Technical Coordination – List of Requirements per SGMA Regulations, Coordination Agreement, Common Chapter, and Technical Memorandums

COMMON CHAPTER

1) *General Information*
    a. *Decision Making and Governance*
2) *Plan Area / Description*
    a. *Compile Individual GSP Physical Settings and Characteristics*
    b. *Communication Section and Outreach Discussion*

OUTREACH REQUIREMENTS OF THE REGS OR IMPLEMENTED TOOLS

A. *Communication Section of GSP Regs (Section 354.10)*
    - *An explanation of the decision making process (Coordination Committee, maybe include decision tree / flow chart under development January 2019)*
    - *Identification of opportunities for public engagement and discussion of how public input was/will be used*
        - *Delta-Mendota Subbasin public workshops*
            - *April 2018*
            - *October 2018*
            - *February 2019*
            - *Spring 2019*
            - *Summer 2019 – confirm: based on timing of public draft release*
            - *Fall 2019*
        - *Additional public meetings/workshops*
    - *Method GSA (or Committee) shall follow to inform the public about progress implementing the Plan, including status of actions*
B. *Public Workshops – Compile Agendas, describe noticing, dates, and participation*
C. *Subbasin-Wide website*
D. *Monthly Newsletter; Describe purpose, structure, and distribution*
E. *Consider Beneficial Uses and users of groundwater when describing undesirable results, thresholds, projects and actions (GSP Prep Section 10727.8 and 10723.3)*
    - *Public Notice of Proposed Adoption (Adopting Common Section(s)) (Section 10728.4)*

3) *Cost and Funding*
    a. *Cost Sharing Agreement and Coordinated Expenses (Executed 12/12/18)*

BASIN SETTING

1) *Hydrogeologic Conceptual Model Development*
    a. *Visual (Maps) and Narrative Description*
        i. *High-level Basin Description - discuss general basin boundaries, primary aquifers and Corcoran Clay, bottom of basin, presence of A-Clay in southern portion of basin*
        ii. *Recharge and Discharge Areas*

iii. *Water Level Contour Maps*
iv. *Hydrographs at representative monitoring sites*

b. *Cross Sections*
   i. *Two from USGS. Ensure depth to Corcoran and base to freshwater are shown.*

c. *Lateral Boundaries and Definable Bottom*

d. *High-level Summary of Aquifer Properties and Groundwater Conditions*
   i. *California Code of Regulations: Groundwater Conditions (Section 354.16)*
      1. *Description of current (2013) and historical (2003-2012) groundwater conditions in the basin*
         a. *Groundwater elevation contour maps with groundwater table or potentiometric surface associated with the current seasonal high and seasonal low for each principal aquifer within the basin*
            i. *Current seasonal high: [February-April 2013]*
            ii. *Current seasonal low: [September-October 2013]*
            iii. *Principal aquifers within the basin: [Upper and lower aquifers relative to the Corcoran Clay layer]*

e. *Identification of Subbasin-wide (Coordinated) Management Areas, if any [none]*
   i. *Woodard & Curran to compile GSP management areas into one map*

2) *Water Budgets (Section 10727.2)*
   a. *Historic, Current, and Projected Timeframes*
   b. *Wet, Dry, Normal year designations*
   c. *Methodology*
   d. *Assumptions*
   e. *Confirm Boundary Flows and Change in Storage*
   f. *Datasets*
      i. *Land Surface Budget*
         1. *Inflows*
            a. *Precipitation*
            b. *Surface Water Inflows*
            c. *Applied Water – Groundwater*
            d. *Applied Water – Imported Surface Water*
            e. *Other Direct Recharge*
         2. *Outflows*
            a. *Runoff*
            b. *Evapotranspiration*
            c. *Surface Water Outflows*
            d. *Deep Percolation*
      ii. *Groundwater Budget*
         1. *Inflows*
            a. *Deep Percolation*
               i. *Precipitation Infiltration*
               ii. *Surface Water Infiltration*
               iii. *Applied Water Infiltration*
            b. *Subsurface Groundwater Inflows*

i. Upper Aquifer
ii. Lower Aquifer
c. Other Direct Recharge
2. Outflows
a. Groundwater Extraction from Upper Aquifer
b. Groundwater Extraction from Lower Aquifer
c. Subsurface Groundwater Outflows
i. Upper Aquifer
ii. Lower Aquifer
g. Well Inventory
h. Cross-Check (Subbasin wide contouring)
3) Management Areas
a. Common Terminology

