

State of California  
Natural Resources Agency  
Department of Water Resources

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

Staff Working Draft  
April 6, 2011

## List of Acronyms and Abbreviations

AWMC	Agricultural Water Management Council
AWMP	Agricultural Water Management Plan
AWS	Agricultural Water Suppliers
CVPIA	Central Valley Project Improved Act (1992)
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

## 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 that agricultural water suppliers to submit an annual report to the DWR to include aggregated farm-gate water delivery data on a monthly or bi-monthly basis.

In order for agricultural water suppliers to be in compliance with provisions of AB 1404, they must provide to DWR 1) Measured farm-gate deliveries, 2) aggregated monthly or bi-monthly farm-gate deliveries on an annual basis, and 3) their farmgate measurement programs or practices to document that they are using “Best Professional Practices” or provide to DWR documentation that water measurement is not locally cost-effective.

This law also requires submission to the board an annual statement of water diversion with monthly records of water diversions, no later than January 1, 2012. Lastly, AB 1404 conditions the eligibility for certain grants or loans to those persons on compliance with this reporting requirement.

- **Current Legislation and Regulations**

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

- **Related Programs**

- California Water Plan Update
- California Agricultural Water Management Council Efficient Water Management Practices (EWMPs)
- U.S.D.I. Bureau of Reclamation Water Conservation Plans (CVPI)
- U.S.D.I. Bureau of Reclamation RRA Plans
- U.S.D.I. Bureau of Reclamation 2008 Conservation Efficiency Standards (PL 102-575)

### **Who's Required to Prepare an AWMP**

- Agricultural water supplier as defined by SBx7-7 (10608.12):

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.

- How the SBx7-7 process is different from Reclamation's CVPIA process
- How the SBx7-7 process is different from the AWMC MOU Process

### **Use of This Guidebook**

#### **Guidebook Organization**

#### **Guidebook Objectives**

## **Part I: Preparing an AWMP**

AWMP Organization

AWMP Development Overview

Restructuring or Updating an Existing AWMP

Possible 2012 AWMP Organization

### **Section 1: Plan Preparation**

#### Required Elements — Coordination

Coordination with other agencies and the public to allow the submittal of joint AWMPs and to ensure notification to interested parties that an AWMP is being prepared. It is recommended that signatories with mutual needs work together to develop agreements/MOUs to prepare and/or implement its AWMP. The signatory water supplier will include public participation in its AWMP development and implementation. The AWMP should describe how participation by interested parties (local, regional, state, and federal agencies; special districts; land use agencies; and citizens groups [business, environmental, social]) was solicited. The AWMC or DWR will maintain and provide, upon request, a list of interested parties that the water supplier can notify about AWMP preparation.

The AWMP should describe mutual agreements/MOU with other signatories or agencies and specific public participation involvement.

#### Required Elements — Plan Adoption, Submittal, and Implementation

#### Required Elements — Previous water management activities

## Section 2: System Description

### Required Elements — Agricultural water supplier and service area

The intent of this section is to describe the general physical information about the water supplier in order to form a basis for evaluating 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.

- **Size of the Service Area**

Gross acreage

Present irrigated acreage

- **Location of the Service Area and its water management facilities**

Describe the water conveyance and delivery system within the service area by supplying the following information:

Miles of unlined canals

Miles of lined canals

Miles of pipeline

Miles of drains

Reservoirs – number and capacity

Water supplier tailwater/spill recovery system: Yes/No

Water supplier delivery system is:

- On demand
- Modified demand
- Rotation
- Other

Describe any additional information, as needed, to further clarify the water supplier's delivery system.

Provide a map of the service area showing, where possible, existing water diversion(s), distribution and drainage facilities, and water measurement devices

If the water supplier has restriction on its water sources(s) that result(s) in operation constraints, describe the restriction and how it affects the water delivery operations.

If the water supplier's service area is expected to materially change within the next five years, describe the expected change.

- **Terrain and Soils**

Describe the topography of the water supplier's service area (i.e., hilly, flat, sloping to a water course). Indicate the impact 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://www.nrcs.usda.gov/>

- **Climate**

Describe the general climate of the water supplier. Include average precipitation, and maximum and minimum temperatures. If areas within the water supplier's service area are known to have significantly different microclimates, describe how they affect water management decisions and operations.

The National Weather Service has weather data from climatological stations throughout California and may be a useful tool: <http://www.wrcc.dri.edu/climsum.html>

- **Operating rules and regulations**

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

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.

