

Appendix D. Conjunctive Management Survey

An inventory and assessment of conjunctive management operations in California was conducted as part of *California Water Plan Update 2013*. The overall intent of this effort was to (1) provide a statewide summary of conjunctive water management program locations, operational methods, and capacities, and (2) identify their challenges, successes, and opportunities for growth to share with policy makers and other stakeholders to enable an informed decision making process regarding groundwater management. The statewide conjunctive management inventory and assessment consisted of literature research, an online survey, personal communication with local agencies, and a documented summary of the known conjunctive management programs in California. Information from these efforts was compiled into a comprehensive spreadsheet of projects and historic operational information, which was updated and enhanced with data from a coordinated survey by the California Department of Water Resources (DWR) and the Association of California Water Agencies (ACWA). The online survey was administered by ACWA and requested the following conjunctive management program information from its member agencies; survey results are provided on Table D-1.

1. Location of conjunctive use project.
2. Year project was developed.
3. Capital cost to develop the project.
4. Annual operating cost of the project.
5. Administrator/operator of the project.
6. Capacity of the project in units of acre-feet.

In an attempt to build upon the ACWA survey and develop a greater understanding of the size and diversity of conjunctive management projects in California, staff from DWR's four regional offices contacted, either by telephone or through email, each of the entities identified as having a conjunctive management program. DWR's follow-up information requested additional details regarding the following topics; survey results are provided on Table D-2.

1. Source of water received.
2. Put and take capacity of the groundwater bank or conjunctive use project.
3. Type of groundwater bank or conjunctive use project.
4. Program goals and objectives.
5. Constraints on development of conjunctive management or groundwater banking (recharge) program

Statewide, a total of 89 conjunctive management and groundwater recharge programs were identified. Because of confidentiality concerns expressed by some local agencies, information for some existing conjunctive management programs was not reported. Also, conjunctive management and groundwater recharge programs that were in the planning and feasibility stage were not included in the inventory.

A statewide map and series of tables listing the conjunctive management projects, and operational information that was reported to DWR, as of July 2012, is provided. The project locations shown on Figure D-1 represent the implementing agency's office address and do not necessarily represent the project location.

A copy of the conjunctive management questionnaire is included in this appendix.

Figure D-1 Locations of Agencies in California that Operate Conjunctive Management Programs



Responses Requested for Groundwater Management Survey

ACWA, DWR Survey Under Way to Compile Data on Local Groundwater Management Plans and Needs for Assistance

The Association of California Water Agencies (ACWA) and the California Department of Water Resources (DWR) are conducting a survey on groundwater management activities in California.

Your agency's assistance is requested to help make the survey data as comprehensive as possible.

SURVEY PURPOSE

- The survey is aimed at compiling information on groundwater management efforts statewide to share with policy makers and other stakeholders. The information is expected to be a powerful tool to illustrate that local and regional entities are effectively managing groundwater resources and that statewide permitting and oversight could be counterproductive to existing and planned local investments.
- The information will also help identify areas where local groundwater management needs to be expanded and where local agencies may need assistance to develop and implement sustainable groundwater management activities. This is especially important as opportunities arise to secure funding for groundwater projects.
- ACWA and DWR are also interested in learning about groundwater banking projects in California so information is available for those who may want to learn more about this valuable water management tool.

CALIFORNIA WATER PLAN UPDATE 2013

DWR has partnered with ACWA to gather information for the groundwater content enhancements that will be included in California Water Plan Update 2013. DWR recognizes the importance of groundwater to the overall water supply and quality portfolio in California and would like the next California Water Plan to include more detail and reflect as many basins and subbasins as possible that are covered by groundwater management plans.

We thank you in advance for your participation in this survey. Should you have questions, please contact Danielle Blacet, ACWA senior regulatory advocate, at 916-441-4545, or Abdul Kahn, Update 2013 groundwater lead coordinator for DWR, at 916-651-9660.

Please note that information from the survey will be used in maps and other materials that will be available to the public.

The survey can be taken on-line at http://www.acwa.com/groundwater_survey or e-mail responses to Abdul Kahn at akahn@water.ca.gov. Survey questions are detailed in the information provided below.