SUSTAINABLE MANAGEMENT CRITERIA

1) Sustainability Indicators at Representative Monitoring Sites
a. Determination of Subbasin Management Areas and;
i. Indicators/Minimum Thresholds (sum of the parts?)
ii. Interim Milestone
iii. Undesirable Results
iv. Sustainability Goals (2040 goal and 5-year interim goals)

MONITORING NETWORKS

1) Determination of Subbasin Monitoring Network
a. Locations, Depths, Frequency, type, completion report, screened intervals, aquifer info, reference point elevation
b. Compilation of all relevant data for Representative Monitoring Sites
i. Coordination of Criteria
c. Data Gaps Assessment, Identification and Improvements/Timeframes to fill
d. Describe how network is capable of collecting data to demonstrate short term, Seasonal Highs & Lows, long-term trends in gw and sw conditions, and yield representative info about conditions necessary to evaluate plans
e. Indicators for network for WL/WQ/Subsidence/Surface Water/change in storage
f. Objectives, Protocols, Data Reporting Requirement
i. If Management Areas are used, description of level of monitoring and analysis appropriate for each management area

MANAGEMENT ACTIONS AND PROJECTS

1) Development and Review of Individual GSP Group Projects and Management Actions
2) Discussion and Development of Coordinated Projects and Management Actions
3) Common Section Development
4) *Permitting, Legal Authority, Cost, and Management*

PLAN IMPLEMENTATION

1) *Annual Report Standard Format*
2) *Management Structure supporting GSP Implementation (not required but necessary)*
3) *Determine Coordination, Cost, and Schedule of Implementation*
4) *Funding Sources Identification*

COORDINATED DATA MANAGEMENT SYSTEM DEVELOPMENT

1) *Coordinated Data Management System (Coordination Agreement Section 11)*
    a. *Data Compilation with description of sources, types, management*
    b. *QA/QC of data to support GSP*
    c. *DMS Setup*
    d. *Coordinate Data Management System*
    e. *Compile Data Management System*
2) *Capable of storing and reporting information relevant to reporting requirements and/or implementation of the GSPs and monitoring network of the Subbasin*
3) *Must ensure annual reporting requirements to DWR are met (11.2)*

SUBBASIN COORDINATION

1) *Intrabasin Coordination (Required, Section 357.4)*
    a. *Determine other 'Plans' to be submitted in the subbasin*
    b. *Establish a 'Submitting Agency' to be single point of contact with DWR*
    c. *Develop Coordination Agreement, Executed Coordination Agreement 12/12/2018*
    d. *Develop Cost Sharing Mechanism, Executed Cost Sharing Agreement 12/12/2018*
2) *Interbasin Coordination (Optional, but advised Section 357.2) (lower priority; document as occurred)*
    a. *Stantec Facilitation and GSP Group participation*
        i. *Meet and compare results with all neighboring subbasins*
        ii. *Meet and develop Dispute Resolution language, as necessary*
        iii. *Create Data Sharing Agreements, as necessary*

