Appendix B

Surface Water and Groundwater Model Results

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APPENDIX B

SUMMARY OF SURFACE WATER AND GROUNDWATER MODEL RESULTS

A surface water and groundwater model (Model) has been used to provide information necessary to make decisions related to the Santa Margarita River (SMR) Conjunctive Use Project (SMR CUP) (U.S. Bureau of Reclamation [Reclamation] 2007). The Model is a three-dimensional USGS MODFLOW surface water and groundwater model originally developed in 2001 for the Permit 15000 Study (Reclamation 2001). The Model was updated in 2005 and used to develop over 16 project alternatives, including ten original alternatives (Reclamation 2007a) and six subsequent alternatives (Stetson Engineers Inc. [Stetson] 2012a,b). Of the 16 model runs, only two project alternatives (Alternatives 1 and 2) were found to efficiently meet the long-term water demands of Marine Corps Base (MCB) Camp Pendleton and Fallbrook Public Utility District (FPUD), reduce FPUD's dependence on imported water, maintain watershed resources, and improve water supply reliability by managing the yield of the Lower SMR Basin while protecting environmental resources.

This appendix discusses the most recent Model results for surface water flows and groundwater levels in the lower SMR Basin using flow data from the updated *CUP Surface Water Availability Analysis (TM 1.1)* (Reclamation et al. 2012). This report utilizes model simulations performed by Stetson to compare the effects of Alternatives 1 and 2 Model simulations with results from a Baseline Model simulation.

B.1 MODEL DESCRIPTION

Using the Model, a study was completed to maximize the potential yield for the SMR CUP within limitations set by physical and environmental constraints. The streamflow, groundwater production, environmental, and infrastructure parameters and constraints used for the Baseline and Alternatives 1 and 2 simulations are provided in Table B-1. The parameters and constraints include: historical water levels and hydrologic conditions; Cooperative Water Resources Management Agreement (CWRMA) or Title 22 releases; 3 cubic feet per second (cfs) minimum bypass flows at the diversion structure to meet downstream riparian needs; water quality; and prevention of seawater intrusion and compaction (i.e., subsidence) to the groundwater aquifer (Reclamation 2007). Figure B-1 shows the spatial domain of the Model used for this study. The Model encompasses the Upper Ysidora, Chappo, and Lower Ysidora groundwater sub-basins.

A 50-year simulation period was developed for the Model to describe physical and environmental characteristics during varying hydrologic conditions that are typical in the SMR watershed. The 50-year simulation period utilizes historical hydrologic data (i.e., 1952 through 2001) that encompasses the range of varying hydrologic conditions within the watershed. These hydrologic conditions are described as Extremely Dry (ED), Very Dry (VD), Below Normal (BN), Above Normal (AN), and Very Wet (VW). ED and VD hydrologic conditions are identical except for that ED conditions are based on antecedent conditions and may only occur immediately following a VD or ED year. During the 50-year period, ED/VD conditions occurred for 12 years (24%), BN conditions for 14 years (28%), AN conditions for 15 years (30%), and VW conditions for 9 years (18%).

Table B-1. Modeling Assumptions Used for Alternative Analysis

Operational Parameter \ Run	No-Action Alternative (Baseline)	Alternative 1 Groundwater Wells Only	Alternative 2 Groundwater and Gallery Wells
Streamflow			
CWRMA	✓	✓	✓
3-cfs Bypass	✓	✓	✓
CWRMA Emergency Water	✓	✓	✓
Groundwater Production			
Upper Ysidora/Chappo Pumping	✓	✓	✓
Water Conservation during Droughts	✓	✓	✓
Gallery Wells			✓
Lower Ysidora Pumping (Title 22)			
Historical Pumping Distribution	✓	✓	✓
Environmental Parameters			
VOC Constraint[1]	✓	✓	✓
No Aquifer Compaction[2]		✓	✓
Riparian Water Level Constraint[3]		✓	
Subsurface Flow at LY Narrows		✓	✓
Infrastructure			
Existing Groundwater Wells	12	12	12
New Groundwater Wells		4	4
New Gallery Wells			4
Recharge Ponds	7	7	7
Bi-Directional Pipeline		✓	✓
Minimum Basin Yield (af/y)	6,300	4,600	5,000
Maximum Basin Yield (afy)	8,800	15,800	21,500
Average Basin Yield (af/y)	8,400	10.800	12,800

Notes: [1] The VOC Constraint requires that water not be pumped from wells with known contamination. Groundwater from Well 26018 has shown TCE concentrations below the MCL and has been included in all model runs per discussions with the Base.