*(Formatting Note: Include here a sidebar on accuracy measurement and formulas for sampling)*

- **Water rate schedules and billing**

Describe the basis for water charges for agricultural uses. 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., declining, uniform, or increasing block rate). Include the billing frequency (i.e., monthly, bimonthly, annually).

Suggested Tables (???)

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## Section 3: Inventory of Water Supplies

### Required Elements — Describe the quantity and quality of water resources

The intent of this section is to describe the quantity and quality of water resources (sources, uses, return flows, and drainage) of the water supplier in order to form a basis for evaluating improvements by and within the water supplier. Items for evaluation are quantity and quality descriptions of the water supplier's surface water supply, groundwater supply, 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. In certain circumstances, specific information may not be available. The WMP will describe a process and time table for obtaining relevant information.

- **Surface water supply**

Briefly describe the nature and amounts 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). 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. Provide the amount of water received from each source for each of the last five years.

- **Groundwater supply**

Describe the general characteristics of the groundwater basin(s) that under lies 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. (See "Groundwater recharge" below).

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. Large ground water basins underlie several districts. In a few cases, districts overlie more than one ground water basin.

- **Other water supplies**

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

- **Source water quality monitoring practices**

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.

Suggested Tables (???)

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## Section 4: Water Balance

### Required Elements — Water uses within the agricultural water supplier's service area

Describe 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**

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.

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**

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**

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**

Describe any municipal and industrial water use.

- **Groundwater recharge**

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**

Describe any amount of water 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**

Describe any other uses of water.

#### Required Elements - Drainage from the water supplier's surface area

Identify where surface and subsurface drainage goes (i.e., 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 measure constituents (i.e., selenium, boron, pesticides) that limit reuse of the drainage water. Describe any usage limitation resulting from the drainage water quality.

Also see the SWRCB's Irrigated Lands Regulatory Program regarding the prevention of agricultural discharges from impairing the waters that receive the discharges: [http://www.swrcb.ca.gov/water\\_issues/programs/agriculture/](http://www.swrcb.ca.gov/water_issues/programs/agriculture/)

#### Required Elements — Water accounting

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.

- **Quantifying the water supplier's water supplies**

- All surface water supplies, imported to or originating within the water supplier's service area, by month.
- Groundwater extracted by the water supplier, by month.
- Effective precipitation, annually.
- Estimated groundwater 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.
- **Tabulating water uses**
  - Applied water.
  - Consumptive used 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

- **Overall water budget**

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

- 1) Water supply delivered into the service area (surface and groundwater)
- 2) Crop water use
- 3) Environmental water use
- 4) Other beneficial water uses (i.e., leaching, cultural practices, M&I, recreation, etc.)
- 5) Evaporative and consumptive riparian vegetation losses

- 6) Nonrecoverable percolation losses
- 7) Recoverable and nonrecoverable surface and subsurface outflows.

Suggested Tables (???)

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## **Section 5: Water Supply Reliability and Water Shortage Contingency Planning**

### Required Elements — Water shortage allocation policies

Does the water supplier have a Water Shortage Allocation Policy? (Yes/No)

If yes, attach a copy of the policy.

If no, describe how reduced water supplies, including hardship water, are allocated. Describe any water supplier policies that address wasteful use of agricultural water and describe enforcement methods.

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## **Section 6: Climate Change**

Required Elements — Include an analysis, based upon available information, the effect of climate change on future water supplies.

The agricultural water supplier should consider in its 2012 AWMP the effects of climate change on potential water supply and water balance. Inclusion of potential climate change impacts in the AWMP is consistent with other water supply programs and environmental requirements being implemented in California. Potential climate change impacts could also start to be observed and impacting agricultural water suppliers within the planning horizon of AWMP.

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## **Section 7: Efficient Water Management Practices (EWMPs)**

*(Include all reporting requirements in this section – what and when)*

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

Required Elements — Describe the pricing structure for water customers based at least in part on quantity delivered

A volumetric rate structure may be tiered, whereby the water supplier sets a higher price for that portion of water applied above crop evapotranspiration, leaching requirement, system evaporation, and other beneficial requirements. This practice penalizes growers who waste water.

