

Agricultural Water Management Plan Requirements Update
DRAFT Review of Selected Agricultural Water Management Plans Relative to Requirements of
Executive Order B-37-16
September 19, 2016

Introduction

Governor Edmund G. Brown's Executive Order B-37-16 of May 9, 2016 (EO) states that *"The Department shall work with the California Department of Food and Agriculture to update existing requirements for Agricultural Water Management Plans [AWMPs] to ensure that these plans identify and quantify measures to increase water efficiency in their service area and to adequately plan for periods of limited water supply."* Any updated draft requirements for consideration by the legislature must be publicly released by January 10, 2017. In order to support the update process, the Department of Water Resources (DWR or Department) requested technical assistance from Davids Engineering to review existing AWMPs in relation to the EO's directives, specifically to identify the extent to which they (1) Identify measures to increase water efficiency, (2) Quantify measures to increase water efficiency, and (3) Adequately plan for periods of limited supply. Selected AWMPs were reviewed to identify planned actions addressing these three factors or "criteria". This report provides a summary of the AWMP review results.

Selection of AWMPs for Review

AWMPs were selected for review by DWR staff based on the following considerations:

1. Select plans for water suppliers located in different hydrologic regions of the state,
2. Include plans from agricultural water suppliers representing a range of irrigated acres served,
3. Include plans prepared under U.S. Bureau of Reclamation (USBR or Reclamation) criteria, and
4. Select plans representing suppliers with a range of water supply sources (proportions of surface water and groundwater supplies).

Based on these considerations, DWR staff selected eleven AWMPs. The selected plans are listed in Table 1 along with the hydrologic region, irrigated acres served, and requirements under which the plan was prepared (if applicable).

As indicated in Table 1, AWMPs were selected from six hydrologic regions, including the Central Coast (1), Colorado River (1), Sacramento River (2), San Joaquin River (3), South Coast (1), and Tulare Lake (3).

Irrigated area served ranges from 10,400 acres to 136,900 acres, with two suppliers serving less than 25,000 acres, four suppliers serving between 25,000 and 100,000 acres, and five suppliers serving more than 100,000 acres. In some cases suppliers included acres reliant on private groundwater pumping as part of the acreage served, particularly for water storage districts that rely heavily on groundwater banking and conjunctive management.

The Water Conservation Act of 2009, also known as Senate Bill x7-7 (SBx7-7), modifies the California Water Code and requires most agricultural water suppliers serving more than 25,000 acres to prepare and adopt an AWMP on or before December 31, 2012. The Plan must be updated on December 31, 2015 and every 5 years thereafter (CWC §10820 (a)). In addition, the U.S. Bureau of Reclamation (Reclamation) has developed Standard Criteria for AWMPs that must be followed by all agricultural

water suppliers with Central Valley Project (CVP) water service contracts, repayment contracts, settlement contracts, or any other contracts that specifically invoke the Criteria. Water suppliers that are required to submit an AWMP to Reclamation are able to submit the same plan to DWR along with supplemental information to satisfy the requirements of SBx7-7. As indicated in Table 1, six of the eleven plans reviewed were prepared based on the requirements of SBx7-7, and four were prepared under USBR criteria, one of which included supplemental information to address the additional requirements of SBx7-7 and another of which included tables identified in DWR’s guidebook on preparation of a 2015 AWMP. Two of the plans were prepared in accordance with SBx7-7 by suppliers between 10,000 and 25,000 acres, as required by EO B-29-15 of April 1, 2015. As a party to the Quantification Settlement Agreement (QSA), Coachella Valley Water District is excluded from the requirement to prepare and submit an AWMP but nevertheless voluntarily submitted an AWMP to DWR.

Table1. Selected AWMPs.

Supplier¹	Hydrologic Region	Irrigated Area Served (Acres)	AWMP Requirements
Rancho California WD	South Coast	10,400	SBx7-7 2016 Initial Plan ²
Semitropic WSD	Tulare Lake	136,000	SBx7-7 2015 Update
South San Joaquin ID	San Joaquin River	53,000	SBx7-7 2015 Update
South Sutter WD	Sacramento River	42,000	SBx7-7 2015 Update
Turlock ID	San Joaquin River	136,900	SBx7-7 2015 Update
Woodbridge ID	San Joaquin River	13,000	SBx7-7 2016 Initial Plan ²
Arvin-Edison WSD	Tulare Lake	111,600	2011 USBR Criteria (Update of 2012 Plan)
Fresno ID	Tulare Lake	133,600	2011 USBR Criteria SBx7-7 2015 Supplemental Report
San Benito County WD	Central Coast	30,700	2011 USBR Criteria (Update of 2012 Plan; Includes SBx7-7 Tables)
Glenn-Colusa ID	Sacramento River	135,000	2010/2011 RWMP Annual Update (USBR Regional Criteria)
Coachella Valley WD	Colorado River	50,600 ³	Voluntarily Submitted Plan (Party to the Quantification Settlement Agreement)