Please feel free to e-mail any documents describing your conjunctive water management projects to Abdul Kahn.

GROUNDWATER SURVEY – GROUNDWATER BANKING

The on-line survey requested information regarding:

- 1) Location of project
- 2) Year developed
- 3) Capital costs to develop the project
- 4) Annual operating costs
- 5) Administrator/operator of the project (if private please indicate “private owner”)
- 6) Capacity of the project in acre feet (please indicate if it is an estimate)

GROUNDWATER SURVEY – GROUNDWATER BANKING SUPPLEMENTAL QUESTIONS

In addition to the questions presented by the on-line survey, further information regarding conjunctive management and groundwater banking would be appreciated.

- 1) Water received:
 - a. State water project water
 - b. Central valley project water
 - c. Recycled water
 - d. Local surface water
 - e. Other
- 2) Put and take capacity of the groundwater bank (acre-feet):
 - a. Annual recharge volume (put)
 - b. Cumulative recharge volume (put)
 - c. Annual withdrawal (take)
 - d. Cumulative withdrawal (take)
 - e. Dry year take
- 3) Type of groundwater bank:
 - a. Direct percolation
 - b. In-lieu
 - c. ASR
 - d. Other (please specify)
- 4) Program Goals and Objectives:
 - a. Overdraft correction
 - b. Salinity intrusion
 - c. Water quality protection/improvement
 - d. Part of conjunctive management program
 - e. To meet climate change challenges
 - f. Other
- 5) Constraints on development of conjunctive management or groundwater banking program. Please rank: 1 = minimal constraint, 3 = moderate constraint, and 5 = significant constraint:
 - a. ___Political (local and state)
 - b. ___Legal
 - c. ___Institutional (individual organization or group)
 - d. ___Limited aquifer storage space
 - e. ___Water quality issues
 - f. ___Cost
 - g. ___Other (please help by providing additional information)

Table D-1 Department of Water Resources/Association of California Water Agencies Conjunctive Management Survey

Lead Agency	Table D-1 – DWR/ACWA Conjunctive Management Survey					
	Question Number ¹					
	Location	Year Developed	Capital Cost	Annual Cost	Program Operator	Capacity (ac-ft)
Central Coast Hydrologic Region – DWR South Central Region Office						
Monterey Peninsula Water Management District	Santa Margarita Aquifer	1998	Phase 1 – ASR Project \$6.5M	Phase 1 – ASR Project \$224K	MPWMD	2,426 af/yr. estimated maximum
Monterey Regional Water Pollution Control Agency						
Pajaro Valley Water Management Agency						
Goleta Water District						
Santa Barbara, City of, Water Resources Division						
Colorado River Hydrologic Region – DWR Southern Region Office						
Coachella Valley Water District	Upper Whitewater River Basin	1973	Unknown	\$9M (1984-85 CVWD Annual Review)	Coachella Valley Water District	300,000 af/yr.
South Coast Hydrologic Region – DWR Southern Region Office						
Calleguas Municipal Water District	Ventura County	1992				
Camp Pendleton	San Mateo Basin, San Onofre Basin, and Las Flores				Project is administered by US Gov't (Camp Pendleton)	
Chino Basin Watermaster						
Compton Water Department	Central Basin	2005	\$2.43M	\$55/af	City of Compton	2,289

Lead Agency	Table D-1 – DWR/ACWA Conjunctive Management Survey					
	Question Number ¹					
	Location	Year Developed	Capital Cost	Annual Cost	Program Operator	Capacity (ac-ft)
Elsinore Valley Municipal Water District	Elsinore Basin	2006	\$4.7M	\$185/af	Elsinore Valley MWD	12,000
Foothill Municipal Water District	Raymond, Monkhill Subbasin	2003	\$1.7M	\$100/af	Foothill MWD, La Canada Irrigation District, Rubio Canon Land and Water Co., Valley Water Company, Las Flores Water Company, Lincoln Avenue Water Company	9,000
Inland Empire Utilities Agency	Southern Portion of Basin	2004	Over \$100M		Chino Basin Desalter Authority	40,000
Inland Empire Utilities Agency; Three Valleys MWD; Chino Basin Watermaster	Chino Basin	2003	\$27.5M	\$145/af	Monte Vista Water District, City of Ontario, City of Chino, City of Pomona, City of Upland, Cucamonga Valley Water District, Jurupa Community Services District	100,000
La Verne, City of	Live Oak Basin, Six Basins	2002	\$3.3M	\$147/af	La Verne, City of	3,000
Long Beach Water Department	Central Basin	2002	\$4.5M	\$100/af	Long Beach Water Department	13,000
Long Beach Water Department and City of Lakewood	Central Basin	2005	\$3.1M	\$100/af	Long Beach Water Department and City of Lakewood	3,600

