DELTA-MENDOTA SGMA

April 10, 2019

TO: Delta-Mendota Subbasin Technical Working Group and Interested Parties

FROM: Cheri Worthy (on behalf of Federico Barajas, Executive Director)

RE: JOINT WORKSHOP OF THE COORDINATION COMMITTEE AND TECHNICAL WORKING GROUP OF THE DELTA-MENDOTA SUBBASIN, **TUESDAY, April 16th, 2019, 10:00 AM**

NOTICE IS HEREBY GIVEN that a Joint Workshop of the Coordination Committee and Technical Working Group of the Delta-Mendota Subbasin Groundwater Sustainability Agencies has been called for **Tuesday, April 16, 2019, 10:00 AM at the San Luis & Delta-Mendota Water Authority Los Banos Administrative Office, 842 6th Street**, Los Banos, California, on items listed on the attached agenda, which is incorporated by reference and made a part hereof.

Delta-Mendota Subbasin
Joint Workshop of the Coordination Committee and Technical Working Group

Tuesday, April 16, 2019, 10:00 AM
842 6th Street, Los Banos, CA
Call-in Number: (866) 661-7061; Code: 9811738464

AGENDA

1. Introductions

2. Committee to Consider Corrections or Additions to the Agenda of Items, as authorized by Government Code Section 54950 et seq.

3. Opportunity for Public Comment

Consent Calendar

4. Committee to Consider Approval of March 19, 2019 Delta-Mendota Subbasin Technical Working Group Meeting Minutes

Report Items

5. Committee to Review Delta-Mendota Subbasin Upper Aquifer Sustainable Yield Calculation for Recommendation to Delta-Mendota Coordination Committee, Garcia/Dumas

6. Committee to Review and Discuss Roll-up of Sustainable Management Criteria, Garcia/Dumas

7. Committee to Review and Discuss Roll-up of Subbasin Monitoring Network, including subsidence monitoring stations, Garcia/Dumas

8. Next Steps

9. Reports Pursuant to Government Code Section 54954.2(a)(3)

10. ADJOURNMENT

Persons with a disability may request disability-related modification or accommodation by contacting Cheri Worthy at the Water Authority, 842 6th Street, Los Banos, CA 93635, and telephone: (209) 826-9696 at least 3 for regular or 1 for special day(s) before the meeting date.

Delta-Mendota Technical Working Group Sign-In Sheet

Date: 4-16-19

Name	Affiliation	Initials
Adam Scheuber	Del Puerto WD	
Alejandro Paolini	Henry Miller Reclamation District	AP.
Amanda Peisch	DWR	
Andrew Francia	LSCE	
Andrew Garcia	SLDMWA	AG
Anthea Hansen	Del Puerto WD	
Ben Fenters	SLWD	BF
Bobby Pierce	West Stanislaus ID	
Breanne Ramos	Merced County Farm Bureau	
Briana Seapy	California Fish and Wildlife	
Cheri Worthy	SLDMWA	
Chris Olvera	DWR	
Christina Guzman	Fresno County	
Diane Cannon	LSCE	
Diane Rathmann	SLDMWA	
Don Wright	Waterwrights	
Ellen Wehr	Grassland WD	(phone)
Frances Mizuno	SLDMWA	
Glenn Allen	Fresno County	
Jarrett Martin	CCID	
Jason Dean	Meyers	
Jim Stilwell	Farmers WD	
Joe Hopkins	Provost & Pritchard	
Joe McGahan	Summers Engineering	
John Beam	JAB Environmental	(attended)
Ken Swanson	Grassland WD	
Lacey Kiriakou	Merced County	
Larry Harris	Turner Island WD	

Name	Affiliation	Initials
Leslie Dumas	Woodard & Curran/SLDMWA	(phone)
Linda Harris	Murdoc	
Linda Sloan	Provost & Pritchard	
Lon Martin	San Luis WD	
Palmer McCoy	Henry Miller Reclamation District #2131; San Luis Canal Company	
Rebecca Akroyd	SLDMWA	
Ricardo Ortega	Grassland WD	
Rick Iger	Provost & Pritchard	
Steve Chedester	SJR Exchange Contractors	
Valerie Kincaid	O'Laughlin & Paris LLP	
Vince Lucchesi	Patterson Irrigation District	VL
Will Halligan	LSCE	WH
~~Zachary Roy~~	~~SLDMWA~~	
Chris Rogers	CCID	CR
Kyle Hill	CCID	
Augustine C Ramirez	Fresno County	
Keasha Blew	P&B	
Chris Howard	civicspark/SLDMWA	CH
Juan Cadena	MSWD	JC
Kait Pals	P&P	
Seth Harris	SLDMWA	SH

Delta-Mendota Subbasin
Technical Working Group Meeting

Tuesday, March 19, 2019, 10:00 AM
842 6th Street, Los Banos, CA

Meeting Minutes

Voluntary Technical Working Group Representatives in Attendance
Adam Scheuber (Del Puerto WD)
Will Halligan (LSCE)
Ken Swanson (Grassland WD)
Ben Fenters (San Luis WD)
Jarrett Martin (Central California Irrigation District/SJREC)
Joe Hopkins (Provost & Pritchard/Aliso WD)
Augustine Ramirez (Fresno County)
Kyle Hill (CCID)
Chris Rogers (CCID)
Kait Palys (Provost & Pritchard/Aliso WD)
Ric Ortega (Grassland WD)
Juan Cadena (Panoche WD)
Christina Guzman (Fresno County)
Vince Lucchesi (Patterson ID)
Larry Harris (Turner Island WD)
Keasha Blew (Provost & Pritchard/Grassland WD)
Rick Iger (Provost & Pritchard/Grassland WD)
Ellen Wehr (Grassland WD) – Phone

Authority Representatives Present
Andrew Garcia
Claire Howard

Others in Attendance
Leslie Dumas (Woodard & Curran)
Reza Namvar (Woodard & Curran) – Phone

1. Introductions

   Vince Lucchesi/Patterson ID called the meeting to order at approximately 10:05 AM.