DEVELOP TECHNICAL MEMORANDUMS

1) *Technical Memorandum on "data and methodologies" (Coordination Agreement Section 8.3)*
    a. *Common Methodologies for GSP Development / Coordination*
    b. *Subbasin Wide Monitoring Network (Coordination Agreement Section 9)*
        i. *Objectives, Protocols, and Data Reporting Requirements specific to enumerated sustainability indicators (Coordination Agreement Section 9.1)*
    c. *Coordinated Water Budget (Coordination Agreement Section 10)*
        i. *Total Annual Volume (inflow/outflow), including historical, current, projected water budget conditions, and change in storage, and safe/**sustainable** yield for differing aquifers (10.1)*
    d. *Coordinated Data Management System (Coordination Agreement Section 11)*
        i. *Capable of storing and reporting information relevant to reporting requirements and/or implementation of the GSPs and monitoring network of the Subbasin*
        ii. *Must ensure annual reporting requirements to DWR are met (11.2)*

    e. *Description of how respective GSPs implemented together satisfy requirements of SGMA and are in substantial compliance of SGMA*
        i. *Description of Physical Setting and Characteristics of the separate aquifer systems within the Subbasin,*
        ii. *Sustainability Goal (supported by locally-defined minimum thresholds and undesirable results)*
        iii. *Measurable Objectives for each such GSP*
        iv. *Interim Milestones*
        v. *Monitoring Protocols*

2) *All Technical Memoranda are subject to the unanimous approval of the Coordination Committee (Coordination Agreement Section 8.3)*
    a. *Together these are to provide a detailed description of how the Basin as a whole will be sustainably managed*

COMPILE FINAL GSP SECTIONS

1) *Distribute draft GSP to basin stakeholders (CWC Section 10728.4)*
2) *Release public draft and 90-day public review*
3) *Hold public hearing(s) to adopt Plan(s) at least 90 days after providing notice to a city or county within the area of the proposed plan, to receive feedback and revise (if necessary)*
4) *Submit all plans and common sections / plan to DWR after which DWR is to establish a period of at least 60 days to receive comments on the adopted Plan (23 –CCR Section 355.2)*

<u>Water Budget Evaluation</u>

- Quantify Water Budget Components (Inflows/Outflows)
    - Provide Description of Individual GSP Group Water Budget Components
- Identify Boundary Type and Locations
- Calculate Change in Storage
- Quantify Overdraft over average conditions
- Estimate Sustainable Yield
- Comparison amongst GSP Groups

GSP Group to Provide Datasets to be Coordinated: (Tabulated in a common format)

- Grower Data Source(s)
- Groundwater Extraction Data
- ET Values and Data Source(s)
- Inflow by source type (precip., applied water, canals, rivers, inflow) and Data Sources
    - Recharge Rates and Data Source(s)
    - Streamflow Recharge Contribution
    - Boundary inflow from other subbasins
- Gaging Station, Estimated Losses, Allocation, etc.
    - Water Year Type (San Joaquin Valley Designation)
    - Aquifer Characteristics/Properties; Transmissivity, Storage Coefficient, etc.
    - Description of Total Surface Water entering or leaving by water source type

- Water Use info (County Users for example)

Parameters to be Coordinated:

- Compare Seasonal Contour/Water Level Map(s); Upper and Lower Aquifer as data permits

  - Spring 2003: Upper Aquifer (above the Corcoran Clay)
  - Spring 2013: Upper Aquifer (above the Corcoran Clay)
  - Intervening years as data permits

- Agree on Ten Year Water Budget Information Period – [WY 2003 to WY 2012] *Agreed 7/16/18*

- Agree on Year Designating "Current Water Conditions" – [2013] *Agreed on 8/8/18*

- Compare Boundary Flows (Inflow/Outflow Map(s))

- Determine by year type (Dry, Average, and Wet); each GSP region decides on representative year(s) for each WY type based on available data. Use San Joaquin River Index but consider Shasta Critical Index for surface water deliveries

- Calculate Change in Storage between seasonal highs (WY2003-2013) for Upper Aquifer (insufficient data for Lower Aquifer calcs): *Ongoing-Jan2019*

- Calculated change in storage in Lower Aquifer as a result of inelastic land subsidence

- Defining Bottom of Usable Basin: *Completed*

- Corcoran Clay Map(s); Depth and thickness: *Completed*

- If overdraft occurs, quantify overdraft over a period of years during which water year and water supply conditions approximate average conditions.

- GSP Groups to provide evaluation of accuracy and uncertainty associated with individual water budget components.