Lead Agency	Table D-1 – DWR/ACWA Conjunctive Management Survey					
	Question Number ¹					
	Location	Year Developed	Capital Cost	Annual Cost	Program Operator	Capacity (ac-ft)
Los Angeles County Department of Public Works	Coastal Plain of Los Angeles, San Gabriel Valley, Raymond, San Fernando Valley				Los Angeles County Department of Public Works	114,000+
Main San Gabriel Basin Watermaster	Basinwide	1970's	No capital cost	< \$10,000		100,000 af MET portion plus 80,000 af other parties
Metropolitan Water District	Many basins in Southern California					
Orange County Water District	Orange County Basin (basinwide)	2003	\$32M	\$80,000	Orange County Water District	66,000
Cucamonga Valley Water District						
Eastern Municipal Water District						
Raymond Basin Management Board	Foothill MWD conjunctive use project (9,000 af) Policy of long term storage account for parties in basin size of account can be up to 3 years or 3 times annual decreed right. Can be stored in-lieu, carry over, or ASR	Foothill conjunctive use, 2003; Long term storage policy, 1979	\$2.3M	\$1.50/af for storage fee	Public Raymond basin and MWD	Looking to bring additional water to basin for more storage
San Bernardino Valley MWD	Kern Delta Water District	2011	0	0	Kern Delta Water District	30,000**
San Bernardino Valley Water Conservation District	Bunker Hill Subbasin	1912		Approx. \$700K based on 2011-2012	San Bernardino Valley Water Conservation District	

Lead Agency	Table D-1 – DWR/ACWA Conjunctive Management Survey					
	Question Number ¹					
	Location	Year Developed	Capital Cost	Annual Cost	Program Operator	Capacity (ac-ft)
San Diego, City of, Public Utilities Department	San Pasqual Basin				City of San Diego	3,000 to 5,600 (estimate)
Three Valleys Municipal Water District	San Gabriel Basin, Upper Claremont Heights Basin, Chino Basin, Live Oak Basin				Various cooperating entities	52,000
Water Replenishment District of Southern California	Montebello Forebay Spreading Grounds	1959-1960			Los Angeles County Flood Control	4,200 (estimate)
Helix Water District [El Monte Valley]						
Oxnard, City of						
Rancho California Water District	Temecula Valley					
Sweetwater Authority						
United Water Conservation District	Mound Basin, Oxnard Plain Basin, Pleasant Valley Basin, West Las Posas Basin, Santa Paula Basin, Oxnard Forebay, Fillmore basin and Piru Basin	As early as 1955				
Upper Los Angeles River Area (ULARA) Watermaster						
West Basin Municipal Water District						