1. WD = Water District; WSD = Water Storage District; ID = Irrigation District.
2. AWMP for supplier serving between 10,000 and 25,000 acres prepared as required by EO B-29-15.
3. Irrigated area not reported directly. Estimated based on reported agricultural demand for 2010 divided by estimated per-acre demand of 6.27 ac-ft/ac.

Available water supply sources differ substantially among the selected AWMPs and include diverted surface water, groundwater pumping, and other supplies. Other supplies include operational spillage and tailwater from upgradient suppliers and recycled municipal and industrial (M&I) effluent. Reported water supplies by source, expressed as a percentage of total water supply, are shown for the selected suppliers in Figure 1. As indicated, reliance on surface water is greatest for Glenn-Colusa Irrigation District at 97%, with reliance on groundwater greatest for Semitropic Water Storage District at 97%¹. Generally, groundwater pumping to meet demands in water supplier service areas is primarily accomplished through private pumping. One exception among the plans reviewed may be Rancho California Water District, though private pumping estimates were not provided as part of its AWMP. In the figure, values are based on reported data from 2014, or the most recent available year.

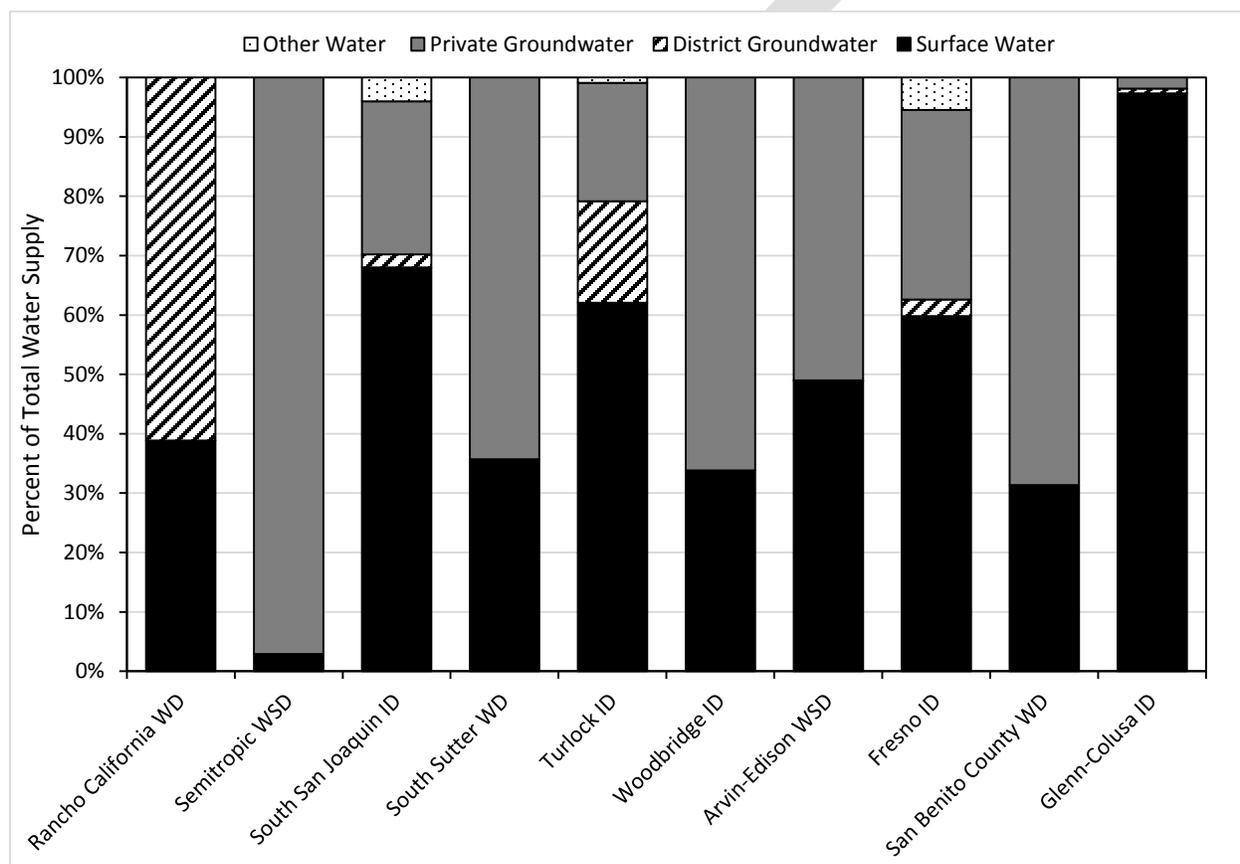


Figure 1. Percent of Total Agricultural Water Supply by Source.

Basis of AWMP Review

Executive Order B-37-16 directs that DWR ensure that AWMPs meet three criteria:

1. Identify measures to increase water efficiency,
2. Quantify measures to increase water efficiency, and

¹ A substantial portion of the groundwater supply utilized by Semitropic WSD customers originates as imported surface water from the state and federal water projects and from net increases in storage resulting from groundwater banking activities.

3. Adequately plan for periods of limited supply.

In order to support discussion regarding possible updates to AWMP requirements to assist DWR in ensuring that the above criteria are met in the future, the selected AWMPs were reviewed to identify the extent to which they include information addressing these criteria in their current form.

Water Efficiency Defined

Water Efficiency or Water Use Efficiency (WUE) has a range of definitions depending on perspective. For example, DWR has identified four proposed methods (or “metrics”) to quantify WUE and four supplemental indicators (DWR 2012²). These methods consider different spatial scales, different uses of water (e.g. crop evapotranspiration, other agronomic uses, and environmental uses), and other factors such as crop yield and production value. Quantification of WUE should consider the fate of unconsumed return flows from distribution system and on-farm recoverable losses and potential consequential effects of increases in efficiency at a particular location and time on existing downstream uses.