2. Committee to Consider Corrections or Addition to the Agenda of Items, as authorized by Government Code Section 54950 et seq.

   Leslie Dumas/Woodard & Curran requested a modification to the agenda to add a new item, now item 8, for the Committee to discuss preliminary sustainable management criteria.

3. Opportunity for Public Comment

   No public comments were received prior to the report items for this meeting.

4. Meeting Minutes Review

   No comments were received on the draft meeting minutes from the February 19, 2019 joint meeting of the Delta-Mendota Coordination Committee and Technical Working Group. The meeting minutes from this meeting were approved.

5. Committee to Review Compiled Delta-Mendota Subbasin Projected Water Budget with Climate Change Factors and Projects

   Leslie Dumas/Woodard & Curran presented a rolled-up projected water budget for the Delta-Mendota Subbasin that includes the climate change factors and projects anticipated to be implemented by each GSP Group. She also presented a draft compilation of information about the various projects to be implemented (as supplied by the individual GSP Groups) and graphs showing annual change in storage and cumulative change in storage at the Subbasin level.

   Rick Iger/Provost & Pritchard noted that, for the Aliso GSP, they balanced out their water budget using the projected baseline water budget, but then when climate change factors were applied, they were no longer in balance. Leslie Dumas/Woodard & Curran noted, that for the Northern & Central Delta-Mendota region, only projects that would reasonably be implemented in the next 5 years were included in the projected water budget. Neither the Fresno, Farmers or Grasslands GSAs included projects in their water budgets. The San Joaquin River Exchange Contractors included shovel-ready projects in their projected water budgets, all of which were recharge projects that are designed to meet peak irrigation demands. In essence, they are putting enough extra surface water into the groundwater basin to cover two consecutive years of shortages (Shasta Critical years) plus a leave behind (estimated to be 20%). All GSP Groups are planning to present these projects and then provide a list of additional projects that could be implemented if additional 'course correction' is required to achieve the sustainability goal.

   Management actions to be considered by the various GSP groups include the following:

   - Lower Aquifer pumping restrictions to prevent/minimize inelastic land subsidence
   - Maximizing other water supplies, such as recycled water
   - Rotational fallowing of crop lands
   - GSAs having access and input to well permits
   - Taking opportunity to get surplus surface water and to recharge that water
   - Drought contingency planning in urban areas

Additionally, all GSP Groups are anticipating requiring cities/urban areas to offset growth using conservation and other projects to minimize additional pumping.

The Working Group then discussed the cumulative change in storage by GSP Group, and the average annual change in storage by GSP Group. The Technical Working Group requested that the EXCEL Workbook used to created the rolled-up Subbasin Projected Water Budget be distributed for QC review by the GSP groups.

6. Committee to Review the Delta-Mendota Subbasin Upper Aquifer Sustainable Yield Calculation and Preliminary Allocations Based on Contribution

   As requested by an Ad Hoc Committee formed to develop a methodology for calculating Upper Aquifer sustainable yield at the subbasin level, Woodard & Curran did an analysis comparing the anticipated shortage in the Upper Aquifer (as determined by total pumping – total change in storage deficit) with contributions to Upper Aquifer recharge by GSP group (calculated by summing precipitation, surface water inflows, applied surface water and other direct recharge). Leslie Dumas/Woodard & Curran reminded the Working Group that this was a preliminary calculation and represented one possible method for determining sustainable yield in that aquifer.

   Several questions were posed regarding the analysis including why the period from WY2003 to 2017 was used instead of the historic period from WY2003 to 2012. Additional discussion occurred and the Technical Working Group decided that this was not the appropriate methodology for determining Upper Aquifer sustainable yield. An alternative methodology was proposed whereas, for the period of WY 2003 to 2012, the yield would be calculated by (at the Subbasin level):

Imported Surface Water & Other Recharge (e.g. Canal seepage	+	Natural Recharge (precip recharge, river seepage, etc.	-	Consumptive Use	-	Net Export Surface Water	=	Surplus/ Deficit

   The deficit will then need to be addressed. A second method for estimating sustainable yield was also proposed, using the historic and current water budgets, hydrographs and other GSP-area information to estimate Upper Aquifer sustainable yield in each GSP area and then roll those numbers up. The concerns with this method include not using same methodology (as required by SGMA) and not understanding how each GSP Group is accounting for recharge (e.g. those GSP Groups immediately by the river taking 'credit' for all river seepage to the Subbasin).

   It was agreed that each GSP Group will resend their historic & current water budgets to Woodard & Curran in a format similar to that used for the projected water budgets, and then Woodard & Curran will roll up the water budgets and do a first cut at the analysis above.

7. Committee to Review Lower Aquifer Sustainable Yield Calculations by Individual GSP Groups

   Each GSP Group was to come to the meeting with an estimate of their Lower Aquifer sustainable yield, however, several groups have not done the calculations due to lack of information. As the GSP regulations require that the documents include a numerical estimate of sustainable yield for each principle aquifer, a discussion ensued as to how to develop that number. It was suggested that a literature search be conducted to see what estimates have been done to date. The Westside Subbasin, to the south, is proposing 0.25 AF/acre for the Upper Aquifer and 0.35 AF/acre for the Lower Aquifer. This was discussed

and the Technical Working Group recommended using something similar but more conservative in estimating the Lower Aquifer sustainable yield as a preliminary value until additional data can be collected and this number refined during the first 5-year GSP update.

8. Committee to Discuss Preliminary Sustainable Management Criteria

   This topic was tabled until a future meeting.

9. Next Steps

   1. GSP Groups will resend their historic and current water budgets to Woodard & Curran who will then roll those up and calculate the Upper Aquifer sustainable yield estimate based on the Technical Working Group recommended methodology described above.