Lead Agency	Table D-1 – DWR/ACWA Conjunctive Management Survey					
	Question Number ¹					
	Location	Year Developed	Capital Cost	Annual Cost	Program Operator	Capacity (ac-ft)
Western Municipal Water District	San Bernardino Bunker Hill Basin	2005				
Castaic Lake Water Agency	Kern County Subbasin	2005			Rosedale Rio-Bravo Water Storage	20,000 af/yr. up to 100,000 af storage
San Francisco Bay Hydrologic Region – DWR North Central Region Office						
Zone 7 Water Agency	1. Livermore 2. Kern 3. Kern	1962			1. Zone 7 2. Semitropic 3. Cawelo	1. 126,000 (a "full" local basin) 2. 78,000 3. 120,000
Santa Clara Valley Water District	Llagas Area, Santa Clara Valley, and Coyote Subbasins	1920s		Approximately \$3 million	Santa Clara Valley Water District, Semitropic WSD	In 2010: To GW Recharge: ~104,060 af To Semitropic: ~51,990 af
Alameda County Water District	Semitropic Groundwater Storage Bank	1996		\$278K (Groundwater portion of costs)	Semitropic Groundwater Storage Bank	150,000 af (ACWD's secured capacity)
East Bay Municipal Utilities District	East Bay Plain	2009			EBMUD	Up to 1 mgd
San Joaquin River Hydrologic Region – DWR South Central Region Office						
Stockton East Water District	Eastern San Joaquin Groundwater Subbasin	2003			Stockton East Water District	35,000 af/yr. at buildout for recharge basins
Northeastern San Joaquin County Groundwater Banking Authority	Eastern San Joaquin, Cosumnes and Tracy Subbasins				NSJCGBA	
Madera Ranch Water Bank					Madera Irrigation District	250,000 (est. max, see EIS)

Lead Agency	Table D-1 – DWR/ACWA Conjunctive Management Survey					
	Question Number ¹					
	Location	Year Developed	Capital Cost	Annual Cost	Program Operator	Capacity (ac-ft)
Madera ID						
Root Creek Water District						
South Lahontan Hydrologic Region – DWR Southern Region Office						
Antelope Valley-East Kern Water Authority						
Mojave Water Agency	DWR GW basins 6-40, 6-41, 6-42, 7-12	Started 1991; currently being expanded		\$900K per year	Mojave Water Agency	390,000 (estimate)
Sacramento River Hydrologic Region – DWR North Central Region Office						
Sacramento Suburban Water District	North American Subbasin	1998			Sacramento Suburban Water District	32,000+
Yuba County Water Agency	North and South Yuba Subbasin	Approx. 1991			Yuba County Water Agency	0 to 90,000 af/yr.
City of Roseville	North American Subbasin	2003	\$3M		City of Roseville	5 mgd or 4,772 af/yr.
Tulare Lake Hydrologic Region – DWR South Central Region Office						
Chowchilla Water District						
Buena Vista Water Storage District	Kern County					
Semitropic Water District						2,100,000
Arvin-Edison Water Storage District					Arvin-Edison WSD	500,000

Lead Agency	Table D-1 – DWR/ACWA Conjunctive Management Survey					
	Question Number ¹					
	Location	Year Developed	Capital Cost	Annual Cost	Program Operator	Capacity (ac-ft)
Kern Water Bank Authority						1,000,000
Fresno Irrigation District (Waldron Pond)						
North Kern Water Storage District						
City of Bakersfield 2800 Acre Water Bank						800,000 (Actual)
Meyers Water Bank and Wildlife Project					Private Owner	
Delano-Earlimart ID					Delano-Earlimart Irrigation District	
City of Fresno (Leaky Acres, other)					City of Fresno	
Consolidated Irrigation District						
Kings County WD Apex Conjunctive use	Kings Groundwater Basin	2002	\$5M	\$250K	Kings County Water District	20,000
James ID Lateral K					James Irrigation District	
Kern County Water Agency						
Kern-Tulare/Rag Gulch WD						
Rosedale-Rio Bravo WSD						
Cawelo Water District						
Golden Hills						

Lead Agency	Table D-1 – DWR/ACWA Conjunctive Management Survey					
	Question Number ¹					
	Location	Year Developed	Capital Cost	Annual Cost	Program Operator	Capacity (ac-ft)
Community Service District						
Kern Delta Water District						
Laton Community Service District						
Liberty Water District						
Terra Bella, Lower Tule River, Saucelito, Poxley and Porterville Irrigation Districts						
Tranquility Water District						
Wheeler Ridge-Maricopa Water Storage District						
Buena Vista Water Storage District and West Kern Water District						
Shafter Wasco Irrigation District						
Southern San Joaquin Municipal Utilities District						
Kern County Water Agency, ID #4						
Kern County Water Agency and Berrenda Mesa Water District						