- Determine if those adjacent to other subbasins will be drafting "Interbasin" agreements (as time allows)

- Share information re: how coordinating agencies (across the San Joaquin River, for example) have taken steps to ensure each GSP developer utilized similar data and compatible methodologies for applicable budget components (as time allows)

GSP Coordination and Development

1/15/2019

Item No.	Task	Due	2018 Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	2019 Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	2020 Jan	Feb	Mar	Comments
1	Coordinated Activities																													
2	**Common Chapter**	*7/21/2019*																												
3	**General Information**																				X									
4	a. Decision Making and Governance	12/12/2018													X															
5	**Plan Area / Description**	6/21/2019																			X									
6	a. Compile Individual GSP Physical Settings and Characteristics	6/21/2019															X			X										
7	b. Communications Section / Outreach Discussion	3/17/2019															X				X									This chapter will have to be updated to the latest
8	**Cost and Funding**	12/12/2018												X																
9	a. Cost Sharing Agreement / Coordinated Expenses	12/12/2018												X																
10	**Basin Setting**	*3/8/2019*																												
11	**Hydrogeologic Conceptual Model Development**	3/8/2019															X													
12	a. Maps and Narrative Description	3/8/2019															X													
13	b. Cross Sections	3/8/2019															X													
14	c. Lateral Boundaries and Definable Bottom	11/1/2018											X																	
15	d. Summary of Aquifer Properties and Groundwater Conditions	11/1/2018											X																	
16	e. Identifiation of Subbasin-wide (Coordinated) Management Areas, if any	N/A																												
17	**Water Budgets (Section 10727.2)**	3/16/2019															X													
18	a. Historic, Current, and Projected Timeframes	10/31/2018											X																	
19	b. Wet, Dry, Normal Year Designations	1/21/2019													X															
20	c. Methodology	1/21/2019													X															
21	d. Assumptions	1/7/2019													X															
22	e. Confirm Boundary Flows and Change in Storage	3/1/2019															X													
23	f. Develop and Compile all GSP Group Datasets (Land Surface and Groundwater Budget for Historic, Current and Projected Water Budgets)	1/26/2019															X													
24	g. Well Inventory	3/16/2019															X													
25	h. Cross-Check with Subbasin-wide Contouring and Change in Storage from historical water level measurements	1/17/2019													X															
26	**Management Areas**	N/A																												
27	a. Common Terminology	N/A																												
28	**Sustainable Management Criteria**	*4/1/2019*																												
29	**Sustainability Indicators at Representative Monitoring Sites**																	X												
30	a. Determination of Subbasin Management Areas	3/1/2019																X												
31	b. Miminum Thresholds and Sustainability Indicators (Sum of the parts and Cross-Check)	4/1/2019																X												
32	c. Interim Milestones	4/1/2019																X												
33	d. Undesirable Results Definition	4/1/2019																X												
34	e. Sustainability Goals	4/1/2019																X												
35	**Monitoring Networks**	*7/21/2019*																												
36	**Determination of Subbasin Monitoring Network**	7/21/2019																		X										
37	a. Locations, Depths, Frequency, Type, Completion report, RP Elevation, etc.	4/1/2019																X												
38	b. Compilation of relevation data for Represenative Monitoring Sites and Coordination of 'Site' Criteria	4/1/2019																X												
39	c. Data Gap Assessment	5/1/2019																	X											
40	d. Description of how network will meet requirements of SGMA	5/1/2019																		X										
41	e. Indicators for network for each of the applicable undesirable results	5/1/2019																		X										
42	f. Objectives, Protocols, Data Reporting Requirements	5/1/2019																		X										
43	g. Finalize Monitoring Network Plan	6/10/2019																		X										
44	**Management Actions and Projects**	*7/1/2019*																												
45	**Development and Review of Individual GSP Group Projects and Management Actions**	4/15/2019															X													
46	**Discussion and Development of Coordinated Projects and Managament Actions**	5/6/2019																X												