10. Reports Pursuant to Government Code Section 54954.2(a)(2)

    No additional reports were made.

11. Adjournment

    Ben Fenters/San Luis Water District adjourned the Technical Working Group meeting at approximately 1:25 PM.

Upper Aquifer	Average Annual (2014-2070), AF Projected with CCF & Projects/MAs	Baseline Projected (with CCF)
Pumping	335,544	332,895
Change in Storage	(31,544)	(49,825)
Outflow	252,596	199,912
Inflow	184,088	166,035
Inflow from Coastal Range	38,000	38,000
Total	410,509	354,947
10% error	41,051	35,495

Upper Aquifer Sustainable Yield		
Low	369,458	319,453
High	451,560	390,442
Overall Range	**319,453**	**451,560**
Overall Range (rounded)	**320,000**	**450,000**

Equation for Upper Aquifer:

Pumping + Change in Storage + (Outflow - Inflow) + Inflow from Coastal Range

A ±10% factor is applied, based on the % difference between change in storage contour mapping prepared by Provost & Pritchard and reported change in storage from the Delta-Mendota Subbasin rolled-up Historic Water Budget (2003-2012).

A range is provided using the above formula for the rolled-up Projected Water Budget with CCF and Projects/Management Actions and Baseline Projected Water Budget (includes CCF), applying the ±10% factor. This is to demonstrate where the Subbasin currently stands without implementing any projects and management actions (low end of range) and where the Subbasin is headed by implementing projects and management actions (high end of range).

This methodology for calculating Upper Aquifer Sustainable Yield is recommended by the Delta-Mendota Technical Working Group to the Coordination Committee, as a result of the April 16, 2019 Technical Working Group meeting.

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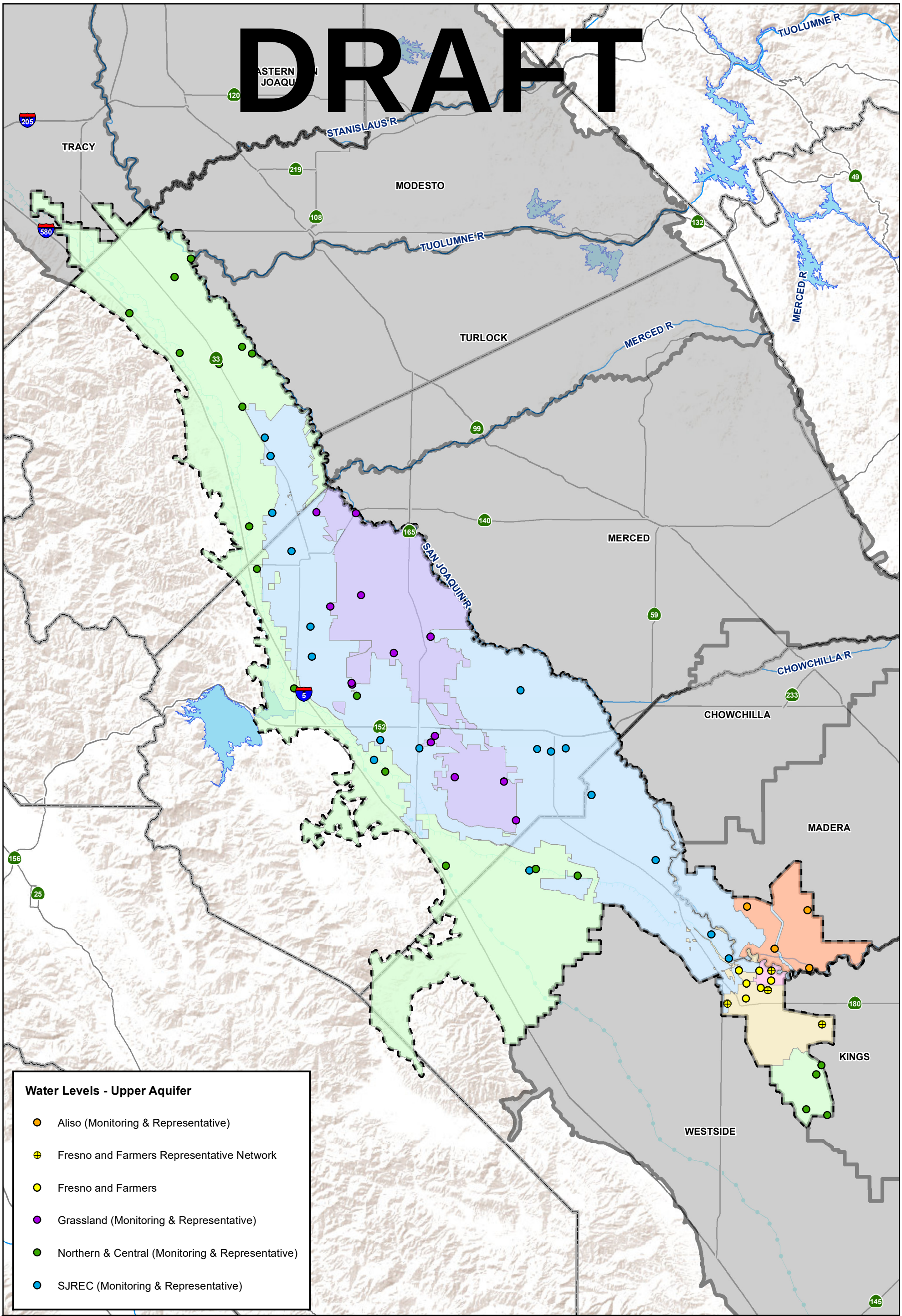

Delta-Mendota Subbasin

Monitoring Network and Representative Monitoring Network

Subbasin-wide Monitoring

Delta-Mendota Subbasin Boundary
County Boundary
Highway
Major Lake or Reservoir
Major River
California Aqueduct
Delta-Mendota Canal