Lead Agency	Table D-1 – DWR/ACWA Conjunctive Management Survey					
	Question Number ¹					
	Location	Year Developed	Capital Cost	Annual Cost	Program Operator	Capacity (ac-ft)
Kern Co Water Agency Pioneer Recharge and Recovery Project						
James Irrigation District						
Berrenda Mesa Water District						
Kaweah Delata Water Conservation District						
Tehachapi-Cummings County Water District	Tehachapi Basin, Cummings Basin	1990	\$0.7M	\$30K	TCCWD	10,000 af/yr.
Tejon-Castac Water District						
West Kern Water District						
Total Number of Statewide Survey Responses	39	31	17	19	38	34

Notes:

¹DWR's questions are provided in the attachment.

af = acre-feet; af/yr. = acre-feet per year; HR = hydrologic region

Data Compiled by DWR as of July 2012.

No conjunctive water management or groundwater recharge programs were identified in the North Coast Hydrologic Region or the North Lahontan Hydrologic Region.

Conjunctive management programs that were determined to be in the planning or feasibility stage, or had completed a feasibility project that was determined to be unsuccessful, were not included on this list.

Table D-2 Department of Water Resources Conjunctive Management Survey – Supplemental Information

Table D-2 – DWR Conjunctive Management Survey Supplemental Information					
Lead Agency	Question Number ¹				
	Water Source	Put and Take Capacity	Type of GW Bank	Goals and Objectives	Constraints
Central Coast Hydrologic Region – DWR South Central Region Office					
Monterey Peninsula Water Management District	d. Local surface water Carmel River Basin	a. 5,326 af c. 3,000 af	c. ASR	a, b, c, d, f (comply with SWRCB)	
Monterey Regional Water Pollution Control Agency					
Pajaro Valley Water Management Agency	d. Local surface water	a. 700 af b. 6,780 af c. 170 af d. 1,530 af	a. Direct percolation	a, b	
Goleta Water District					
Santa Barbara, City of, Water Resources Division					
Colorado River Hydrologic Region – DWR Southern Region Office					
Coachella Valley Water District	a. SWP e. Colorado River water via exchange with MWD	a) varies from 0 - 300,000; b) 2,394,524 (end of 2010) c) none; d) none	a. Direct percolation	a, b, c, d, e	a: 1 b: 1 c: 1 d: 3 e: 2 f: 5 g: 5 - Economy
South Coast Hydrologic Region – DWR Southern Region Office					
Calleguas Municipal Water District					

Lead Agency	Table D-2 – DWR Conjunctive Management Survey Supplemental Information				
	Question Number ¹				
	Water Source	Put and Take Capacity	Type of GW Bank	Goals and Objectives	Constraints
Camp Pendleton	c. Recycled water		a. Direct percolation - ponds in the San Mateo and San Onofre Basin c. ASR - wells in the Las Flores Basin. All are used for salt water barriers.	b. All water is recycled wastewater that is put into the ground to maintain a seawater intrusion barrier for the potable wells up gradient.	d. 5 - These basins are very small and have limited capacity.
Chino Basin Watermaster					
Compton Water Department	a. SWP e. Colorado River Aqueduct	a: 572 c: 763	b. In-lieu	d	c: 5
Elsinore Valley Municipal Water District	a. SWP b. CVP e. Colorado River Aqueduct	a: 3,000*; b: 12,000**; c: 4,000***; d: 500	c. ASR	a, d, e **	a: 3 b:1 c: 1 d: 5 e: 5 f: 3 g (complex geology): 3
Foothill Municipal Water District	a. SWP e. Colorado River Aqueduct	a: 2,250 c: 3,000	b. In-lieu d. Injection	d	e: 5
Inland Empire Utilities Agency	a. SWP c. Recycled water d. Local surface water	a: 100,000+ c: 140,000*	a. Direct percolation b. In-lieu c. ASR	a, c, d, e	
Inland Empire Utilities Agency; Three Valleys MWD; Chino Basin Watermaster	a. SWP	a: 25,000; c: 33,000	a. Direct percolation b. In-lieu	d	a: 5

