrictions on the time of diversion.
- Describe any anticipated changes in the water supplier's surface water supplies during the next five years.

Table 3: Example tabulation of water types by AF

Pre-1914 water rights	CVP Class I water	SWP water	Exchange

Groundwater supply (§10826 (b)(2))

Describe the general characteristics of the groundwater basin(s) that underlies the water supplier. Provide a map locating water supplier's operated water wells and groundwater recharge areas, if applicable. If the water supplier operates a conjunctive use program, describe it. For managed groundwater basins, attach a copy of the management plan or provide an electronic copy. (See "Groundwater recharge" below).

Helpful information necessary to describe ground water basins can be found in California DWR Bulletin 118:

<http://www.water.ca.gov/groundwater/bulletin118/update2003.cfm>

Bulletin 118 describes the general boundaries of each basin and indicates if there is evidence of overdraft. You can use this Bulletin to identify the basin or basins that

underlie your boundaries and their size, usable capacity, and safe yield. In a few cases, districts overlie more than one ground water basin.

Other water supplies (§10826 (b)(3))

Identify any long-term water supplies not described above (e.g., drainage from upstream areas, transfer agreements and other sources).

Source water quality monitoring practices (§10826 (b)(4))

Describe any source water quality monitoring practices currently conducted for surface water and groundwater to determine water quality problem(s) that limit(s) use of source water for water supplier purposes.

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Section 4: Water Balance

Water uses within the agricultural water supplier's service area (§10826 (b)(5))

Explanation: Describe average annual water uses within water supplier's service area supported by the water supplier's water supplies (agricultural, environmental, recreational, municipal and industrial, groundwater recharge, exchanges and transfers, and other uses).

Agricultural (§10826 (b)(5)(A))

For example, tabulate the type and acreage of crops grown in the water supplier's service area, evapotranspiration rates for each crop, cultural practices, and the leaching requirement to maintain salt balance in the soil profile. These data will be used in the Water Accounting section below.

DWR's CIMIS database is a useful tool for obtaining crop ET in your area:

<http://www.cimis.water.ca.gov/cimis/info.jsp>

Environmental (§10826 (b)(5)(B))

For example, describe any environmental resources supported by the water supplier's water supplies (i.e., wetlands, vernal pools, streams, wildlife refuges), and the amount of water supplied by the water supplier for these uses.

Recreational (§10826 (b)(5)(C))

For example, describe any water-related recreational facilities within the water supplier's service area by type and the amount of water supplied to them.

Municipal and industrial (§10826 (b)(5)(D))

For example, describe any municipal and industrial water use.

Groundwater recharge (§10826 (b)(5)(E))

For example, describe any amount of water used for groundwater recharge, method of recharge. Identify any groundwater recharge that is for conjunctive water use. Investigate and implement possible improvements in conjunctive use programs. Wherever possible, during wet years conjunctive use programs should attempt to use

surplus water from within or outside the basin for the recharge of groundwater supplies or to reduce the use of those supplies (see “Groundwater supply” above).

Transfers and exchanges (§10826 (b)(5)(F))

For example, describe the amount of water (acre foot or AF) that is transferred and/or exchanged into or out of the water supplier’s service area, and identify the uses. Describe any other significant water transactions, such as trades, wheeling, etc.

Other water uses (10826 (b)(5)(G))

Describe any other water uses that are supplied by your district. For example, this could include watering dirt roads for dust abatement.

Drainage from the water supplier’s surface area (§10826 (b)(6))

For example, Identify where surface and subsurface drainage goes (e.g., to wildlife refuge or other wildlife habitat, beneficial reuse within the service area, discharge to a river or other water course, another water service area, a groundwater aquifer, a saline sink, or evaporation ponds). If drainage leaves the service area and is reused, identify the discharge location and quantity. Describe any water quality monitoring programs for surface or subsurface drainage water (frequency of measuring and analyses performed). Identify any measured contaminants (e.g., selenium, boron, pesticides) that limit the reuse of drainage water. Describe any usage limitation resulting from the drainage water quality.