N

0 2.5 5 10 Miles

DELTA-MENDOTA SGMA

Project #: 0011081.01
Map Created: April 2019

Figure Exported: 4/15/2019 By: ncochran Using: \\woodardcurran.net\shared\Projects\RMC\WCR\0617 SLDMWA\0011081 GSP Development\G..GIS\Maps\Monitoring Network\Subbasin-wide Monitoring Network (26Mar2019).mxd

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TRACY
MODESTO
TURLOCK
MERCED
CHOWCHILLA
MADERA
KINGS
WESTSIDE
STANISLAUS R
TUOLUMNE R
MERCED R
SAN JOAQUIN R
CHOWCHILLA R

Water Quality - Upper Aquifer

- Aliso
- Fresno and Farmers
- Grassland
- Northern & Central

Delta-Mendota Subbasin

Monitoring Network and Representative Monitoring Network

Subbasin-wide Monitoring

- Delta-Mendota Subbasin Boundary
- County Boundary
- Highway
- Major Lake or Reservoir
- Major River
- California Aqueduct
- Delta-Mendota Canal

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Water Levels - Lower Aquifer

- Fresno and Farmers Representative Network
- Fresno and Farmers
- Grassland (Monitoring & Representative)
- Northern & Central (Monitoring & Representative)
- SJREC (Monitoring & Representative)

Delta-Mendota Subbasin

Monitoring Network and Representative Monitoring Network

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Subsidence

- Aliso
- Fresno and Farmers

Delta-Mendota Subbasin

Monitoring Network and Representative Monitoring Network

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Surface Water-Groundwater Interaction

- Fresno and Farmers
- Grassland
- Northern & Central

Delta-Mendota Subbasin

Monitoring Network and Representative Monitoring Network

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Sustainability Criteria: Water Quality	SJREC	Grassland	Aliso	Farmers	Fresno	Northern & Central		
						Shallow GW MA	Upper Aquifer	Lower Aquifer
Definition of Undesirable Results	Significant and unreasonable degradation of groundwater quality, as defined by each GSP Group, that has an impact on the beneficial users of groundwater in the Subbasin through either intra- and/or inter-basin actions and/or activities							
Definition of Significant and Unreasonable	Migration of contamination plume that makes the water unusable for beneficial use	Degradation of groundwater quality resulting in reduced ability to develop and manage groundwater for habitat productivity.	Aliso is not experiencing any significant and unreasonable impacts of water quality. Significant and unreasonable reduction in crop production due to water quality issues. If **30%** of the wells exceed the minimum threshold value on a **4** year consecutive average without treatment.	1)Continued migration of the Steffens plume (elevated Total dissolved solids) in upper aquifer both within Management Area A and towards Farmers Water District. 2) Unreasonable rates of migration of groundwater in the upper aquifer with naturally-occurring elevated concentrations of total dissolved solids in Management Area B. ~~3)Evaluation of groundwater quality will focus on TDS concentrations to evaluate rate of change over planning and implementation horizon of increases in TDS concentrations.~~ 3)Potential effects on the beneficial uses of groundwater include agricultural and domestic uses. 4) Degraded water quality in the Fresno Slough effect benfical users of surface water	(1) Impairment of groundwater quality from the migration of the Steffens Plume from Fresno County's Management Area A. Impacts from the Steffens plume impacts FWD ability to utilize groundwater for adjacent use and discharge into the Mendota Pool. ~~(2) Criteria used include water quality measurements of TDS.~~ (3)Potential effects on the beneficial users of groundwater include water quality levels that impact crops and drinking water standards for domestic uses. (4) Degraded water quality in the Fresno Slough effecting benefical users of surface water.	•Exceedance of Primary MCLs in public water systems •Crop damage resulting in >10% yield reduction •Water qualilty degradation due to recharge projects		
Sustainability Goal	Monitor existing groundwater contamination sites and engage to ensure cleanup and abatement orders are consistent with our GSP	Maintain groundwater quality suitable for habitat.	Maintain Current Water Quality	Contain the Spreckels Plume and maintain historical rates of saline front migration.	Prevent further degradation of groundwater quality from the Steffens Plume migrating from Fresno County Management Area A.	Maintain existing water quality in all aquifers		
5-Year Interim Goals	Year 5: same Year 10: Year 15:	Year 5: Maintain groundwater quality below thresholds identified Year 10: Maintain groundwater quality below thresholds identified Year 15:Maintain groundwater quality below thresholds identified	Year 5: Maintain Year 10: Maintain Year 15: Maintain	Year 5: average annual rate of degradation of 30 mg/L TDS for saline front Year 10: average annual rate of degradation of 30 mg/L TDS for saline front Year 15: average annual rate of degradation of 30 mg/L TDS for saline front Spreckels Steffens plume dependent on RWQCB CAO actions.	Year 5: 1000 mg/L TDS Year 10: 800 mg/L TDS Year 15: 700 mg/L TDS	Year 5: TBD Year 10: TBD Year 15: TBD	Year 5: TBD Year 10: TBD Year 15: TBD	Year 5: TBD Year 10: TBD Year 15: TBD
Minimum Threshold	site specific	Production Wellhead thresholds: TDS 2500 mg/L, Selenium - 5.0 µg/L	EC - **4.5** dS/m based on FAO 50% yield for grapes. Cl - **13.3** meq/L based on FAO for Thompsons Seedless Grapes NO3 - N **30** mg/L based on FAO Section 5.1 typical crop tolerance	Average annual rate of degradation of 60 mg/L TDS for saline front. Threshold for Steffens plume determined by RWQCB.	TDS Concentration 1100 mg/L	Primary MCLs: NO3 – 10 mg/L as N TDS – 1,000 mg/L Boron – 0.7 mg/L	Primary MCLs: NO3 – 10 mg/L as N TDS – 1,000 mg/L Boron – 0.7 mg/L	Primary MCLs: NO3 – 10 mg/L as N TDS – 1,000 mg/L Boron – 0.7 mg/L
Measurable Objective	site specific	Production Wellhead thresholds: TDS - 20% avg annual concentration increase, Selenium - 20% avg annual concentration increase	EC - **0.75-1.0** dS/m based on JM Lord and FAO 100% yield for grapes and almonds. Cl - **3.0** meq/L based on JM Lord minimum recomendations NO3-N - **>5** mg/L based on FAO Section 5.1, sensitive crop tolerance	Average annual rate of degradation of 20 mg/L TDS for saline front. Measurable objective for Steffens plume will be determined by Central Valley Regional Water Quality Control Board (CVRWQCB) as part of a Clean Up and Abatement Order (CAO).	TDS Concentration equivalent to background concentrations (maybe? 500 mg/L, depending on CAO from RWQCB for Steffens Plume).	Current groundwater quality conditions by GSP sub-region	Current groundwater quality conditions by GSP sub-region	Current groundwater quality conditions by GSP sub-region
Notes			See graphs and excerpts from FAO. 30% exceeedence based on an assumed blending ratio. If too many well exceedence then would not be able to blend and come under levels. 4 year cycle based on flood water availablity to dilute	RWQCB Clean up and Abatement Order in place for former Spreckels Sugar Company Plant in Mendota to address Steffens plume. Measurable objective based on Upper tolerance bounds for Background TDS concentrations near FCMA	CAO for former Spreckels Sugar Company plant will govern the containment of the Steffens plume.			