Lead Agency	Table D-2 – DWR Conjunctive Management Survey Supplemental Information				
	Question Number ¹				
	Water Source	Put and Take Capacity	Type of GW Bank	Goals and Objectives	Constraints
La Verne, City of	a. SWP	a: 750; c: 1,000	a. Direct percolation	d	d (aquifer storage): 3 e: 5
Long Beach Water Department	a. SWP e. Colorado River Aqueduct	a: 3,250 c: 4,300	b. In-lieu	d	c: 5
Long Beach Water Department and City of Lakewood	a. SWP e. Colorado River Aqueduct	a: 900 c: 1,200	b. In-lieu	d	c: 5
Los Angeles County Department of Public Works	a. SWP c. Recycled water d. Local surface water e. Colorado River water	a) average 275,000	a. Direct percolation b. In-lieu c. ASR	b, d	
Main San Gabriel Basin Watermaster	a. SWP		a. Direct percolation	f. 5 year terms for storage of excess water	
Metropolitan Water District	a. SWP d. Local surface water e. Colorado River water	a) average 758,000 per year from 1995-2004 c) 1,560,000 per year from 1995-2004	a. Direct percolation b. In-lieu c. ASR	a, b, c, d	
Orange County Water District	a. SWP	a: 16,500 b: 66,000 c: 22,000 d: 66,000	a. Direct percolation b. In-lieu	d	a: 1 b: 1 c: 1 d: 3 e: 1 f: 3
Cucamonga Valley Water District					
Eastern Municipal Water District					

Lead Agency	Table D-2 – DWR Conjunctive Management Survey Supplemental Information				
	Question Number ¹				
	Water Source	Put and Take Capacity	Type of GW Bank	Goals and Objectives	Constraints
Raymond Basin Management Board	a. SWP e. Colorado River water mix of SWP (75%(and Colorado River water (25%))		b. In-lieu c. ASR	f. increased water supplies	g. Lack of additional storage water (no ranking)
San Bernardino Valley MWD	a. SWP	b: 30,000 c: 5,000 (maximum) d: 17,800	a. Direct percolation	f. Meet direct delivery demands during a single dry-year	f: 5
San Bernardino Valley Water Conservation District	a. SWP d. Local surface water	a) varies between 0-70,000; 55,000 in 2011 b) approximately 1,000,000 c) none d) none	a. Direct percolation		
San Diego, City of, Public Utilities Department	c. Recycled water d. Local surface water e. Other: looking into raw water from the San Diego County Water Authority	a: 3,000-5,600 b: 3,000-5,600 c: 5,800 d: 5,800	a. Direct percolation b. In-lieu c. ASR	c, d, f: emergency storage	a: 3, b: 1, c: 3, d: 5, e: 1, f: 3, g. Other (environmental): 3
Three Valleys Municipal Water District	a. SWP d. Local surface water	a) 8,500* b) 52,000* c) 4,000* d) 52,000*	a. Direct percolation b. In-lieu	a, c, d	a: 3 b: 2 c: 5 d: 5 e: 4 f: 5

Lead Agency	Table D-2 – DWR Conjunctive Management Survey Supplemental Information				
	Question Number ¹				
	Water Source	Put and Take Capacity	Type of GW Bank	Goals and Objectives	Constraints
Water Replenishment District of Southern California	a. SWP c. Recycled water d. Local surface water e. Colorado River Aqueduct	a: 255,000 b: 8,599,462 c: 245,000 d: since 1960, 13,025,200*	a. Direct percolation b. In-lieu d. seawater barrier injection wells	a, b, c, d	a: 5 b: 5 c: 4 d: 1 e: 1 f: 3
Helix Water District [El Monte Valley]					
Oxnard, City of					
Rancho California Water District					
Sweetwater Authority					
United Water Conservation District					
Upper Los Angeles River Area (ULARA) Watermaster					
West Basin Municipal Water District					
Western Municipal Water District					
Castaic Lake Water Agency					
San Francisco Bay Hydrologic Region – DWR North Central Region Office					
Zone 7 Water Agency	d. Local surface water e. South Bay Aqueduct	Variable local put/take Purchases water rights from Kern	a. Direct percolation		