Locally Cost-Effective Elements — Describe additional efficient water management practices implemented including (but not limited to), practices to accomplish all of the following:

- Measures that is locally cost effective and technically feasible. If not locally cost effective, describe why they are not implementable. Additional information may be requested by DWR should documentation be inadequate.
- Facilitation of alternative land use for lands with exceptionally high water duties or whose irrigation contributes to significant problems, including problem drainage.
- 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.
- Implement an incentive pricing structure that promotes one or more of the following goals:
  - More efficient water use at the farm level such that it reduces waste.
  - Conjunctive use of groundwater, e.g., in dry years the water suppliers may encourage, through higher prices for surface water, pumping more groundwater and leaving surface water for environmental uses.
  - Appropriate increase of groundwater recharge. In wet years pricing may be used to encourage greater use of surface water to facilitate recharge.
  - Reduction in problem drainage

- Improved management of all water sources throughout the year by adjusting seasonal pricing structures based on current conditions
- Expand line or pipe distribution systems, construct regulatory reservoirs to increase distribution system flexibility and capacity, decrease maintenance, and reduce seepage
- Increase flexibility in water ordering by, and delivered to, water customers within operational limits
- Construct and operate supplier spill and tailwater systems. This may increase efficiency or, in some cases, reduce losses of water from operational spills. In some areas, interception and recovery of farm tailwater 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.
- Increase planned conjunctive use of surface water and groundwater with the supplier service area
- Automate canal control devices. 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.
- Facilitate or promote customer pump testing and evaluation
- Designate a water conservation coordinator who will develop and implement the water management plan and prepare progress reports.
- Provide for the availability of water management services to water users. These services may include, but are not limited to, all of the following:
  - On-farm irrigation and drainage system evaluations
  - Normal year and real-time irrigation scheduling and crop evapotranspiration information
  - Surface water, groundwater, and drainage water quantity and quality data.
  - Agricultural water management educational programs and materials for farmers, staff, and the public (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.).

- 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
- Evaluate and improve the efficiencies of the supplier's pumps

Required Elements — 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.

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

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## **Section 8: Completed AWMP Checklist (optional)**

### **Part II: AWMP Supporting Information**

#### **Section A: 2012 Agricultural Water Management Plan Schedule, Submittal, and Review Schedule**

DWR Supporting Information Schedule  
Water Supplier Important Schedule Considerations  
Plan Submittal  
AWMP Data  
AWMP Delivery to DWR  
Required Supporting Documents  
Plan Review  
Tracking Plan Review  
DWR Review  
Changes to a Submitted Plan after DWR Review  
Regional Contacts  
Online Resources

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

*(Do we want to include the same section here as contained in Part II, Section G of the UWMP Guidebook?)*

Background  
Water Supplier Considerations  
Mitigation  
Adaptation  
Potential Climate Change Effects  
CEQA Climate Change Requirements

#### **Section C: Electronic Submittal and DWR Staff AWMP 2012 Review Sheet**

#### **Section D: Agricultural Water Management Plan Checklist**

#### **Section E: Guidelines for Compliance with AB 1404 Requirements**

#### **Section F: Recommended AWMP Data Tables**

## Section G: References

Department of Water Resources. 2003. California's Groundwater: Bulletin 118 update <http://www.water.ca.gov/groundwater/bulletin118/update2003.cfm>

Department of Water Resources California Irrigation Management Information System (CIMIS) Database  
<http://www.cimis.water.ca.gov/cimis/info.jsp>

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

Department of Water Resources. 1975. Vegetative Water Use in California. Bulletin 113-3.  
[http://www.water.ca.gov/pubs/use/land\\_and\\_water\\_use/vegetative\\_water\\_use\\_in\\_california\\_bulletin\\_113-3\\_1974/bulletin\\_113-3.pdf](http://www.water.ca.gov/pubs/use/land_and_water_use/vegetative_water_use_in_california_bulletin_113-3_1974/bulletin_113-3.pdf)

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[http://www.water.ca.gov/pubs/use/land\\_and\\_water\\_use/crop\\_water\\_use\\_in\\_california\\_bulletin\\_113-4\\_/bulletin\\_113-4.pdf](http://www.water.ca.gov/pubs/use/land_and_water_use/crop_water_use_in_california_bulletin_113-4_/bulletin_113-4.pdf)

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

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>

USBR Water Management Plan Guidebook. 2008.  
[http://www.usbr.gov/mp/watershare/documents/Water\\_mgmt/index.html](http://www.usbr.gov/mp/watershare/documents/Water_mgmt/index.html)

## Section H: Glossary