[2] The potential for aquifer compaction is indicated by dewatering of areas with a higher percentage of clay sediments.

[3] The Riparian Water Level Constraint requires that groundwater levels in the riparian corridor are not dropped below historical measured water levels.

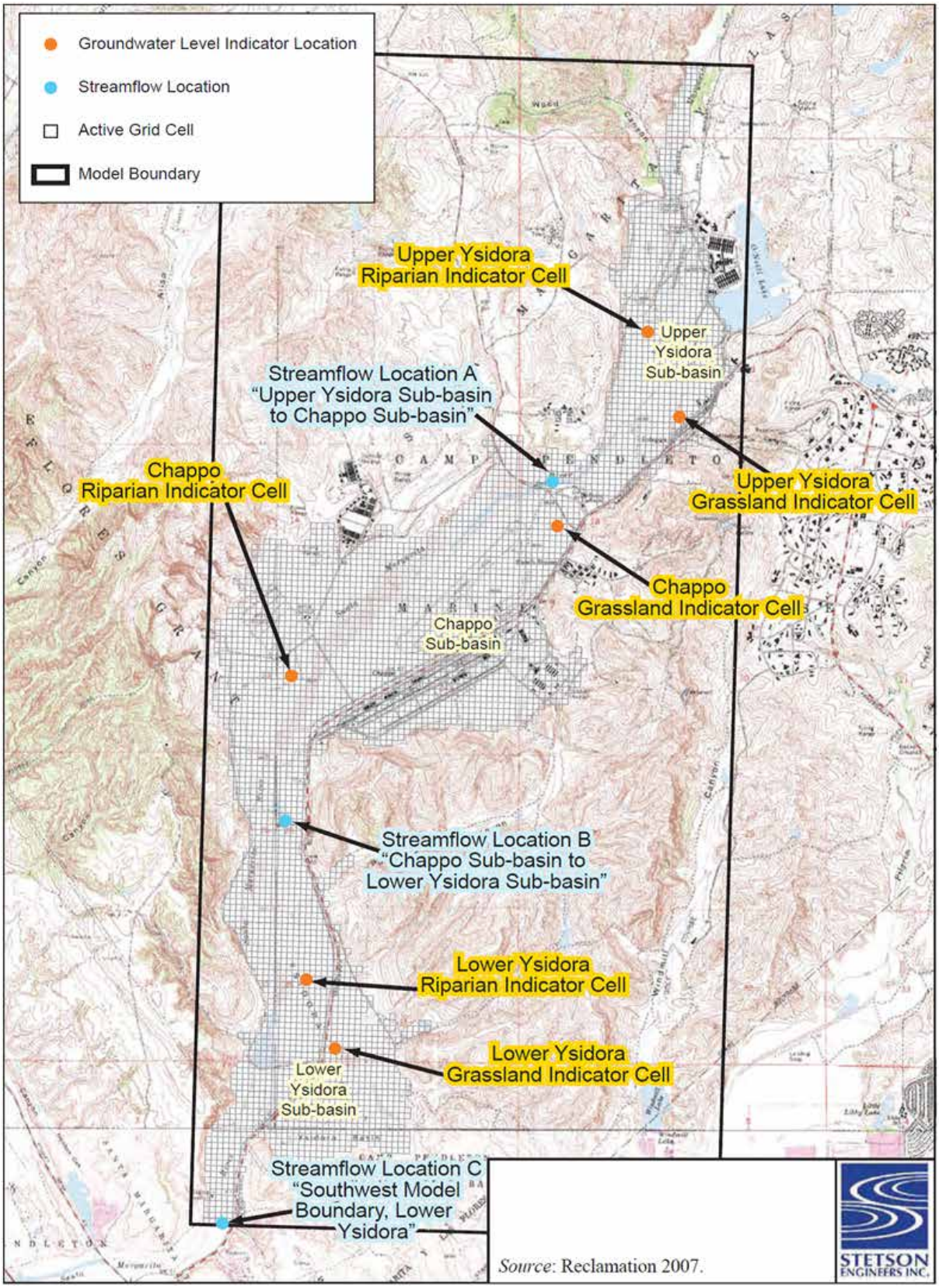


Figure B-1
Model Grid, Boundary, Groundwater Indicator Locations,and Streamflow Locations

The Model was used to assess the effects of various project components such as groundwater pumping, diversions from the SMR, and recharge from the SMR and recharge ponds. A Baseline Model simulation (Attachment 1; Stetson 2012a) was developed and serves as the basis for comparison of other simulations representing Alternative 1 (Attachment 2; Stetson 2012b) and Alternative 2 (Attachment 3; Stetson 2012c). Comparison of groundwater levels and streamflow quantities during different hydrologic conditions allows for assessment of potential impacts between the No-Action Alternative (Baseline) and the action alternatives.