GSP Coordination and Development

1/15/2019

Item No.	Task	Due	2018 Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	2019 Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	2020 Jan	Feb	Mar	Comments
1	Coordinated Activities																													
47	**Common Section Development**	**7/1/2019**																			X									
48	**Permitting, Legal Authority, Cost, and Management**	Ongoing																			X	ONGOING								
49	**Plan Implementation**	***6/24/2019***																												
50	**Annual Report Standard Format**	5/10/2019																	X											
51	**Determine Coordination, Cost, and Schedule of Implementation**	6/24/2019																		X										
52	**Funding Sources Identification**	12/12/2018												X	ONGOING															
53	**Coordinated Data Management System (Required, § 352.6)**	***6/30/2019***																												
54	**Development of Coordinated DMS**	6/30/2019																		X										
55	a. Data Compilation with description of sources, type, managemnet	3/1/2019															X													
56	b. QA/CQ of data to support GSP	4/1/2019																X												
57	c. DMS Setup	5/1/2019																	X											
58	d. Coordinate DMS Permissions, Pages, Capabilities	5/30/2019																		X										
59	e. Ensure Annual Reporting Requirements can be met	6/30/2019																		X										
60	**Subbasin Coordination**	***2/1/2020***													ONGOING															
61	**Intrabasin Coordination (Required, § 357.4)**	12/12/2018												X																
62	a. Determine other Plans to be submitted	2/1/2018		X																										
63	b. Establish a submitting agency to be single point of contact and report submittal to DWR	6/1/2018						X																						
64	c. Develop Coordination Agreement	12/12/2018												X	ONGOING															
65	d. Develop Cost Sharing Mechanism	12/12/2018												X																
66	**Interbasin Coordination (Optional but advised, § 357.2)**																													
67	a. Meet and Compare Results	7/1/2019																			X									
68	b. Develop Dispute Resolution Processes	2/1/2020																									X			
69	c. Develop Data Sharing Agreements, as necessary	2/1/2020																									X			
70	**Development of Technical Memorandums**	***7/1/2019***																												
71	**Development of 5 Coordinated Technical Memorandums**	6/15/2019																		X										
72	a. Commonon Methodologies for GSP Development	5/1/2019																	X											
73	b. Subbasin Wide Monitoring Network	6/1/2019																		X										
74	c. Coordinated Water Budget	4/1/2019																X												
75	d. Coordinated Data Management System	6/1/2019																		X										
76	e. Description of how respective GSPs implemented together will meet the requirements of SGMA	6/15/2019																		X										
77	**Review and Unanimous Approval of Technical Memorandums by Coordination Committee**	7/1/2019																			X	X								Accounts for revisions
78	**Compile Final GSP Sections**	***8/15/2019***																												Accounting for Public Review Draft
79	**Distribute draft GSP to basin stakeholders (Section 10728.4)**	8/15/2019																				X								Public Draft
80	**90-Day Public Review Period**																													Public Draft
81	**Finalize GSPs and distribute for final review**																													
82	**Hold Public Hearing to adopt plan(s) at least 90 days after notice to city/county to receive feedback**																													Adoption
83	**Submit all plans and Common sections / plan to DWR**	1/31/2020																									X			