For purposes of the review of AWMPs presented herein WUE is broadly defined as one or more metrics to quantify achievement of specific water management objectives. These metrics may include DWR proposed methods and supplemental indicators, targeted changes in flow path volumes or percentages, or other metrics. Beyond the use of volumes and fractions of water to describe efficiency, quantification of the degree to which Efficient Water Management Practices (EWMPs) and Best Management Practices (BMPs) are implemented could also be considered a measure of WUE. These WUE metrics are discussed in greater detail below.

AWMP Review Results

This section summarizes the results of the review of the selected AWMPs with respect to the criteria above. Each plan was reviewed individually with respect to each criterion.

Criterion 1: Identify Measures to Increase Water Efficiency

In order to review plans with respect to Criterion 1, the numbers of EWMPs (as defined in the CWC) or BMPs (as defined by Reclamation criteria) identified in the plans as being implemented or for which the implementation status was otherwise reported were tabulated. Of those EWMPs or BMPs identified, the numbers falling into one of the following implementation status categories were determined:

- Implemented, including distinction between mandatory and conditional EWMPs³
- Not locally cost-effective
- Not technically feasible

As indicated in Table 2, all suppliers reported the implementation status of the 16 SBx7-7 listed EWMPs, with the exception of the Coachella Valley Water District (CVWD). CVWD’s plan was prepared under a

² DWR. 2012. A Proposed Methodology for Quantifying the Efficiency of Agricultural Water Use. A report to the Legislature pursuant to Section 10608.64 of the California Water Code. May 8, 2012.

³ The distinction between mandatory and conditional EWMPs is based upon the California Water Code (CWC), which lists two mandatory EWMPs that must be implemented by suppliers serving more than 25,000 acres and fourteen conditional EWMPs that must be implemented by all suppliers if found to be locally cost effective and technically feasible. Under Reclamation criteria, mandatory and conditional BMPs differ slightly. For purposes of this review, the AWMPs are characterized with respect to the CWC EWMPs.

custom format and submitted voluntarily and thus did not require explicit consideration of the 16 listed EWMPs. Despite the lack of a requirement to report specific actions, the CVWD plan identifies seven programs to promote on-farm water conservation.

For the remaining ten AWMPs, all suppliers reported implementation of the two mandatory EWMPs. All remaining plans also reported implementation of at least ten conditional EWMPs, with two suppliers implementing ten EWMPs, two suppliers implementing twelve EWMPs, four suppliers implementing thirteen EWMPs, and two suppliers implementing all fourteen EWMPs. In all cases, conditional EWMPs not implemented were reported as not technically feasible, with the exception of Woodbridge Irrigation District, which reported three EWMPs as being not locally cost-effective.