The Baseline Model establishes physical parameters under existing conditions that rely only on existing infrastructure to meet potable groundwater requirements on MCB Camp Pendleton. Alternatives 1 and 2 would rely on increased diversion and recharge rates and new production and gallery wells to increase sustained basin yield to meet MCB Camp Pendleton and FPUD demands, but include water management constraints to prevent negative environmental impacts. These constraints vary by alternative and would include maintenance of groundwater levels within their historical range to protect riparian water levels (Alternative 1), no aquifer compaction (both action alternatives), and/or no seawater intrusion by maintaining minimum subsurface flow out of the model at the Lower Ysidora Narrows (both action alternatives). The action alternatives include the construction of a bi-directional pipeline that would connect MCB Camp Pendleton to an off-base source of imported water. MCB Camp Pendleton access to imported water would allow for an increase in sustained basin yield due to the availability of an alternative water supply during prolonged drought conditions. Under Alternative 1 and 2 operations, groundwater pumping would be curtailed during dry hydrologic conditions to protect physical and environmental concerns and instead rely on imported water to meet a portion of MCB Camp Pendleton's water demand.

B.2 RESULTS AND DISCUSSION

The average annual groundwater pumping under the Baseline Model simulation is 8,400 af/y (Stetson 2012a), which is 400 af/y less than the 8,800 af/y allowed under existing water rights due to conservation measures during ED/VD hydrologic conditions. Based on the environmental constraints and operational parameters that were used to develop each action alternative, increases in Alternatives 1 and 2 sustained basin yield above baseline yield would be limited to 10,800 af/y and 12,800 af/y, respectively (Stetson 2012b,c); this equates to an increase over the Baseline by 2,400 af/y and 4,400 af/y, respectively. Imported water supplies required to meet sustained basin yield requirements for Alternatives 1 and 2 are 500 af/y and 1,100 af/y, respectively.

The Model simulates evapotranspiration which measures consumptive use of groundwater by riparian phreatophytes. Modeled evapotranspiration can be used as an indicator of potential impacts to riparian habitat and the riverine environment. A substantial decline in annual evapotranspiration could be indirectly related to a stressed riverine environment. Evapotranspiration for the Baseline and two action alternatives is described in the annual Model budget shown in Attachments 1 through 3. Baseline evapotranspiration averaged 2,500 af/y under Baseline conditions and decreased by 100 af/y (4%) for both Alternatives 1 and 2. This is not considered a significant decline in annual evapotranspiration.

Analysis of specific environmental parameters may be assessed from the Model's groundwater budget and groundwater level hydrographs shown in Section B.2-1. VOC migration occurs when groundwater production wells are placed near known contaminant plumes. Aquifer compaction may occur when groundwater levels drop below the highest clay layer in the aquifer. Impacts to riparian habitat may occur when groundwater levels below the SMR drop below the root extinction depth of riparian vegetation. Lastly, seawater intrusion may occur when subsurface outflow from the Model at the Lower Ysidora

Narrows becomes a negative number. Each of these physical and environmental factors was reviewed throughout the development of the Baseline and Alternative 1 and 2 Model simulations.

The simulated groundwater level and SMR streamflow information relating to Alternatives 1 and 2 is summarized below in Section B.2-1, *Groundwater Levels* and Section B.2-2, *SMR Streamflow*, respectively.

B.2.1 GROUNDWATER LEVELS

In order to assess the changes in groundwater levels between the Baseline Model simulation and the Model simulations for Alternatives 1 and 2, six "indicator" locations were identified that depict water levels representative of conditions in each sub-basin. Two locations were chosen in each sub-basin, with one location representing conditions in the riparian zone and the other location representing conditions in grassland areas that do not contain phreatophyte vegetation. Figure B-1 shows the locations of each of these six indicator locations.