WATER BUDGETS FOR THE NORTHERN & CENTRAL DELTA-MENDOTA GSP REGION, REVISED

1545 River Park Drive
Sacramento, CA 95815
916-999-8700

woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

0011081.01
San Luis & Delta-Mendota Water Authority
January 22, 2019

Historical and Current Water Budgets

Northern Central Delta-Mendota GSP

Row	Land Surface Water Budget (AFY)												
00	***Component***	**2003** Average	**2004** Dry	**2005** Wet	**2006** Wet	**2007** Dry	**2008** Dry	**2009** Average	**2010** Average	**2011** Wet	**2012** Dry	***Historic Average***	**2013** Dry
01	**Inflow**												
02	Surface Water Deliveries	458,536	452,248	432,073	428,789	443,507	364,434	344,447	384,531	467,178	438,709	421,445	421,445
03	Pumping	107,720	109,827	127,834	131,312	125,490	171,315	156,380	137,361	105,979	136,169	130,939	130,939
04	Precipitation	233,060	145,136	312,804	282,396	89,743	165,332	127,920	246,752	333,568	167,264	210,398	210,398
05													
06	***Inflow Subtotal***	***799,317***	707,211	872,712	842,497	658,740	701,081	***628,747***	***768,643***	906,725	742,142	***762,781***	762,781
07	**Outflow**												
08	Runoff	67,355	52,258	60,213	66,356	33,279	65,809	32,047	55,011	69,968	32,444	53,474	53,474
09	Deep Percolation	79,657	61,681	82,223	80,110	51,502	60,915	48,177	70,440	87,551	59,385	68,164	68,164
10	Evapotranspiration	661,327	605,852	739,624	705,074	596,506	575,770	562,585	645,151	751,287	674,446	651,762	651,762
11													
12	***Outflow Subtotal***	***808,340***	719,791	882,060	851,540	681,287	702,494	***642,809***	***770,603***	908,805	766,275	***773,400***	773,400
13	**Land Surface Water Budget Balance**	**(9,023)**	**(12,580)**	**(9,349)**	**(9,043)**	**(22,546)**	**(1,413)**	**(14,062)**	**(1,960)**	**(2,080)**	**(24,133)**	**(10,619)**	**(10,619)**
14	**(% of inflow)**	**-1%**	**-2%**	**-1%**	**-1%**	**-3%**	**0%**	**-2%**	**0%**	**0%**	**-3%**	**-1%**	**-1%**

Notes:

[1] Years referenced are Water Years

Historical and Current Water Budgets

Northern Central Delta-Mendota GSP

Groundwater Budget (AFY)