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Table 2. Total Number of EWMPs Identified for Selected AWMPs and Number by Implementation Status.

Supplier	AWMP Requirements	Irrigated Area Served (Acres)	SBx7-7 EWMPs/ USBR BMPs Identified	SBx7-7 Mandatory EWMPs Implemented	SBx7-7 Conditional EWMPs Implemented	SBx7-7 EWMPs Not Locally Cost-Effective	SBx7-7 EWMPs Not Technically Feasible
Rancho California WD	SBx7-7 2016 Initial Plan ¹	10,400	16	2	10	0	4
Semitropic WSD	SBx7-7 2015 Update	136,000	16	2	14	0	0
South San Joaquin ID	SBx7-7 2015 Update	53,000	16	2	13	0	1
South Sutter WD	SBx7-7 2015 Update	42,000	16	2	13	0	1
Turlock ID	SBx7-7 2015 Update	136,900	16	2	13	0	1
Woodbridge ID	SBx7-7 2016 Initial Plan ¹	13,000	16	2	10	3	1
Arvin-Edison WSD	2011 USBR Criteria (Update of 2012 Plan)	111,600	16	2	12	0	2
Fresno ID	2011 USBR Criteria 2015 SBx7-7 Supplemental Report	133,600	16	2	13	0	1
San Benito County WD	2011 USBR Criteria (Update of 2012 Plan; Includes SBx7-7 Tables)	30,700	16	2	12	0	2

Supplier	AWMP Requirements	Irrigated Area Served (Acres)	SBx7-7 EWMPs/ USBR BMPs Identified	SBx7-7 Mandatory EWMPs Implemented	SBx7-7 Conditional EWMPs Implemented	SBx7-7 EWMPs Not Locally Cost-Effective	SBx7-7 EWMPs Not Technically Feasible
Glenn-Colusa ID	2010/2011 RWMP Annual Update (USBR Regional Criteria)	135,000	16	2	14	0	0
Coachella Valley WD	Voluntarily Submitted USBR Plan (Party to the QSA)	50,600	The plan briefly describes seven on farm management programs to conserve water including scientific irrigation scheduling, scientific salinity management, monitoring, distribution uniformity evaluations, conversion to drip irrigation, and pricing.				

1. AWMP for supplier serving between 10,000 and 25,000 acres prepared as required by EO B-29-15.

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Criterion 2: Quantify Measures to Increase Water Efficiency

In order to review plans with respect to Criterion 2, it is necessary to consider the means by which measures to increase WUE can be quantified. To accomplish the review, subcriteria were developed to identify the types of information provided by suppliers to support quantification of increases in WUE. These subcriteria are as follows:

- Description of Measures Implemented and Planned. A foundational first step to quantifying measures to increase WUE and/or conserve water is to verify that the action was actually taken and to document the implementation of that action. As a result, the extent to which the plans describe specific actions to increase WUE was reviewed.
- Methods to Quantify Measures to Increase Water Efficiency. Beyond verifying and documenting implementation of measures to increase WUE, methods may be employed to estimate the magnitude of increases in WUE. These may be applied in *aggregate* based on pre- and post-implementation analysis of a supplier's distribution system and/or on-farm water use or may be applied with respect to *individual* EWMPs in a similar manner. Methods may include change in volume of a targeted flow path (e.g. drainwater recovery, operational spillage, seepage, evaporation, deep percolation, tailwater, etc.); a percent reduction in a targeted flow path; or one of the 2012 DWR proposed methodologies including the Crop Consumptive Use Fraction (CCUF), Agronomic Water Use Fraction (AWUF), Total Water Use Fraction (TWUF), and Water Management Fraction (WMF). Additionally, the 2012 DWR proposed methodologies include supplemental indicators such as Distribution Uniformity (DU), Delivery Fraction (DF), Productivity of Applied Water Fraction (PAW), and Value of Applied Water Fraction (VAW). Other indicators may also be used. To address this subcriterion, plans were reviewed to identify the extent to which information quantifying the magnitude of increases in WUE was reported both in aggregate (i.e. for the entire supplier services area, supplier distribution system, or irrigated area) and for individual EWMPs.
- Additional Information to Support Quantification of Measures to Increase Water Efficiency. In addition to the subcriteria above, plans may include additional information to support quantification of increased WUE. This information may include a complete or partial water budget for the supplier's distribution system and/or irrigated lands served and other information describing the magnitude of implementation of various EWMPs. This other information could include previous and planned dollars spent, quantity of actions taken (fields evaluated, acres converted, miles of canal lined, irrigation control structures upgraded, spill sites instrumented, regulating reservoirs constructed, etc.), or other information describing the magnitude of EWMP implementation but not explicitly quantifying reduction in a targeted flow path or using other metrics described above. As a result, plans were reviewed to characterize the extent to which additional information to support quantification of increased WUE is provided.