Also see the SWRCB’s Irrigated Lands Regulatory Program regarding the protection of receiving waters from agricultural water discharges:

http://www.swrcb.ca.gov/water_issues/programs/agriculture/

Water accounting (§10826 (b)(7))

For example, tabulate a water supply inventory for the water supplier based on a representative water supply year. Identify the basis used to develop the water supplier’s representative water supply year (see below).

Quantifying the water supplier’s water supplies (§10826 (b)(7)(A))

Example of additional detailed information:

- All surface water supplies, imported to or originating within the water supplier’s service area (AF by month).

- Groundwater extracted by the water supplier, by month.
- Effective precipitation, annually.
- Estimated groundwater use by non-water supplier parties within water supplier's boundaries (if records are not available, provide an estimate and basis for estimation).
- Recycled water.
- Other water supplies.

Table 4: Suggested table for AF water supplies by month

	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
Surface water												
Ground water												

Tabulating water uses (§10826 (b)(7)(B))

Examples of additional detailed information:

- Applied water.
- Consumptive use by crop evapotranspiration and riparian vegetation.
- Seepage, evaporation, and operational spills.
- Water used for leaching, cultural practices (i.e., frost protection, soil reclamation).
- Municipal and industrial water use, if any.
- Any water used for environmental purposes (including instream flows and wildlife habitat).
- Any water used for recreational purposes.
- Groundwater recharge/conjunctive use.
- Water exchanges or transfers.
- Estimated deep percolation.
- Any flows to saline sink or perched water table.
- Totaled recycled water, if any.
- Any water leaving the water supplier's service area.
- Other

Table 5: Suggested water uses tabulation

Elements	AF
Applied water	
Consumptive used by crop evapotranspiration and riparian vegetation	
Seepage, evaporation, and operational spills	
Water used for leaching, cultural practices	
Municipal and industrial water use	
Any water used for environmental purposes	
Any water used for recreational purposes	
Groundwater recharge/conjunctive use	
Water exchanges or transfers	
Estimated deep percolation	
Any flows to saline sink or perched water table	
Totaled recycled water	
Any water leaving the water supplier's service area	
Other	

Overall water budget (§10826 (b)(7)(C))

For example, use the water supply and water use data tabulated above to prepare a water budget summary that quantifies to the best of your ability:

- Water supply delivered into the service area (surface and groundwater)
- Crop water use
- Environmental water use
- Other beneficial water uses (e.g., leaching, cultural practices, M&I, recreation, etc.)
- Evaporative and consumptive riparian vegetation losses
- Non-recoverable percolation losses
- Recoverable and non-recoverable surface and subsurface outflows.

Table 6: Suggested Overall water budget

Elements	AF
Water supply delivered into the service area	
Crop water use	
Environmental water use	
Other beneficial water uses	
Evaporative and consumptive riparian vegetation losses	
Non-recoverable percolation losses	
Recoverable and non-recoverable surface and subsurface outflows	

Water Supply Reliability (§10826 (b)(8))

For example, discuss the need for firmness of supply based upon factors of importance to the water supplier. Does your district need a firm water supply for tree crops?

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Section 5: Climate Change

Include an analysis, based upon available information, the effect of climate change on future water supplies (§10826 (c))

For example, the agricultural water supplier should consider in its 2012 AWMP the effects of climate change on water supply availability. The inclusion of potential climate change impacts in planning is consistent with other water supply programs and environmental requirements being implemented within California. Potential climate change impacts could impact agricultural water suppliers within the planning horizon of AWMP. *See Part II, Section B for suggested detail.*

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Section 6: Efficient Water Management Practices (EWMPs)

(§10608.48)

The purpose of this section is to identify EWMPs that will accomplish improved and more efficient water management.

a. Measure the volume of water delivered to customers with sufficient accuracy **(§10608.48 (a)(1))**

For the complete regulation regarding measuring water volume delivered, see **Title 23, §597 et seq. Agricultural Water Measurement** in Section D). (This rule is still under development)

§597.4 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: $\text{Volume} = \text{flow rate} \times \text{duration of delivery}$.
 - 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: $\text{Volume} = \text{velocity} \times \text{cross-section flow area} \times \text{duration of delivery}$.