Row 00	Component	2003 Average	2004 Dry	2005 Wet	2006 Wet	2007 Dry	2008 Dry	2009 Average	2010 Average	2011 Wet	2012 Dry	Historic Average	2013 Dry
01	**Inflow**												
02	Deep Percolation	79,657	61,681	82,223	80,110	51,502	60,915	48,177	70,440	87,551	59,385	68,164	68,164
03	Upper Aquifer Underflows	57,073	50,095	73,695	67,613	29,888	45,006	36,924	60,406	77,822	48,637	54,060	53,812
04	*Tracy*	-	-	-	-	-	-	-	-	-	-	-	-
05	*Modesto*	-	-	-	-	-	-	-	-	-	-	-	-
06	*Turlock*	-	-	-	-	-	-	-	-	-	-	-	-
07	*SJREC*	1,926	10,895	2,599	2,599	1,767	1,767	2,806	2,521	2,574	5,012	3,447	1,559
08	*Grassland*	-	-	-	-	-	-	-	-	-	-	-	-
09	*Fresno County*	262	262	262	262	262	262	262	262	262	262	262	262
10	*Kings*	-	-	-	-	-	-	-	-	-	-	-	-
11	*Westside*	8,272	9,911	8,272	8,272	9,911	9,911	8,272	8,272	8,272	9,911	8,272	9,911
12	*Foothills*	46,612	29,027	62,561	56,479	17,949	33,066	25,584	49,350	66,714	33,453	42,080	42,080
13	Lower Aquifer Underflows	30,077	26,400	38,837	35,632	15,751	23,718	19,459	31,834	41,012	25,632	28,835	28,359
14	*Tracy*	-	-	-	-	-	-	-	-	-	-	-	-
15	*Modesto*	-	-	-	-	-	-	-	-	-	-	-	-
16	*Turlock*	-	-	-	-	-	-	-	-	-	-	-	-
17	*SJREC*	1,015	5,741	1,370	1,370	931	931	1,479	1,329	1,357	2,641	1,816	822
18	*Grassland*	-	-	-	-	-	-	-	-	-	-	-	-
19	*Fresno County*	138	138	138	138	138	138	138	138	138	138	138	138
20	*Kings*	-	-	-	-	-	-	-	-	-	-	-	-
21	*Westside*	4,360	5,223	4,360	4,360	5,223	5,223	4,360	4,360	4,360	5,223	4,705	5,223
22	*Foothills*	24,565	15,297	32,970	29,765	9,459	17,426	13,483	26,008	35,158	17,630	22,176	22,176
23													
24	***Inflow Subtotal***	***166,807***	***138,176***	***194,754***	***183,355***	***97,141***	***129,640***	***104,559***	***162,680***	***206,385***	***133,654***	***151,715***	***150,335***
25	**Outflow**												
26	Pumping	107,720	109,827	127,834	131,312	125,490	171,315	156,380	137,361	105,979	136,169	130,939	130,939
27	Upper Aquifer Underflows	59,904	64,712	54,186	54,186	67,385	75,570	66,506	60,096	60,957	66,424	62,993	52,044
28	*Tracy*	3,784	3,784	3,784	3,784	3,784	3,784	3,784	3,784	3,784	3,784	3,784	3,784
29	*Modesto*	-	-	-	-	-	-	-	-	-	-	-	-
30	*Turlock*	-	-	-	-	-	-	-	-	-	-	-	-
31	*SJREC*	40,212	45,020	34,495	34,495	47,693	55,878	46,814	40,405	41,265	46,732	43,301	32,352
32	*Grassland*	-	-	-	-	-	-	-	-	-	-	-	-
33	*Fresno County*	-	-	-	-	-	-	-	-	-	-	-	-
34	*Kings*	15,908	15,908	15,908	15,908	15,908	15,908	15,908	15,908	15,908	15,908	15,908	15,908
35	*Westside*	-	-	-	-	-	-	-	-	-	-	-	-
36	*Foothills*	-	-	-	-	-	-	-	-	-	-	-	-
37	Lower Aquifer Underflows	31,569	34,103	28,556	28,556	35,512	39,825	35,048	31,671	32,124	35,005	33,197	27,427
38	*Tracy*	1,994	1,994	1,994	1,994	1,994	1,994	1,994	1,994	1,994	1,994	1,994	1,994
39	*Modesto*	-	-	-	-	-	-	-	-	-	-	-	-
40	*Turlock*	-	-	-	-	-	-	-	-	-	-	-	-
41	*SJREC*	21,192	23,726	18,179	18,179	25,134	29,448	24,671	21,293	21,747	24,628	22,820	17,050
42	*Grassland*	-	-	-	-	-	-	-	-	-	-	-	-
43	*Fresno County*	-	-	-	-	-	-	-	-	-	-	-	-
44	*Kings*	8,383	8,383	8,383	8,383	8,383	8,383	8,383	8,383	8,383	8,383	8,383	8,383
45	*Westside*	-	-	-	-	-	-	-	-	-	-	-	-
46	*Foothills*	-	-	-	-	-	-	-	-	-	-	-	-
47													
48	***Outflow Subtotal***	***199,193***	***208,642***	***210,577***	***214,054***	***228,386***	***286,709***	***257,934***	***229,128***	***199,060***	***237,598***	***227,128***	***210,410***
49	**Change in Storage**												
50	Upper Aquifer	94,023	(66,726)	122,779	(66,863)	(156,749)	(210,601)	(45,057)	76,947	(63,738)	(105,297)	(42,128)	(72,775)
51	Lower Aquifer	18,805	(13,345)	24,556	(13,373)	(31,350)	(42,120)	(9,011)	15,389	(12,748)	(21,059)	(8,426)	(14,555)
52													
53	***Change in Storage Subtotal***	***112,827***	***(80,071)***	***147,335***	***(80,236)***	***(188,099)***	***(252,721)***	***(54,068)***	***92,337***	***(76,486)***	***(126,357)***	***(50,554)***	***(87,331)***
54	**Groundwater Budget Balance**	**(145,213)**	**9,605**	**(163,157)**	**49,537**	**56,854**	**95,651**	**(99,307)**	**(158,784)**	**83,810**	**22,413**	**(24,859)**	**27,256**
55	**(% of Inflow)**	**-87%**	**7%**	**-84%**	**27%**	**59%**	**74%**	**-95%**	**-98%**	**41%**	**17%**	**-16%**	**18%**