The application of the subcriteria described above is summarized in Table 3. As indicated, all plans reviewed provided descriptions of implemented and planned activities related to EWMP implementation. These descriptions vary from brief narrative descriptions to expanded descriptions including estimates of WUE estimates (e.g. change in targeted flow path volume) and quantification of the magnitude of implementation (number of sites, miles of canal affected, etc.).

Several plans include methods to quantify WUE in aggregate. Two plans include DWR proposed methods (WMF and CCUF) and supplemental or other indicators (DF and SWSF⁴), while a third plan includes WUE calculated at the basin scale using traditional irrigation efficiency and effective efficiency approaches (Keller and Keller 1995⁵). The Coachella Valley Water District plan includes an estimate of the aggregate volume of water conserved through past on-farm water conservation programs.

Several plans also include methods to quantify increases in WUE for individual EWMPs. Five plans include estimates of conserved water volumes associated with targeted flow paths. One plan includes an estimate of the increase in DU resulting from on-farm improvements. Two plans include an explicit analysis of each implemented EWMP including linkage of the EWMPs to targeted water budget flow paths, identification of WUE benefits associated with EWMP implementation, and evaluation of the relative magnitude of WUE improvements over time.

In addition to metrics that quantify WUE explicitly, all plans include additional information to support quantification. All plans include either partial or complete water balances⁶, allowing in many cases for the application of DWR's 2012 proposed methods such as CCUF and WMF in aggregate. For plans with partial water balances, information not included often includes estimates of private groundwater pumping or separate water balances for the distribution system and irrigated lands. In all or almost all cases partial water balances include the majority of inflows and outflows. Complete, multi-year water balances are not necessarily needed to quantify increases in WUE but are supportive of the development of such estimates.

Other additional information to support quantification included monetary investments by suppliers for EWMP implementation and information quantifying the magnitude of implementation (fields evaluated, acres converted, miles of canal lined, irrigation control structures upgraded, spill sites instrumented, regulating reservoirs constructed, etc.). Most plans include detailed additional information to support quantification.

⁴ The Surface Water Supply Fraction (SWSF) represents the fraction of agricultural water supplies from surface water sources and supports quantification of conjunctive management of surface water and groundwater supplies over time.

⁵ Keller, A. and J. Keller. 1995. Effective Efficiency: A Water Use Efficiency Concept for Allocating Freshwater Resources. Discussion Paper 22. Center for Economic Policy Studies. Winrock International. Arlington, VA. 20 pp.

⁶ For purposes of the review, a complete water balance is defined to consist of at least one distribution and one irrigated lands accounting center and separate flow paths for inflows and outflows associated with applied water and precipitation.

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Table 3. Information Supporting Quantification of Measures to Increase Water Efficiency.