B.2.1.1 Alternative 1 Simulation

Figures 1 to 3 in Attachment 2 (Stetson 2012b) show the simulated groundwater levels in Upper Ysidora, Chappo, and Lower Ysidora sub-basins, respectively, comparing the Baseline Model simulation to the Alternative 1 Model simulation (*Note*: Alternative 1 is referred to as "Run 16b" in Attachment 2). Each figure presents two graphs, one for the riparian indicator location and one for the grassland location. The following information is presented on each graph:

<u>Riparian Indicator</u>

The following lines are shown on each of the graphs for the riparian indicator locations:

- *Land Surface Elevation*: This line represents the elevation of the ground surface at this location.
- *Low Water Level*: This line shows the elevation of the lowest recorded groundwater level in the area of the indicator location.
- *Baseline Simulated Water Level*: The red dashed line is the calculated groundwater level from the baseline simulation.
- *Alternative 1 Simulated Water Level*: The green line is the calculated groundwater level from the Alternative 1 simulation. This simulation was termed "Run 16B" by Stetson (Stetson 2012b).

<u>Grassland Indicator</u>

The following lines are shown on each of the graphs for the riparian indicator locations:

- *Land Surface Elevation*: This line represents the elevation of the ground surface at this location.
- *Baseline Simulated Water Level*: The red dashed line is the calculated groundwater level from the baseline simulation.
- *Alternative 1 Simulated Water Level*: The green line is the calculated groundwater level from Alternative 1 simulation.

The riparian and grassland indicator graphs also have shaded vertical bands behind the lines. Each of the colors of these bands represents the hydrologic condition for a specific year (i.e., ED [Drought], VD, BN, AN, or VW).

Results

During several ED/VD years groundwater levels in the riparian indicator drop to the measured historical low in the Upper Ysidora and Chappo sub-basins. The Alternative 2 Model includes the same constraints outlined in an Adaptive Management Plan (AMP) (Stetson 2009) that reduce pumping rates during ED/VD and further reduce pumping rates as historical low groundwater levels are approached. Specifically, groundwater pumping would be curtailed when the average monthly groundwater level drops to within 3 feet (ft) of the historical minimum. These groundwater levels would be determined by a series of telemetered groundwater monitoring wells. Pumping would be further reduced or shut off if the groundwater level is within 0.5 ft of the historic minimum. Pumping rates would remain reduced until the average monthly groundwater levels returned to 0.5 ft above the historical minimum (Stetson 2009). As a result, groundwater levels would not drop below historical groundwater lows.

Under Alternative 1, the effect of lowered groundwater levels in the Upper Ysidora and Chappo sub-basins may result in reduced pumping efficiency or production from other MCB Camp Pendleton supply wells. However, the AMP would monitor water levels throughout the groundwater basin and production rates at individual wells would be adjusted accordingly to maintain yield.

Simulated groundwater levels in the grassland area of the Upper Ysidora and Chappo sub-basins are allowed to drop lower than in the riparian indicator because these areas have no phreatophytes to be adversely affected by the lowered groundwater table (i.e., no historical groundwater level constraint has been set). Simulated groundwater levels at the riparian and grassland indicators in the Lower Ysidora sub-basin (Figure 3 in Attachment 2) are similar to baseline conditions because agricultural pumping would continue to be discontinued in this sub-basin.

B.2.1.2 Alternative 2 Simulation

Figures 1 to 3 in Attachment 3 (Stetson 2012c) show the simulated groundwater levels in Upper Ysidora, Chappo, and Lower Ysidora sub-basins, respectively, comparing the Baseline Model simulation to the Alternative 2 Model simulation (*Note*: Alternative 2 is referred to as "Run 13A" in Attachment 3). Each figure presents two graphs, one for the riparian indicator location and one for the grassland location. The types of data included on each of the graphs are the same as described in Section B.2.1.1.

Results

Simulated groundwater levels at the riparian indicator in the Upper Ysidora Sub-basin typically drop below Baseline conditions during AN conditions and drop below measured historical groundwater levels during 19 dryer years in the 50-year simulation period (Figure 1 in Attachment 3). Groundwater levels in the Chappo and Lower Ysidora sub-basins are projected to remain above the historic low measured water level throughout the 50-year simulation period (Figures 2 and 3 in Attachment 3).