Notes:

[1] Years referenced are Water Years

Row	Land Surface Water Budget (AFY)	
00	***Component***	**Source**
01	**Inflow**	
02	Surface Water Deliveries	Agency data used when available, CVHM2 data used otherwise.
03	Pumping	Agency data used when available, CVHM2 data used otherwise.
04	Precipitation	Data from CVHM2 source files used.
05		
06	***Inflow Subtotal***	***Sum of inflow values.***
07	**Outflow**	
08	Runoff	Data from CVHM2 results used.
09	Deep Percolation	Proportions from CVHM2 results used with budget data. The percentage of deep percolation attributed to applied waters from CVHM2 was used with the total volume of applied waters in this budget.
10	Evapotranspiration	Proportions from CVHM2 results used with budget data. The percentage of Evapotranspiration attributed to applied waters from CVHM2 was used with the total volume of applied waters in this budget.
11		
12	***Outflow Subtotal***	***Sum of outflow values.***
13	**Land Surface Water Budget Balance**	**Inflow less outflow.**
14	**(% of inflow)**	**Balanced volume as a percentage of inflow volume.**

Row	Groundwater Budget (AFY)	
00	***Component***	**Source**
01	**Inflow**	
02	Deep Percolation	CVHM2 calculated seepage proportion used with budget inflows.
03	Upper Aquifer Underflows	See below
04	*Tracy*	Gradient determined by local well hydrographs. Transmissivity assumed to be 14,375 sqft/day.
05	*Modesto*	Flow parallel to boundary, assumed no underflows.
06	*Turlock*	Flow parallel to boundary, assumed no underflows.
07	*SJREC*	Gradient determined by local well hydrographs. Hydrographs were considered using 7 sub-sections of the SJREC/N&C D-M boundary. The sum of the resulting flows is reported. Contours for the region were determined for each year and were used to confirm the hydrograph gradients. Contours were developed using local well data. Transmissivity assumed to be 14,375 sqft/day.
08	*Grassland*	Minimal boudnary between regions, assumed no underflows.
09	*Fresno County*	Values from MODFLOW Groundwater Model from Fresno County, total upper and lower aquifer flows are 400 AFY.
10	*Kings*	Gradient calculated from 2013 DWR contour map. Gradient was assumed constant for all years. Transmissivity assumed to be 14,375 sqft/day.
11	*Westside*	Gradient calculated from Westlands Model contours for years 2011 and 2015. 2015 gradient values used in dry years. 2011 gradient values used in other years. Underflows between Tranquillity and Westlands accounted for 83% of total underflows in Dry years, and 100% of total underflows in other years. Transmissivity assumed to be 14,375 sqft/day.
12	*Foothills*	Flow volume assumed to be 20% of precipitation on GSP area.
13	Lower Aquifer Underflows	Assumed to be 20% of upper aquifer inflows.
14	*Tracy*	
...	*...*	
22	*Foothills*	
23		
24	***Inflow Subtotal***	***Sum of Inflow values.***
25	**Outflow**	
26	Pumping	Agency data used when available, CVHM2 data used otherwise.
27	Upper Aquifer Underflows	Same assumptions as data as upper aquifer inflows.
28	*Tracy*	
...	*...*	
36	*Foothills*	
37	Lower Aquifer Underflows	Assumed to be 20% of upper aquifer outflows.
38	*Tracy*	
...	*...*	
46	*Foothills*	
47		
48	***Outflow Subtotal***	***Sum of Outflow values.***
49	**Storage Change**	
50	Upper Aquifer	Local well hydrographs used to quantify change in WSE in 7 sub-sections of the GSP area. Specific Yield values from CVHM2 used to determine Storativity.
51	Lower Aquifer	Assumed to be 20% of upper aquifer storage change.
52		
53	***Change in Storage Subtotal***	***Sum of Change in Storage values.***
54	**Groundwater Budget Balance**	**Inflow less Outflow and Storage Change**
55	**(% of Inflow)**	**Balanced volume as a portion of inflow volume.**

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