Sustainability Criteria: Interconnected Surface Water	SJREC	Grassland	Aliso		Farmers	Fresno	Northern & Central
			Aliso Alternative 1	Aliso Alternative 2			
Definition of Undesirable Results	Depletions of interconnected surface water, as defined by each GSP Group, that have significant and unreasonable adverse impacts on the beneficial uses of surface water						
Definition of Significant and Unreasonable	When groundwater extraction directly decreases streamflow in losing stretch of the SJR	The Grassland Plan Area groundwater pumping does not influence surface water depletion. Reduction of Interconnected SW bodies and associated GDEs, requiring reduction in groundwater pumping. (No management activities have depleted interconnected SW in GGSA within the Historic Period.)	Aliso Water District groundwater pumping does not influence surface water depletion. The district landowners are limited by the Herminghaus Agreement and similar pumping restrictions along the SJR that prevent pumping from above the A-Clay. Additionally, the primary aquifer, where groundwater pumping occurs, is disconnected from surface water source. A significant and unreasonable result would be a reduction in water availability to downstream beneficial users beyond what was experienced in similar water years in recent history as a result of groundwater extractions	Aliso Water District groundwater pumping does not influence surface water depletion. The district landowners are limited by the Herminghaus Agreement and similar pumping restrictions along the SJR that prevent pumping from above the A-Clay. Additionally, the primary aquifer, where groundwater pumping occurs, is disconnected from surface water source. A significant and unreasonable result would be a reduction in water availability to downstream beneficial users beyond what was experienced in similar water years in recent history as a result of groundwater extractions	Decrease in surface water stage in Mendota Pool from Bureau of Reclamation and CCID operations that impact GDEs and operations in MWA.	(1) SJRRP operations and groundwater extractions from the upper aquifer that will influence stream depletion along SJR (2) WL measurements along SJR in the shallow zone of the Upper Aquifer to determine degree of vertical gradient (3) Potential degradation to GDEs along SJR primarily dependent on SJRRP operations of SJR flows since groundwater pumping expected to remain stable and consistent with historical (pre-SJRRP) levels.	• Inability to divert from SJR under water rights due to low groundwater elevations • Loss of GDEs
Sustainability Goal		No reduction in Interconnected SW bodies or associated GDEs due to GGSA pumping.	Similar reductions in water availability to downstream beneficial users as was experienced in similar water years in recent history as a result of groundwater extractions	Similar reductions in water availability to downstream beneficial users as was experienced in similar water years in recent history as a result of groundwater extractions	Maintain stage in Mendota Pool between 12.75 and 13 feet.	Minimize downward gradient in SJR	No loss of productive agriculture due to an inability to pump groundwater
5-Year Interim Goals	Year 5: same for the SJREC GSP Group Year 10: Year 15:	Year 5: No reduction in Interconnected SW bodies or associated habitat due to GGSA pumping. Year 10: No reduction in Interconnected SW bodies or associated habitat due to GGSA pumping. Year 15: No reduction in Interconnected SW bodies or associated habitat due to GGSA pumping.	Year 5: Year 10: Year 15:	Year 5: Year 10: Year 15:	Year 5: 12.75 feet stage in Mendota Pool Year 10: 12.75 feet stage in Mendota Pool Year 15: 12.75 feet stage in Mendota Pool	Year 5: -0.4 Year 10: -0.4 Year 15: -0.4	Year 5: TBD Year 10: TBD Year 15: TBD
Minimum Threshold		Thresholds established by the SJRRP regarding regulated flows in the SJR reach adjacent to GGSA. *Any reductions in flow must be linked to groundwater pumping activities. Grasslands has historically produces a net positive flow to the SJR; therefore, with continued sustainability, GGSA is not anticipated to signfiicantly or unreasonably impact river flows.	Similar reductions in water availability to downstream beneficial users as was experienced in similar water years in recent history as a result of groundwater extractions	Thresholds established by the SJRRP regarding regulated flows in the SJR reach adjacent to Aliso. *Any reductions in flow must be linked to groundwater pumping activities. Aliso is prohibited from pumping within a zone of influence; therefore, is not anticipated to signfiicantly or unreasonably impact river flows.	12.5 feet stage in Mendota Pool.	-0.6	Under any critical water year, 100% reduction of SJR diversions under water rights (0 AF diversion) and inability to use groundwater as make-up water
Measurable Objective	Preclude pumping from above a-clay or equivalent	Same as the threshold.	Similar reductions in water availability to downstream beneficial users as was experienced in similar water years in recent history as a result of groundwater extractions	Same as the threshold.	12.75 feet stage in Mendota Pool	-0.4	SJR diversion consistent with 2015 diversions under water rights
Notes	Work with County to establish construction protocol to preclude well perforations from above the a-clay (or equivalent shallow clay) for wells within 1 mile of the San Joaquin River.	*SMC BMP: The minimum threshold metric for depletion of interconnected surface waters shall be a rate or volume of surface water depletion. *Need to clarify lack of depletions of interconnected SW "due to pumping"	Per 354.28 (e) of the GSP regulations, it is not believed that an undesirable result will occur in our GSA, due to existing pumping restriction. Therefore passive monitoring is proposed that will observe existing monitoring wells and stream gages. The Aliso WD GSA recognizes that downstream GSAs will have measurable objectives and minimum thresholds, and will work with them to resolve should issues arise.	Not anticipated to meet threshold.	Interim goals, measurable objectives, and minimum threshold are dependent on the actions of others who are not part of the Fresno County GSA.	Data from monitoring wells SJRRP-09-55 and SJRRP-09-55b	