Lead Agency	Table D-2 – DWR Conjunctive Management Survey Supplemental Information				
	Question Number ¹				
	Water Source	Put and Take Capacity	Type of GW Bank	Goals and Objectives	Constraints
Santa Clara Valley Water District	a. SWP b. CVP c. Recycled water d. Local surface water	In 2010: a. 104,060 af (local) a. 51,990 af (Semitropic)	a. Direct percolation		
Alameda County Water District					
East Bay Municipal Utilities District		Variable, up to 1 mgd	c. ASR		
San Joaquin River Hydrologic Region – DWR South Central Region Office					
Stockton East Water District	b. CVP water - 50,000 af d. Local surface water - 31,500 af	a. Direct 5500 - In-lieu (IL) 76,000 b. Direct 50,000 - IL 630,000 c. Direct 0 - IL 140,000 d. Direct 300 - IL 1,260,000 e. Direct 3500 - IL 195,000	a. Direct percolation b. In-lieu	a,b,c,d,e,f (sustainable supply)	a. 3 b. 3 c. 3 d. 1 e. 1 f. 5 g. 5 (regulatory)
Northeastern San Joaquin County Groundwater Banking Authority			a. Direct percolation (SEWD) b. In-lieu		
Madera Ranch Water Bank		a. 55,000 (est. max, see EIS) b. c. 55,000 (est. max, see EIS) d.	a. Direct percolation b. In-lieu	f. Groundwater recharge with Flood Management	
Madera ID		c. 55,000 af	a. Direct percolation b. In-lieu		
Root Creek Water District		a. 6,000 AF	b. In-lieu		

Lead Agency	Table D-2 – DWR Conjunctive Management Survey Supplemental Information				
	Question Number ¹				
	Water Source	Put and Take Capacity	Type of GW Bank	Goals and Objectives	Constraints
South Lahontan Hydrologic Region – DWR Southern Region Office					
Antelope Valley-East Kern Water Authority					
Mojave Water Agency	a. SWP	a) 50,000 b) 390,000 c) 50,000 d) 390,000	a. Direct percolation	a, d	a: 1 b: 1 c: 1 d: 3 e: 1 f: 5
Sacramento River Hydrologic Region – DWR North Central Region Office					
Sacramento Suburban Water District	d. Local surface water	a. 12,500 to 18,000 b. 176,800 since 1998 c. 4,500 in dry years d. Less than 10,000 e. 4,500	b. In-lieu	a. Overdraft correction c. Water quality protection d. Part of CM program f. Potential water transfer opportunities	a: 3 b: 5 c: 1 d: 1 e: 3 f: 3
Yuba County Water Agency	d. Local surface water	Variable recharge volume - 0-90,000 af/yr.	b. In-lieu (through water transfers)		
City of Roseville	d. Local surface water	Variable	c. ASR	d. Part of CM program f. Water reliability	
Tulare Lake Hydrologic Region – DWR South Central Region Office					
Chowchilla Water District					
Buena Vista Water Storage District	a, b, d	a. 138,000 af c. 40,000 af	a. Direct percolation b. In-lieu	a. Overdraft protection d. Part of CM program	a. 1 b. c. d. e. f. 5

Lead Agency	Table D-2 – DWR Conjunctive Management Survey Supplemental Information				
	Question Number ¹				
	Water Source	Put and Take Capacity	Type of GW Bank	Goals and Objectives	Constraints
Semitropic Water District		a. 315,000 b. c. 365,000 d.	a. Direct percolation b. In-lieu	a. Overdraft Protection c. WQ Protection or Improvement f. Minimize cost of the water to farmers; enhance reliability	
Arvin-Edison Water Storage District		a. 75,000 (Projected) b. c. 17,0235 d.	a. Direct percolation b. In-lieu	c. WQ Protection or Improvement f. Dry/drought year water supply	
Kern Water Bank Authority	a, b, d	a. 500,000 b. 2,000,000 c. 240,000 d. 900,000	a. Direct percolation	a, d	a. 3 b. 3 c. 3 d. 1 e. 3 f. 3
Fresno Irrigation District (Waldron Pond)		a. 10,000 b. c. 9,000 d.	a. Direct percolation		
North Kern Water Storage District	a, b, d	a. 240,000 af perc; 140,000 af in-lieu c. 250,000 AF max theoretical	a. Direct percolation b. In-lieu	a, d	a. 3 b. 5 c. 3 d. 1 e. 3 f.
City of Bakersfield 2800 Acre Water Bank			a. Direct percolation		