If groundwater levels drop below historical levels as a result of Alternative 2, there is the potential for significant impacts to occur to groundwater resources. However, an AMP (similar to Alternative 1) would be adopted to mitigate these impacts. Specifically, groundwater pumping would be curtailed when the average monthly groundwater level drops to within 3 ft of the historical minimum. These groundwater levels would be determined by a series of telemetered groundwater monitoring wells. Pumping would be further reduced or shut off if the groundwater level is within 0.5 ft of the historic minimum. Pumping rates would remain reduced until the average monthly groundwater levels returned to 0.5 ft above the historical minimum (Stetson 2009).

Simulated groundwater levels in the grassland area of the Upper Ysidora and Chappo sub-basins are

allowed to drop lower than in the riparian indicator because these areas have no phreatophytes to be adversely affected by the lowered groundwater table (i.e., no historical groundwater level constraint has been set). The effects to existing MCB Camp Pendleton supply wells and riparian areas would be similar to those under Alternative 1.

B.2.2 SMR STREAMFLOW

The Model provides simulated streamflow data for the following three locations on the SMR: (1) at the boundary between the Upper Ysidora and Chappo sub-basins, (2) between the Chappo and Lower Ysidora sub-basins, and (3) at the southwest model boundary, which is approximately 0.5 mile upstream of the SMR Estuary (Reclamation 2007). In addition, average monthly streamflow data were compiled for each of the hydrologic conditions (i.e., ED/VD, BN, AN, or VW) and for the entire 50-year simulation period.

B.2.2.1 Alternative 1 Simulation

Figure 4 in Attachment 2 (Stetson 2012b) shows the simulated streamflow in the SMR at the three locations mentioned above. Each graph shows two separate lines. The lines represent:

- *Baseline Simulated Water Level*: The red dashed line is the calculated streamflow in the SMR from the baseline simulation.
- *Alternative 1 Simulation*: The green line is the calculated streamflow in the SMR from the Alternative 1 simulation.

Note that the vertical axis of each of the graphs is shown on a "log" scale and represents variations in streamflow over several orders of magnitude.

Table B-2 shows the average monthly SMR flow for all years and the four hydrologic conditions in Alternative 1 simulation at streamflow location "C," the Lower Ysidora Narrows (see Figure B-1), which is located approximately 0.5 mile upstream of the SMR Estuary. For comparison, the simulated flow data for the Baseline Model simulation (i.e., the No-Action Alternative), and changes in SMR flow between the Baseline and Alternative 1 Model simulations are also provided in Table B-2. The changes in flow are presented in terms of flow rate (acre-feet per month [af/m]) and percent change from Baseline conditions. The change in flow between the Baseline and Alternative 1 Model simulations is also shown graphically in Table B-2.

Results

The results in Figure 4 in Attachment 2 show the changes in monthly streamflow in the SMR due to increased diversions and pumping rates under Alternative 1 compared with the Baseline Model simulation. As shown in Table B-2, streamflow reduction would occur during the summer months during AN and VW hydrologic conditions; and early/late wet season during BN hydrologic conditions. There is a slight improvement in streamflow due to the AMP during most months of ED/VD hydrologic conditions.

B.2.2.2 Alternative 2 Simulation

Figure 4 in Attachment 3 (Stetson 2012c) shows the Alternative 2 simulated streamflow in the SMR at the same three locations described in Section B.2.2.1. The types of data included on each of the graphs are the same as described in Section B.2.2.1.

Table B-3 shows the average monthly SMR flow for all years and the four hydrologic conditions in the

Alternative 2 Model simulation at streamflow location "C," the Lower Ysidora Narrows (see Figure B-1), which is located approximately 0.5 mile upstream of the SMR Estuary. The change in flow between the Baseline and Alternative 2 Model simulations is also shown graphically in Table B-3.

Results

The results in Figure 4 in Attachment 3 show the decrease in streamflow in the SMR due to increased diversions and pumping rates with four new gallery wells under Alternative 2. Additional periods of lower (than Baseline) flow are evident during several years. The peak flows in the SMR are relatively unchanged under Alternative 2.

Similar to Alternative 1, average streamflow under Alternative 2 would be reduced during the summer months during VW hydrologic conditions (Table B-3). Alternative 2 shows more streamflow reduction than Alternative 1 throughout the year during AN and BN hydrologic conditions. There is a substantial improvement in streamflow due to the AMP during most months of ED/VD hydrologic conditions.