Per 354.28 (e) of the GSP regulations, it is n Not anticipated to meet threshold.

Sustainability Criteria: Subsidence	SJREC	Grassland	Aliso		Farmers	Fresno	Northern & Central		
			Aliso Alternative 1	Aliso Alternative 2			N-C GSP Region	WSID-PID MA	TRID MA
Definition of Undesirable Results	Changes in ground surface elevation that cause damage to critical infrastructure that would cause significant and unreasonable reductions of conveyance capacity, damage to personal property, impacts to natural resources or create conditions that threaten public health and safety								
Definition of Significant and Unreasonable	Reduction in the conveyance capacity for water distribution and/or damage to critical infrastructure	Damage to infrastructure, permanent loss of conveyance capcity beyond mitigation, and potential inability to flood or drain by gravity and associated habitat impacts.	Aliso WD is not experiencing any significant and unreasonable effects from subsidence. They have no critical infrastructure in the district that is currently being impacted by subsidence. There have been no significant or unreasonable losses of personal property, natural resources or threats to health and safety as a result of subsidence in AWD. Significant and unreasonable effects are considered when there are impacts to district and adjacent landowner's critical infrastructure beyond reasonable mitigation. Potential significant and unreasonable effects would be impacting the water carry capaciity of the SJR and Chowchilla Bypass **beyond their design flow rates.**	Aliso WD is not experiencing any significant and unreasonable effects from subsidence. They have no critical infrastructure in the district that is currently being impacted by subsidence. There have been no significant or unreasonable losses of personal property, natural resources or threats to health and safety as a result of subsidence in AWD. Significant and unreasonable effects are considered when there are impacts to district and adjacent landowner's critical infrastructure beyond reasonable mitigation. Potential significant and unreasonable effects would be **25%** of wells constructed within that last **10** years collapsing.	Damage to infrastructure and lose of conveyance capacity in neighboring GSAs	Damage to infrastructure, lose of conveyance capacity and potential inability to flood or drain by gravity and associated habitat impacts.	Impacts to primary sensitive infrastructure (the Delta Mendota Canal and California Aqueduct delivery capacity) and secondary sensitive infrastructure (local conveyance infrastructure) as a result of differential subsidence	Impacts to laterals from differential settlement	Inadequate freeboard on levee system in wet years
Sustainability Goal	The SJREC are experiencing subsidence originating outside of our area. Our plan is to work with our neighbors to mitigate subsidence impacts on our facilities.	No permanent reduction in conveyance and ability to manage habitat.	Expand access to surface water during flood years for replenishment of the upper aquifer by working with neighbors in both DM and Madera Subbasins where subsidence is occuring.	Expand access to surface water during flood years for replenishment of the upper aquifer by working with neighbors in both DM and Madera Subbasins where subsidence is occuring.	No contribution to lower aquifer compaction	No contribution to lower aquifer compaction	No additional subsidence as a result of future groundwater extraction in the Delta-Mendota Subbasin beyond December 2019 surface elevations	No additional subsidence as a result of future groundwater extraction	No additional subsidence as a result of future groundwater extraction
5-Year Interim Goals	Year 5: Year 10: Year 15: Year 20:	Year 5: Year 10: Year 15:	Year 5: Year 10: Year 15:	Year 5: Year 10: Year 15:	Year 5: < Minimum Threshold Year 10: < Minimum Threshold Year 15: < Minimum Threshold	Year 5: < Minimum Threshold Year 10: < Minimum Threshold Year 15: < Minimum Threshold	Year 5: TBD Year 10: TBD Year 15: TBD	Year 5: TBD Year 10: TBD Year 15: TBD	Year 5: TBD Year 10: TBD Year 15: TBD
Minimum Threshold	We have lost capacity is several conveyance facilities and are spending millions of dollars rehabilitating some of those facilities. The Minimum Threshold is: that which doesn't reduce our conveyance capacity without appropriate mitigation.	1-ft additional subsidence from December 2019 subsidence	The level at which the levees have subsided to a point were flood conditions could cause significant damage to personal property or threaten health and safety. the minimum threshold will be **1/2** of the current design minumum freeboard of 4-feet (therefore 2-feet).	**6** feet of additional subsidence from December 2019. *Significant well damage is likely to occur if land subsides beyond the allowable travel of a compression joint; approximately 6-ft.	**Upper Aquifer Compaction**: 0.005 ft/year **Lower Aquifer Compaction**: 0.1 ft/year **Total Subsidence**: 0.105 ft/year	**Upper Aquifer Compaction**: 0.005 ft/year **Lower Aquifer Compaction**: 0.1 ft/year **Total Subsidence**: 0.105 ft/year	50% loss of standup capacity and/or 75% loss of DMC lining from subsidence	2015 subsidence rates (0.2 ft/yr) as a result of sub-Corcoran (Lower Aquifer) pumping within WSID and PID	4 ft additional subsidence (2017 flood elevation to top of current levee + 2 ft)
Measurable Objective		0.5-ft additional subsidence from December 2019 subsidence	To not exceed the **current** rates of subsidence of approximately **0.2** feet per year or a cumultive total of **2** feet.	**2** feet of additional subsidence from **December 2019**. *In nearby areas, wells without compression joints begin collapsing after aproximately **2** feet.	Maintain Long-term average less than mimimum thresholds	Maintain Long-term average less than mimimum thresholds	0.5 feet of additional subsidence from Decemeber 2019 benchmark elevations	0.05 ft/yr (current local subsidence rate as determined from recent survey)	2 ft additional subsidence (2017 flood elevation to top of current levee)
Notes	We have four parameters for our lower aquifer water budget. 1) Extraction, 2) Seepage through the Corcoran Clay, 3) Groundwater Inflow and 4) Groundwater Outflow. 1) We are sustainable and no reductions are necessary. 2) We are sustainable in the upper aquifer and the seepage is a fairly constant number. 3) Groundwater Inflow is comparably low and no change is required. 4) Subsidence is occuring outside our our GSP Area and lateral Groundwater flows are mostly leaving out of our service area. This is indicative that neighboring areas (causing subsidence) will need to work through SMC likely resulting in net reductions in groundwater extraction from the Lower Aquifer. These reductions in extractions, ultimately mitigating subsidence, will inherently reduce the volume of lateral groundwater flow out of the SJREC GSP area.	There are no confirmed extensometers or survey benchmarks in the Grassland Plan Area. GGSA may consider a survey benchmark. Management Action: Work with neighbors- review well permits, and providing access to floodwaters/any non-CVP water.		It is likely that subsidence in the Aliso Water District is the residual effects of groundwater pumping outside of the District in neighboring areas. It should also be noted that the rate of subsidance may be more of a driving factor in well failure than total subsidence. For example, if ground levels drop at a rate of 0.5 ft/year it may induce well failure before the 2 foot objective Significant well damage is likely to occur if land subsides beyond the allowable travel of a compression joint; approximately 6-ft. In nearby districts experiencing significant subsidance wells without compression joints begin collapsing after aproximately 2 feet of subsidance occurs.	FWD no longer pumps from the Lower Aquifer. Minimum threshold for lower aquifer based on 2012-2016 values. Upper Aquifer Compaciton based on threshold establihsed in MPG transfer program EIS/EIR	No Pumping from lower aquifer. Minimum threshold for lower aquifer based on 2012-2016 values.Upper Aquifer Compaciton based on threshold establihsed in MPG transfer program EIS/EIR	Lining costs =~$207k/mi Standup repair = ??/unit Lining: MT = 60 mi failed MO = 50 mi failed Standup: MT = 68 failed MO = 9 failed		