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.

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.

b. Describe the pricing structure for water customers based at least in part on quantity delivered (§10608.48 (b))

§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.

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 (§10608.48 (c)):

Explanation: Provide a cost-benefit analysis if any one or more of the measures below is not cost effective. Provide an explanation why they are not if any one or more of the measures below is not technically feasible.

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

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))**.

3. Facilitate the financing of capital improvements for on-farm irrigation systems **(§10608.48 (c)(3))**.

4. Implement an incentive pricing structure that promotes one or more of the following goals **(§10608.48 (c)(4))**:
 - A. More efficient water use at the farm level such that it reduces waste **(§10608.48 (c)(4)(A))**.

 - B. Conjunctive use of groundwater **(§10608.48 (c)(4)(B))**.

Explanation: In dry years the water suppliers may encourage, through higher prices for surface water, pumping more groundwater and leaving surface water for environmental uses.

 - C. Appropriate increase of groundwater recharge **(§10608.48 (c)(4)(C))**.

Explanation: In wet years pricing may be used to encourage greater use of surface water to facilitate recharge

 - D. Reduction in problem drainage **(§10608.48 (c)(4)(D))**.

 - E. Improved management of environmental resources **(§10608.48 (c)(4)(E))**.

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

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))**.
 - For example, Line or pipe the distribution system to 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.

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

7. Construct and operate supplier spill and tail-water systems **(§10608.48 (c)(7))**.

Explanation: This may increase efficiency or, in some cases, reduce losses of water from operational spills. 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.

8. Increase planned conjunctive use of surface water and groundwater with the supplier service area **(§10608.48 (c)(8))**.

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

Explanation: This may increase flexibility in water deliveries and increase the water supplier's control over its water supplies, thereby providing the opportunity to improve the efficiency of water use.

10. Facilitate or promote customer pump testing and evaluation **(§10608.48 (c)(10))**.

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

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))**:

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

- DWR conducts an eco/mobile lab program that evaluates the performance of irrigation systems. The laboratories measure water application rates and system distribution uniformity and give recommendations for irrigation system improvement, if necessary: <http://www.water.ca.gov/wateruseefficiency/irrigation/>

B. Normal year and real-time irrigation scheduling and crop evapotranspiration information **(§10608.48 (c)(12)(B))**.

- An important source of ET data 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:
<http://www.cimis.water.ca.gov/cimis/welcome.jsp>

C. Surface water, groundwater, and drainage water quantity and quality data (§10608.48 (c)(12)(C)).

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

Explanation: (e.g., soil moisture and salinity monitoring, in-school awareness programs, Agwater software, efficient irrigation techniques, crop water budget and other approaches, program delivery via workshops, seminars, newsletters, field days and demonstration, etc.).

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)).

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

d. Report on which efficient water management practices have been implemented (§10608.48 (d))

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 (if applicable), and an estimate of the water use efficiency improvements estimated to occur five to 10 years in the future.

Explanation: Submit information that documents the supplier's determination of an efficient water management practice is not locally cost effective or technically feasible.

Part II: AWMP Supporting Information

Section A: Agricultural Water Management Planning Background

- **Legislative History**

- 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.

- AB 1404 (2007) Water Measurement Information

The AB 1404 requires agricultural water suppliers to submit to DWR an annual report that includes measured 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.

See Section F for locating the Agricultural Farm-Gate Delivery Report form.