Lead Agency	Table D-2 – DWR Conjunctive Management Survey Supplemental Information				
	Question Number ¹				
	Water Source	Put and Take Capacity	Type of GW Bank	Goals and Objectives	Constraints
Meyers Water Bank and Wildlife Project		a. 2,500 (actual) b. c. d.	a. Direct percolation		
Delano-Earlimart ID	b	a. 12,000 af	a. Direct percolation b. In-lieu	a. Overdraft protection d. Part of CM program	
City of Fresno (Leaky Acres, other)					
Consolidated Irrigation District		a. 10,000 AF c. 8,000			
Kings County WD Apex Conjunctive use		a. 6,300 (actual) b. c. 4,000 (actual) d.	a. Direct percolation		
James ID Lateral K		a. 2,200 (actual) b. c. 2,000 (actual) d.	a. Direct percolation		
Kern County Water Agency	a, d	a. 165,000 af c. 98,000 af	a. Direct percolation	a, d	a. 1 b. 2 c. 1 d. 2 e. 1 f. 2
Kern-Tulare/Rag Gulch WD					
Rosedale-Rio Bravo WSD					
Cawelo Water District					

Lead Agency	Table D-2 – DWR Conjunctive Management Survey Supplemental Information				
	Question Number ¹				
	Water Source	Put and Take Capacity	Type of GW Bank	Goals and Objectives	Constraints
Golden Hills Community Service District		a. 200 (actual) b. c. d.	a. Direct percolation		
Kern Delta Water District					
Laton Community Service District					
Liberty Water District					
Terra Bella, Lower Tule River, Saucelito, Poxley and Porterville Irrigation Districts					
Tranquility Water District					
Wheeler Ridge-Maricopa Water Storage District					
Buena Vista Water Storage District and West Kern Water District					
Shafter Wasco Irrigation District					
Southern San Joaquin Municipal Utilities District					
Kern County Water Agency, ID #4					
Kern County Water Agency and Berrenda					

Lead Agency	Table D-2 – DWR Conjunctive Management Survey Supplemental Information				
	Question Number ¹				
	Water Source	Put and Take Capacity	Type of GW Bank	Goals and Objectives	Constraints
Mesa Water District					
Kern Co Water Agency Pioneer Recharge and Recovery Project					
James Irrigation District		a. 5,000 af c. 4,000 af	a. Direct percolation		
Berrenda Mesa Water District	a	a. 27,375 af c. 50,000 af	a. Direct percolation	a. Overdraft protection d. Part of CM program	a. 1 b. 1 c. 1 d. 2 e. 1 f. 2
Kaweah Delata Water Conservation District	b, d	a. 70,000 b. 300,000 c. 35,000 d. 150,000	a. Direct percolation b. In-lieu	a, d	a. 2 b. 2 c. 2 d. 2 e. 1 f. 5
Tehachapi-Cummings County Water District	a, d	b. 3,997 + 2,576, + 1,066	a. Direct percolation b. In-lieu	a, d	a. 2 b. 4 c. 3 d. 6 e. 5 f. 1
Tejon-Castac Water District					

Lead Agency	Table D-2 – DWR Conjunctive Management Survey Supplemental Information				
	Question Number ¹				
	Water Source	Put and Take Capacity	Type of GW Bank	Goals and Objectives	Constraints
West Kern Water District	a, b, d	a. 0 to 80,000 af b. 839,031 af c. 20,000 af d. 571,282 af	a. Direct percolation b. In-lieu	c, f	a. 3 b. 1 c. 1 d. 1 e. 1 f. 2

Notes:

¹DWR's questions are provided in the attachment.

af = acre-feet; af/yr. = acre-feet per year ; CVP = Central Valley Project; HR = hydrologic region; SWP = State Water Project

Data Compiled by DWR as of July 2012.

No conjunctive water management or groundwater recharge programs were identified in the North Coast or the North Lahontan hydrologic regions.

Conjunctive management programs that were determined to be in the planning or feasibility stage, or had completed a feasibility project that was determined to be unsuccessful, were not included on this list.