Supplier	AWMP Requirements	Irrigated Area Served (Acres)	Descriptions of Measures Implemented and Planned	Methods to Quantify Increases in Water Efficiency		Additional Information to Support Quantification			Notes
				Aggregate Methods ²	EWMP-Specific Methods ²	Water Budget ³	Dollars Spent/Budgeted	Quantity of Improvements ⁴	
Rancho California WD	SBx7-7 2016 Initial Plan ¹	10,400	✓	None noted.	Percent increase in DU from on-farm improvements. Volume of recycled water use.	Partial.		✓	
Semitropic WSD	SBx7-7 2015 Update	136,000	✓	None noted.	None noted.	Partial.	✓	✓	
South San Joaquin ID	SBx7-7 2015 Update	53,000	✓	WMF, CCUF, DF, and SWSF.	See note.	Complete.	✓	✓	5
South Sutter WD	SBx7-7 2015 Update	42,000	✓	None noted.	None noted.	Partial.	✓	✓	
Turlock ID	SBx7-7 2015 Update	136,900	✓	WMF, CCUF, DF, and SWSF.	Volume of recycled water used. Volume of spillage intercepted. Volume of drainwater recovery. See note.	Complete.	✓	✓	5
Woodbridge ID	SBx7-7 2016 Initial Plan ¹	13,000	✓	None noted.	Volume of in-lieu recharge from conjunctive management.	Partial.		✓	
Arvin-Edison WSD	2011 USBR Criteria (Update of 2012 Plan)	111,600	✓	None noted.	None noted.	Complete.	✓	✓	
Fresno ID	2011 USBR Criteria 2015 SBx7-7 Supplemental Report	133,600	✓	None noted.	Volumes of recycled water use and spillage recovery.	Complete.	✓	✓	
San Benito County WD	2011 USBR Criteria (Update of 2012 Plan; Includes SBx7-7 Tables)	30,700	✓	None noted.	None noted.	Partial.	✓	✓	
Glenn-Colusa ID	2010/2011 RWMP Annual Update (USBR Regional Criteria)	135,000	✓	WUE	Volumes of recovered and recirculated drainwater.	Complete.	✓	✓	6
Coachella Valley WD	Voluntarily Submitted USBR Plan (Party to the QSA)	50,600	✓	Aggregate on-farm conserved water volume and percent reduction in irrigation demand.	None noted.	Partial.	✓	✓	

1. AWMP for supplier serving between 10,000 and 25,000 acres prepared as required by EO B-29-15.

2. Methods proposed by DWR (2012) include Crop Consumptive Use Fraction (CCUF), Agronomic Water Use Fraction (AWUF), Total Water Use Fraction (TWUF), and Water Management Fraction (WMF). Supplemental indicators identified by DWR include Distribution Uniformity (DU), Delivery Fraction (DF), Productivity of Applied Water Fraction (PAW), and Value of Applied Water Fraction (VAW). Other indicators included in some plans include the Surface Water Supply Fraction (SWSF), a measure of conjunctive management and WUE (see note 5 below). Other quantitative indicators may include reduction in targeted flow paths (e.g. spillage, seepage, evaporation, tailwater, deep percolation, etc.) expressed either as a water volume or percent reduction.

3. For purposes of the review, a complete water balance is defined to consist of at least one distribution and one irrigated lands accounting center and separate flow paths for inflows and outflows associated with applied water and precipitation. For plans with partial water balances, information not included often includes estimates of private groundwater pumping or separate water balances for the distribution system and irrigated lands.

4. May include several indicators of the quantity of improvements implemented or planned, including but not limited to number of fields, acres, miles of canal, number of structures or other facilities, or other quantification of the magnitude of EWMP implementation.

5. This AWMP includes an explicit evaluation of WUE improvements for each EWMP including linkage of individual EWMPs to targeted water budget flow paths, identification of WUE benefits associated with EWMP implementation, and evaluation of relative magnitude of WUE improvements over time.

6. The AWMP reports a basin-wide WUE, which is similar to the CCUF at the basin scale. WUE is calculated in the context of projects aligned with CALFED Targeted Benefits (TBs) and Quantifiable Objectives (QOs) based on classical irrigation efficiency and effective efficiency indicators. TBs of water management actions are described, including estimated volumes contributed to QOs.

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Criterion 3: Adequately Plan for Periods of Limited Supply

All agricultural water suppliers experience periods of limited supply⁷, although the frequency and severity of supply limitations varies substantially among suppliers. Some suppliers experience chronic limitations of supply, while others are able to fully meet customer demands most of the time, but unable to meet demands under extraordinary hydrologic conditions or during certain times of year. Variation in supply limitations results from differences among suppliers with respect to: the inherent reliability of the supplier's water supply as related to the terms and conditions of water rights and/or supply contracts; the supplier's past actions to develop or conserve water supplies and plan for periods of limited supply; and the characteristics of local agricultural demands. As a result of these differences, efforts by suppliers to plan for periods of limited supply and actions taken during periods of limited supply also differ. In identifying actions described in the Plans to plan for periods of limited supply, the full content of the Plans was considered, including shortage allocation policies, drought management plans, climate change adaptation strategies, and descriptions of EWMPs implemented.