MA = Management Area

Sustainability Criteria: Change In WL	SJREC	Grassland	Aliso		Farmers	Fresno	Northern & Central
			Aliso Alternative 1	Aliso Alternative 2			
Definition of Undesirable Results	Significant and unreasonable chronic change in in water levels, as defined by each GSP Group, that has an impact on the beneficial users of groundwater in the Subbasin through either intra- and/or inter-basin actions						
Definition of Significant and Unreasonable	Water levels dropping below established trigger levels at representative sites	Lowering of groundwater levels would lead to increased costs associated with higher total lift, lowering pumps, need to drill deeper wells or costs securing alternative water sources. Impacts to habitat would require mitigation, including alternative water supplies and habitat restoration.	Aliso is not currently experiencing significant and unreasonable effects of reduction in water levels. Significant and unreasonable effects that would lead to an undesireable result would be if **25%** of wells constructed within the last **10**-years that fail to produce water.	Aliso is not currently experiencing significant and unreasonable effects of reduction in water levels. Significant and unreasonable effects that would lead to an undesireable result would be if **25%** of wells constructed within the last **10**-years that fail to produce water.	Groundwater elevations dropping below historic lows (2015-2016)	Groundwater elevations dropping below historic lows (2015-2016)	• Continual decline in water levels that prevent extraction during a 3-year drought cycle • More than 10% of private domestic wells go dry due to chronic lowering of groundwater levels
Sustainability Goal		Maintain water levels and storage sufficient to meet operational storage in each the Upper and Lower Aquifer.	To maintain the historic hydrological cycle and expand access to surface water during flood years for replenishment of the upper aquifer.	To maintain the historic hydrological cycle and expand access to surface water during flood years for replenishment of the upper aquifer.	Maintain seasonal highs and lows. Prevent trend of decreasing groundware levels	Maintain seasonal highs and lows. Prevent trend of decreasing groundware levels	Maintain water levels sufficient to meet operational storage as well as 3-year drought buffer storage
5-Year Interim Goals	Year 5: Same we are sustainable Year 10: Year 15:	Year 5: Year 10: Year 15:	Year 5: Year 10: Year 15:	Year 5: Year 10: Year 15:	Year 5: < Minimum Threshold Year 10: < Minimum Threshold Year 15: < Minimum Threshold	Year 5: < Minimum Threshold Year 10: < Minimum Threshold Year 15: < Minimum Threshold	Year 5: TBD Year 10: TBD Year 15: TBD
Minimum Threshold	Water levels established at representative sites	Upper Aquifer: 20% below 2015 end of GGSA pumping season GW levels (set at each monitoring site). Lower Aquifer: subsidence thresholds supercede.	Water level threshold to be set at each monitoring site. Project **1999 to present** change in water level elevation trend to **2040**. *Will be set for the 5 Monitoring Zones	**25%** of wells constructed within the last **10**-years experience a water level **100** feet above the deepest perforated interval.	**Upper Aquifer** Season Low > 126 ft bgs Season High > 57 ft bgs **Lower Aquifer** Season Low >213 ft bgs Season High > 185 ft bgs	**Upper Aquifer** Season Low > 63 ft bgs Season High > 55 ft bgs **Lower Aquifer** Season Low >213 ft bgs Season High > 185 ft bgs	Upper Aquifer: hydrologic low Lower Aquifer: 95% of historic low
Measurable Objective	We are already sustainable and our projected water budget is also sustainable	Upper Aquifer: 2015 end of GGSA pumping season GW levels (set at each monitoring site) Lower Aquifer: Subsidence measurable objective supercede.	Project **1999** to present change in water level elevation and extrapolate to **2040**. The measurable objective(s) are represented by correction factors of **10%/ 30%/ 30%/ 30%** applied, correlating with 2025, 30, 35, and 2040 respective interim milestones. *Will be set for the 5 Monitoring Zones	**15%** of wells constructed within the last **10**-years experience a water level **100** feet above the deepest perforated interval.	Maintain seasonal highs and lows above minimum thresholds	Maintain seasonal highs and lows above minimum thresholds	Both Aquifers: Seasonal historic high average, Spring 2012 or Spring 2017, whichever elevation is lowest or where data exists
Notes			*Water levels to stabilize and realize sustainability at the 2040 point with implementation of projects and management actions corresponding with interim goals and the measurable objective.	*The **10**-year well construction cap is to prevent inclusion of wells that are failing due to exceeding operational lifetimes or outdated construction methods/equipment.	Based on historic measurements from representative monitoring sites	Based on historic measurements from representative monitoring sites	