B.3 REFERENCES.

Reclamation. 2007. Santa Margarita River Conjunctive Use Project: Final Technical Memorandum No. 2.2, 2 Volumes. Prepared by Stetson Engineers. April 2007. Available at: http://www.usbr.gov/lc/socal/planning.html.

Reclamation, MCB Camp Pendleton, and Fallbrook Public Utility District. 2012. Southern California Steelhead Passage Assessment, Lower Santa Margarita River, California and CUP Surface Water Availability Analysis (TM 1.1). Prepared by Stetson and Cardno Entrix. 27 April. Available at: http://www.usbr.gov/lc/socal/planning.html.

Stetson. 2008. Technical Memorandum to Camp Pendleton Office of Water Resources: Surface Water and Groundwater Modeling Analyses of Gallery Well Alternatives for the Santa Margarita River Conjunctive Use Project (CUP). September 10, 2008.

_____. 2009. Draft Technical Memorandum to Reclamation: Response to Questions Regarding the Santa Margarita Conjunctive Use Project Environmental Impact Statement. April28, 2009.

_____. 2012a. Baseline Run: using updated TM 1.1 Streamflow.

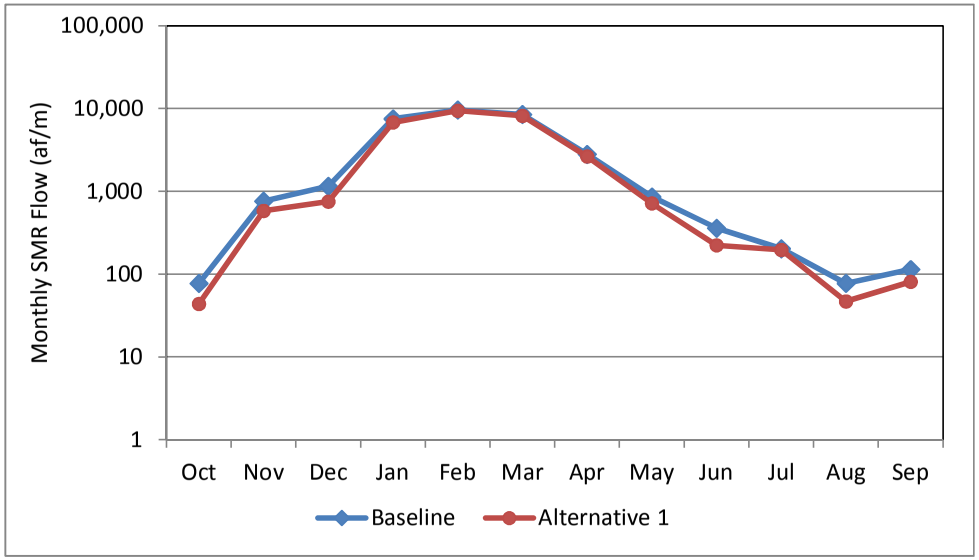
_____. 2012b. Run 16B Annual Pumping Summary: using updated TM 1.1 Streamflow.

_____. 2012c. Run 13A Basin Yield: using updated TM 1.1 Streamflow.

_____. 2012d. Average Monthly Streamflow by Subbasin/Hydrologic Condition for Baseline, Run 13A, and Run 16B. Provided via email by Reclamation. 17 April.

Table B-2. Baseline and Alternative 1 Comparison of Monthly SMR Flow at Lower Ysidora Narrows

All Years Month	Baseline af/m	Alternative 1 af/m	Change in SMR Flow af/m	%
Oct	78	44	-34	-43%
Nov	761	582	-179	-24%
Dec	1,154	754	-400	-35%
Jan	7,515	6,813	-702	-9%
Feb	9,601	9,416	-186	-2%
Mar	8,499	8,160	-339	-4%
Apr	2,807	2,645	-163	-6%
May	858	718	-140	-16%
Jun	359	224	-136	-38%
Jul	204	196	-7	-4%
Aug	78	47	-31	-39%
Sep	114	81	-33	-29%



VW Month	Baseline af/m	Alternative 1 af/m	Change in SMR Flow af/m	%
Oct	57	10	-46	-81%
Nov	374	265	-108	-29%
Dec	1,655	1,141	-514	-31%
Jan	34,007	32,264	-1,743	-5%
Feb	44,934	44,528	-406	-1%
Mar	34,020	33,103	-916	-3%
Apr	8,446	8,070	-376	-4%
May	3,356	3,065	-291	-9%
Jun	1,415	1,025	-390	-28%
Jul	866	887	21	2%
Aug	309	179	-130	-42%
Sep	577	419	-157	-27%