Planned actions to address limited supply can be generally classified as efforts to increase supply ("supply augmentation") and efforts to reduce demand ("demand management"). Supply augmentation actions include measures to increase overall supplies available to the supplier and measures to reduce distribution system losses to spillage, seepage, and evaporation. Demand management actions include top-down measures to limit deliveries such as allocation of available water supplies, limitations on planted acreage, and enhanced enforcement of rules to prohibit wasteful use, and bottom-up measures to limit on-farm water demands such as grower education and outreach, irrigation system audits and irrigation scheduling support, pricing incentives, and facilitation of on-farm capital improvements. These actions to address limited supply are shown graphically in Figure 2. The specific actions listed are not intended to be exhaustive but rather to provide examples of actions taken by suppliers to address limited supply.

Planned actions for periods of limited supply for the AWMPs reviewed are identified in Table 4. As indicated all suppliers identify planned supply augmentation actions, with all including actions to increase overall water supplies and to reduce system losses to some degree. In general, due to limited availability of additional surface water supplies, emphasis is placed on conjunctive management and reduction in distribution system losses. Additionally, all suppliers identify planned demand management actions, including both top down and bottom up approaches, with the exception of Glenn-Colusa Irrigation District, for which bottom up approaches were not specifically identified during the AWMP review. Appropriately, the specific actions planned and implemented vary among suppliers based on the unique characteristics of their supplies and demands and resulting opportunities and challenges.

⁷ Agricultural water supply is defined for purposes of this discussion as the amount of water available to the supplier to meet customer demands at the point of delivery.