- **Current Legislation and Regulations**

- Water Conservation Bill of 2009 (SBX7-7)
- New Agricultural Water Measurement (Title 23 California Code of Regulations, §597 *et seq.*, 2011)

- **Related Programs**

- California Water Plan Update
<http://www.waterplan.water.ca.gov/cwpu2013/index.cfm>

- California Agricultural Water Management Council Efficient Water Management Practices (EWMPs)
- Bureau of Reclamation Water Conservation Plans (CVPIA). For the updated 2011 Standard Criteria, see:
http://www.usbr.gov/mp/watershare/documents/Water_mgmt/index.html
- Bureau of Reclamation RRA Plans
- Bureau of Reclamation 2008 Conservation Efficiency Standards (PL 102-575)
http://www.usbr.gov/mp/cvpia/title_34/public_law_complete.html

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Section B: Guidance on Climate Change for Agricultural Water Management Plans

This section is provided as an example for compliance with **§10826 (c)**.

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. Estimates indicate that by 2050 the Sierra snowpack will be significantly reduced (see Figure B-1 for historical trend). Much of the precipitation is expected to fall as rain instead of snow during winter and cannot be stored in our current water 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.

Potential Climate Change Effects

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. Some of these potential changes are presented below.

Water suppliers should consider the following climate change effects, many of which are already documented in California:

- **Water Demand** — Shorter winters, more hot days and nights, and a longer irrigation season will increase water demand.
- **Water Supply and Quality** — Reduced snowpack, shifting spring runoff to earlier in the year (Figure B-1), has the potential to impact water supply.
- **Sea Level Rise** — The Delta will be at greater risk to increased salinity due to sea level rise. It is expected that sea level will continue to rise due to the warming of the oceans. This will result in near-shore ocean changes such as stronger storm surges, more forceful wave energy, and more extreme tides. This will also affect levee stability in low-lying areas and increase flooding.
- **Disaster** — Disasters are expected to become more frequent as climate change brings increased climate variability, resulting in more extreme droughts and floods.

A thorough discussion in the AWMP is encouraged by agricultural water suppliers to address their potential actions and responses to these changes as part of addressing the effects of climate changes on future water supplies.

Specific points to consider

- Irrigation demand is likely to increase as temperatures rise and rainfall becomes more variable.
- 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.
- Flooding risk is expected to increase as a result of more severe rainfall patterns and warmer winter rains. This could affect water supply and conveyance.
- Snowpack is expected to significantly diminish as the climate warms. Diminished snowfall in the mountains and earlier runoff will result in reduced water supply availability for 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.
- The Sacramento-San Joaquin River Delta is vulnerable to impacts of climate change, most notably sea level rise. Higher sea levels will make it more difficult to export water from the Delta with the existing infrastructure and may result in reduced water deliveries over time.

See “*Climate Change Handbook for Regional Water Planning*” (2011) for additional details: <http://www.water.ca.gov/climatechange/CCHandbook.cfm>