Sustainability Criteira: Change in Storage	SJREC	Grassland	Aliso		Farmers	Fresno	Northern & Central
			Aliso Alternative 1	Aliso Alternative 2			
Definition of Undesirable Results	Significant and unreasonable chronic decrease in groundwater storage, as defined by each GSP Group, that has an impact on the beneficial users of groundwater in the Subbasin through either intra- and/or inter-basin actions						
Definition of Significant and Unreasonable	Water levels dropping below established trigger levels at representative sites	Insufficient water storage to develop necessary water to maintain critical habitat. Reduction in storage would lead to increased costs associated with higher total lift, lowering pumps, need to drill deeper wells or costs securing alternative water sources. Impacts to habitat would require mitigation, including alternative water supplies and habitat restoration.	Aliso is not currently experiencing significant and unreasonable effects of reduction in water levels or aquifer storage. Significant and unreasonable effects that would lead to an undesireable result would be a change in storage that leaves less than **4** years of groundwater supply avaliable for use during an extreme drought.	Aliso is not currently experiencing significant and unreasonable effects of reduction in water levels or aquifer storage. Significant and unreasonable effects that would lead to an undesirable result would be a change in storage that leaves less than **4** years of groundwater supply avaliable for use during an extreme drought.	Depletion of storage greater than 2012-2016 period	Depletion of storage greater than 2012-2016	• Continual decline in water levels that prevent extraction during a 3-year drought cycle • More than 10% of private domestic wells go dry due to chronic lowering of groundwater levels
Sustainability Goal		Maintain water levels and storage sufficient to meet operational demand.	To expand access to surface water during flood years for replenishment of the upper aquifer by working with neighbors in both DM and Madera Subbasins where overdraft is occuring.	To expand access to surface water during flood years for replenishment of the upper aquifer by working with neighbors in both DM and Madera Subbasins where overdraft is occuring.	Minimize storage change during extended dry periods.	Minimize storage change during extended dry periods.	Maintain water levels sufficient to meet operational storage as well as 3-year drought buffer storage
5-Year Interim Goals		Year 5: Year 10: Year 15:	Year 5: Year 10: Year 15:	Year 5: Year 10: Year 15:	Year 5: < Minimum Threshold Year 10: < Minimum Threshold Year 15: < Minimum Threshold	Year 5: < Minimum Threshold Year 10: < Minimum Threshold Year 15: < Minimum Threshold	Year 5: TBD Year 10: TBD Year 15: TBD
Minimum Threshold	Year 5: Same we are sustainable Year 10: Year 15:	Upper Aquifer: 20% below 2015 GGSA end of pumping season GW levels (set at each monitoring site). Lower Aquifer: subsidence thresholds supercede.	Thresholds established at each monitoring site. Project **1999 to present (dry period trend)** change in water level elevation trend to 2040. (Dry period trend to reprentent drought water level trends)	**2** years worth of storage to sustain a drought while maintaining a minimum water level **100** ft above Corcoran Clay.	**Upper Aquifer** Storage Loss of >12,000 AF from over extended dry period **Lower Aquifer** Storage Loss of > 4600 AF over extened dry period	**Upper Aquifer** Storage Loss of >90,000 AF over extended dry period **Lower Aquifer** Storage Loss of > 55,000 AF over extended dry period	Upper Aquifer: hydrologic low Lower Aquifer: 95% of historic low
Measurable Objective	Water levels established at representative sites	Upper Aquifer: 2015 GGSA end of pumping season GW levels (set at each monitoring site) Lower Aquifer: Subsidence measurable objectives supercede.	**72,000** AF available above water level minimum threshold.	**6** years worth of storage while maintaining a minimum water level **100** ft above the Corcoran Clay.	Long term average of Δ 0 AF/year	Long term average of Δ 0 AF/year	Both Aquifers: Seasonal historic high average, Spring 2012 or Spring 2017, whichever elevation is lowest or where data exists
Notes	We are already sustainable and our projected water budget is also sustainable		*The measurable objective assumes a **4** ft/yr rate of decline, Over the district's area of 26,000 acres with 0.12 specific yield aquifer parameter, applied over **6** years	*The 100-ft buffer is set in response to well pumping functionality. i.e. a pump needs so much head above it to account for drawdown and submergence	Based on model results	Based on model results	