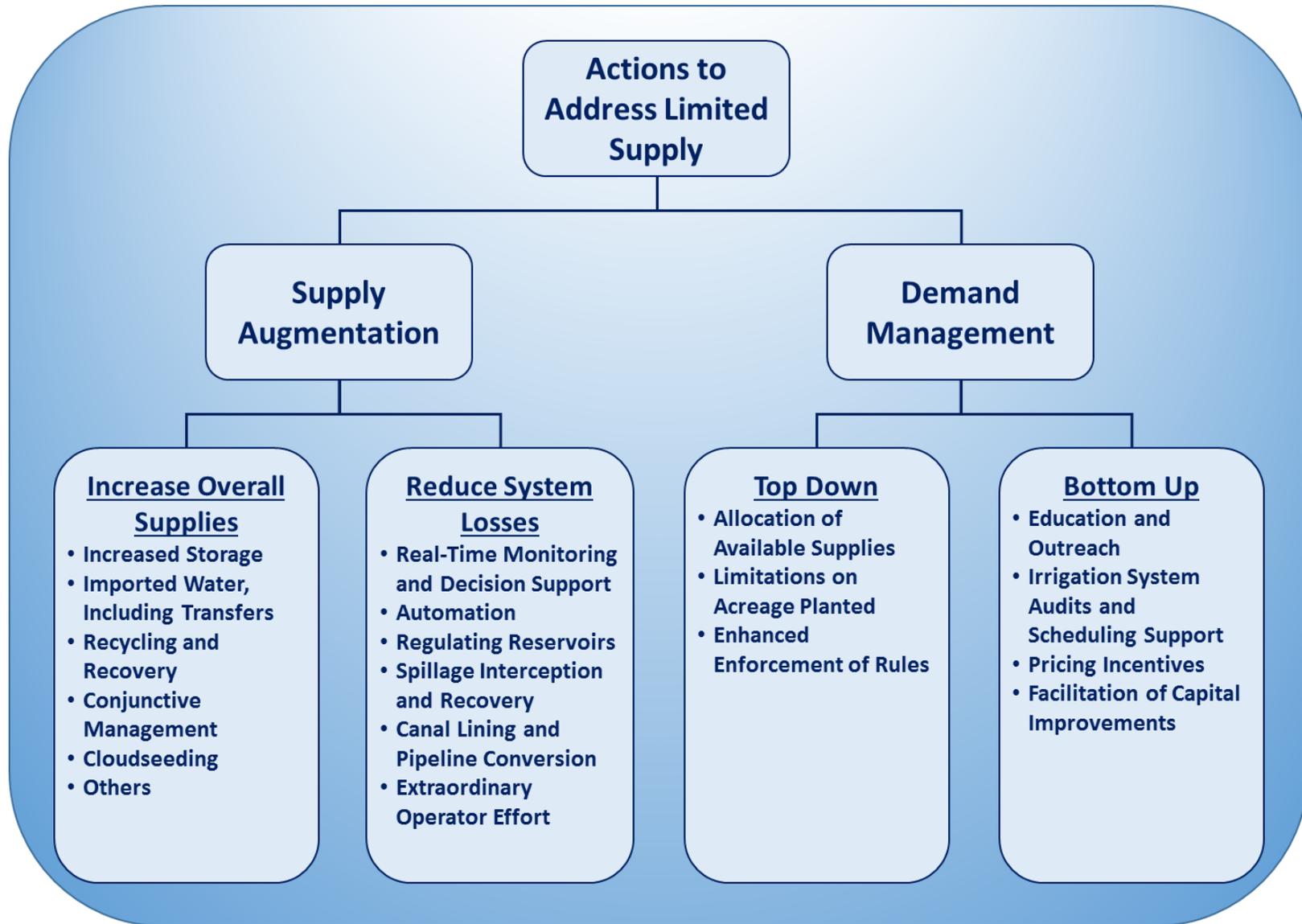


Figure 2. Framework and Examples for Agricultural Water Supplier Planned Actions for Periods of Limited Supply.

Table 4. Supplier Implemented and Planned Actions for Periods of Limited Supply.

Supplier	AWMP Requirements	Irrigated Area Served (Acres)	Supply Augmentation		Demand Management	
			Increase Overall Supplies	Reduce System Losses	Top Down (Delivery Limitations)	Bottom Up (Outreach, Incentives, and Support)
Rancho California WD	SBx7-7 2016 Initial Plan ¹	10,400	✓	✓	✓	✓
Semitropic WSD	SBx7-7 2015 Update	136,000	✓	✓	✓	✓
South San Joaquin ID	SBx7-7 2015 Update	53,000	✓	✓	✓	✓
South Sutter WD	SBx7-7 2015 Update	42,000	✓	✓	✓	✓
Turlock ID	SBx7-7 2015 Update	136,900	✓	✓	✓	✓
Woodbridge ID	SBx7-7 2016 Initial Plan ¹	13,000	✓	✓	✓	✓
Arvin-Edison WSD	2011 USBR Criteria (Update of 2012 Plan)	111,600	✓	✓	✓	✓
Fresno ID	2011 USBR Criteria 2015 SBx7-7 Supplemental Report	133,600	✓	✓	✓	✓
San Benito County WD	2011 USBR Criteria (Update of 2012 Plan; Includes SBx7-7 Tables)	30,700	✓	✓	✓	✓
Glenn-Colusa ID	2010/2011 RWMP Annual Update (USBR Regional Criteria)	135,000	✓	✓	✓	
Coachella Valley WD	Voluntarily Submitted USBR Plan (Party to the QSA)	50,600	✓	✓	✓	✓

1. AWMP for supplier serving between 10,000 and 25,000 acres prepared as required by EO B-29-15.

Key Findings and Observations

Selected plans cover the range of conditions potentially affecting how agricultural water supplies and demands are managed, including hydrologic regions, supplier sizes, plan types, and water supply sources.

All plans address all of the EWMPs/BMPs required by applicable regulations. All suppliers are implementing mandatory EWMPs. All suppliers are implementing most conditional EWMPs. EWMPs not implemented are not locally cost effective or not technically feasible.

All plans describe implemented and/or planned actions for individual EWMPs as a foundational first step in quantifying WUE increases. Seven of the eleven plans include metrics to quantify WUE in aggregate and/or for at least one individual EWMP. Four of the eleven plans include metrics applied in aggregate. Six of the eleven plans include metrics applied to at least one EWMP. In addition to these metrics, all plans include supplemental information to support quantification of WUE.

Translation of supplemental information describing actions to increase WUE into explicit changes in WUE, particularly for individual EWMPs, poses a substantial challenge due to the need to link investments and actions taken to changes in targeted flow paths or other WUE indicators. Adequate information to quantify changes in flow paths resulting from EWMP implementation may not be available, and other factors (weather, water supply, cropping changes, etc.) impacting flows within the system may confound the estimates. Establishing a linkage allowing for quantification of WUE increases from EWMP implementation typically requires substantial effort above and beyond the effort required to actually implement the EWMP. Supplemental information included in the plans provides a means of quantifying the measures to increase WUE (degree of actions taken to increase WUE).

Although suppliers experience a range of conditions related to the frequency and severity of supply shortages, all suppliers identify implemented and/or planned measures to address such periods. These include supply augmentation and demand management measures. The degree to which these are implemented in any given year depends upon each supplier's supply and demand conditions at that time. These measures are described throughout the plans including shortage allocation policies, drought management plans, climate change adaptation strategies, and descriptions of EWMP implementation.