**Sacramento River System Runoff
April - July Runoff in percent of Water Year Runoff**

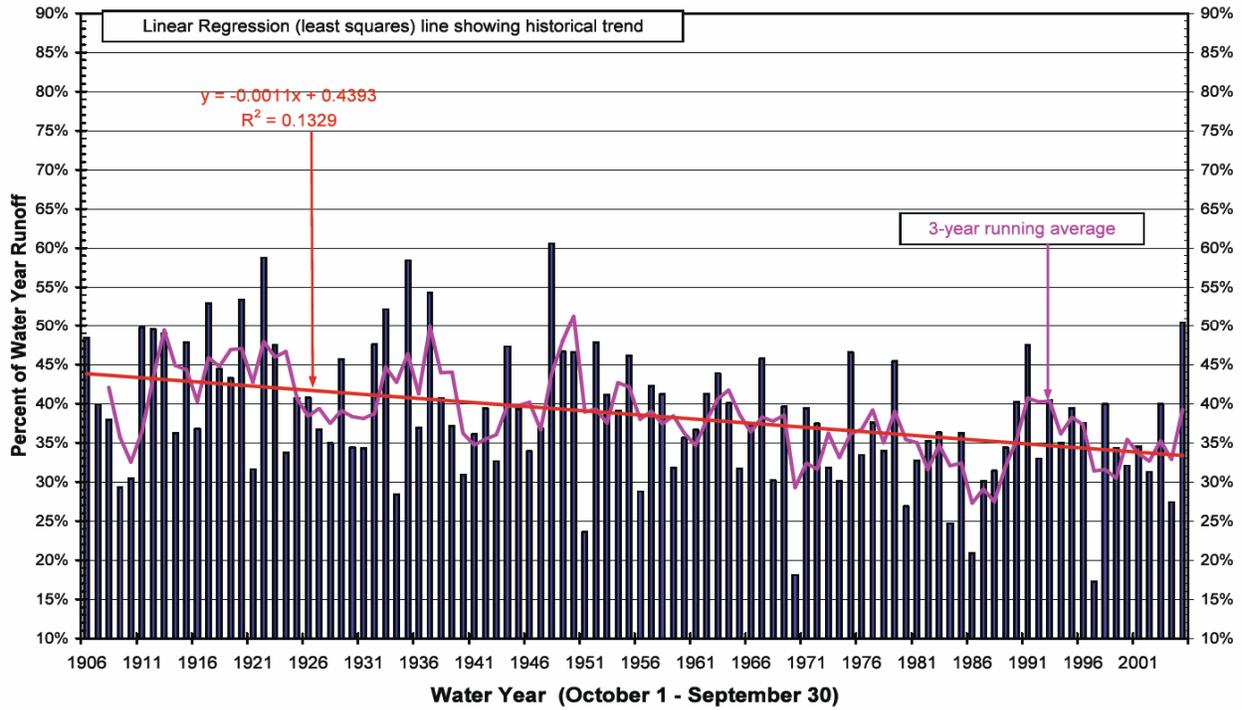


Figure B-1 Change in the timing of seasonal runoff on the Sacramento River

Source: Roos and Anderson 2006.

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Section C: Electronic Submittal and DWR Staff AWMP 2012 Review Sheets

(Under development)

Section D: Title 23, §597 et seq. Agricultural Water Measurement (*under development*)

<http://www.water.ca.gov/wateruseefficiency/sb7/committees/ag/a2/>

Section E: AB 1404 Form

The Agricultural Farm-Gate Delivery Report (AB 1404 of 2007) is due annually on March 1 each year. The form can be found on DWR's web site at:

<http://www.water.ca.gov/wateruseefficiency/sb7/committees/ag/a6/>

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Section F: References

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<http://www.cimis.water.ca.gov/cimis/info.jsp>

Department of Water Resources. 1975. Vegetative Water Use in California. Bulletin 113-3.

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<http://www.water.ca.gov/groundwater/bulletin118/update2003.cfm>

Department of Water Resources. 2008. Managing an Uncertain Future: Climate Change Adaptation Strategies for California's Water. Oct.

<http://www.water.ca.gov/climatechange/docs/ClimateChangeWhitePaper.pdf>

Department of Water Resources. 2009. California Water Plan Update 2009. Bulletin 160-09. <http://www.waterplan.water.ca.gov/cwpu2009/index.cfm>

Department of Water Resources. 2011. Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan. Final, March 2011.

http://www.water.ca.gov/urbanwatermanagement/docs/UWMP_Guidebook.pdf

Memorandum of Understanding Regarding Efficient Water Management Practices by Agricultural Water Suppliers in California. Agricultural Water Suppliers Efficient Water Management Practices Act of 1990, AB 3616. January 1, 1999.

<http://www.agwatercouncil.org/images/stories/pdfs/awmcmou.pdf>

Roos, M. and M.L. Anderson. 2006. Monitoring Monthly Hydrologic Data to Detect Climate Change in California. Presented at the Third Annual Climate Change Research Conference in Sacramento. Sept 2006. Available from:
http://www.climatechange.ca.gov/events/2006_conference/poster_session/Roos+Anderson_Hydrolic_monitoring.pdf

USBR Water Management Plan Guidebook. 2008.
http://www.usbr.gov/mp/watershare/documents/Water_mgmt/index.html

USBR Water Measurement Manuel. 2001.
http://www.usbr.gov/pmts/hydraulics_lab/pubs/wmm/

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Section G: Glossary

Agricultural Water Management Council. A non-profit organization established in 1996 dedicated to bringing together all interested parties in agricultural water management with the expressed goal to achieve greater water management efficiency.

<http://www.agwatercouncil.org/>

Board. State Water Resources Control Board.

Conjunctive Use. Conjunctive use is the management of surface and ground water together (where both are available) in combination or separately in response to hydrologic conditions or other water use demands. An example is: during a drought year, a water user would use a larger percentage of ground water allowing surface water to stay in the river/stream for other uses. Whereas, during a wet year in which surface flows are high, more surface water is used (less ground water is used) to allow the underlying aquifer a chance to recharge. In addition, conjunctive use includes water banking during wet years with subsequent aquifer withdrawals during dry years.

For example, implementation of the Efficient Water Management Practices (EWMPs) could result in diverted or pumped water that was previously used and is conserved and banked.

Department. California Department of Water Resources.

Ground Water Management Plan. This is a set of practices and management actions that improve ground water conditions with the intent of protecting and/or increasing benefits including the sustainability of ground water aquifers.

Ground Water Recharge. The natural or intentional infiltration of surface water into the zone of saturation.

Implementation. Achieving and maintaining the staffing, funding, and the priority levels necessary to achieve the level of activity called for in the descriptions of the various BMPs, and to satisfy the commitment by the Contractor to use good-faith efforts to optimize benefits from implementing BMPs.

Inflow. Water that enters a district's boundaries which also enters the district distribution system.

Outflow. Water that leaves a district's boundaries which was once inside the district's distribution system.

Water Management. The act, manner, or practice of deliberate human control of the quantity and/or quality of a given volume of water, for a specific period of time and

within specific spatial boundaries; such waters are received, stored, distributed, used, and/or released for the purposes of efficient water use.

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Section H: Frequently Asked Questions (FAQs)

Q1: Who has to 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.

Suppliers that provide less than 25,000 irrigated acres are not required to adopt and submit a plan unless sufficient funding has specifically been provided to that water supplier for these purposes.

Q2: What happens if an agricultural water supplier doesn't submit a plan?

A2: An agricultural water supplier is not eligible for a water grant or loan awarded or administered by the state unless the supplier adopts and implements an AWMP per Water Code §10852.

Q3: Why does DWR use the years 2012 and 2015 as two AWMP cycles since a cycle is 5 years?

A3: Agricultural Water Management Plans submittal years 2012 and 2015 are set by the SBx7-7 legislation. After 2015, plans are to be submitted every 5 years.

Q4: Do 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 plan every five years to the 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 SBx7-7 if the following apply:

- The agricultural water supplier has adopted and submitted the plan to the Bureau of Reclamation within the previous four years (§10828(a)(1)).
- The Bureau of Reclamation has accepted the plan as adequate (§10828(a)(2)).

Q5: Do Bureau of Reclamation contractor suppliers comply with the state's agricultural water measurement regulation?

A5: Federal water suppliers that currently comply with Reclamation's 2011 Criteria and measure water using devices that are maintained and calibrated to meet the federal standards would meet the accuracy standards of state regulation. Information submitted to DWR should include

- Information on initial certification that their existing devices meet the accuracy standards of Reclamation's 2011 Criteria. This can be done through field testing or field inspection of the devices by trained individuals and approved by a Professional Engineer.
- 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 section 597.3(b) of regulation.
- Provide information that the documents will be kept for 10 years or two cycles of water conservation plans.
- Provide performance information, including devices correctly installed, maintained, operated, inspected, and monitored. Devices that no longer meet the accuracy standards should be repaired or replaced with new devices
- Description of best professional practices used; protocols used to convert non-volume readings; schedule, budget and finance plan for taking corrective actions.
- If existing devices are not in compliance with Reclamation 2011 Criteria standards, provide schedule, budget, and finance plan to replace the device with new devices in 3 years.

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

A6: There is not any language in SBx7-7 regarding tiered pricing per se. However, see the following sections from the law regarding pricing:

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.

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