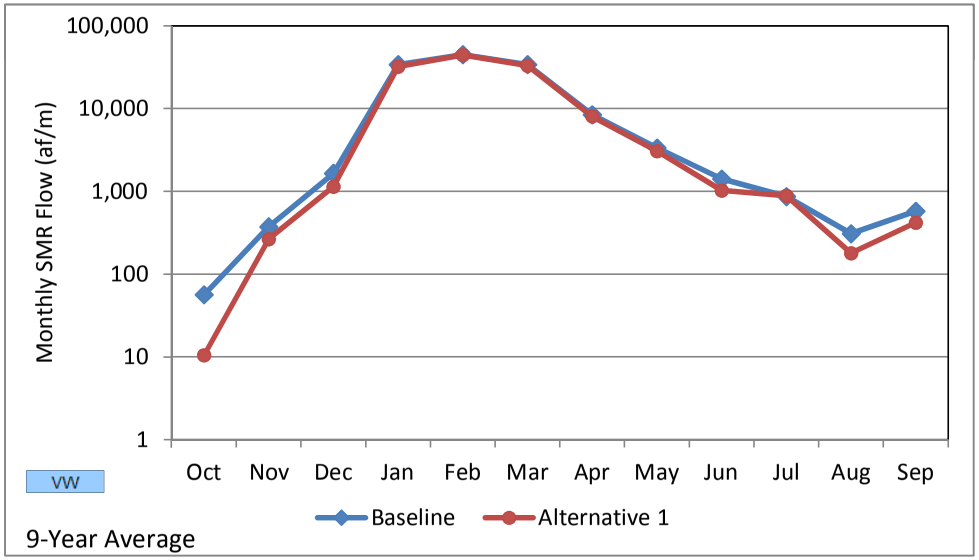
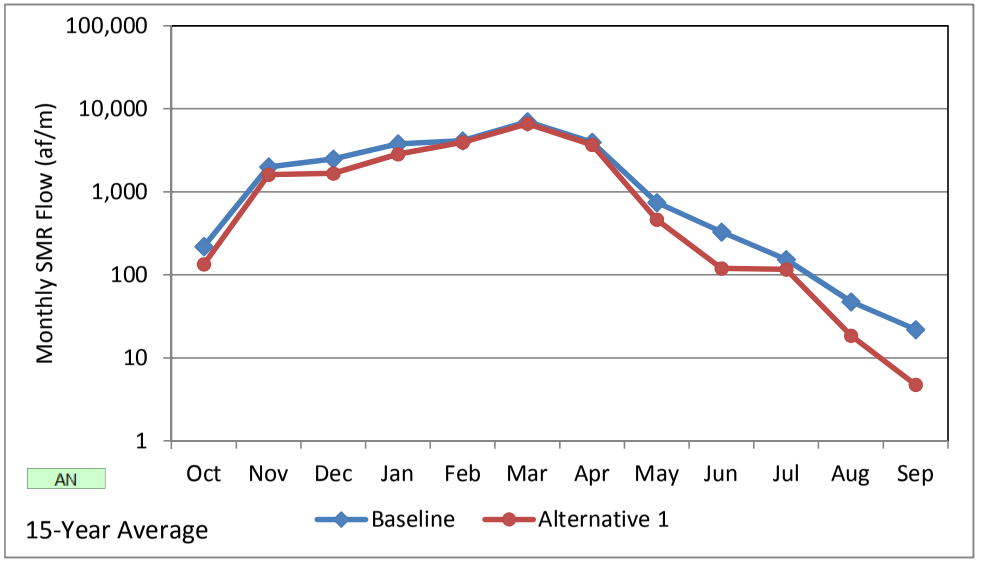


Table B-2. Baseline and Alternative 1 Comparison of Monthly SMR Flow at Lower Ysidora Narrows (cont.)

AN	Baseline	Alternative 1	Change in SMR Flow	
Month	af/m	af/m	af/m	%
Oct	219	134	-85	-39%
Nov	1,998	1,612	-386	-19%
Dec	2,483	1,664	-819	-33%
Jan	3,781	2,842	-939	-25%
Feb	4,126	3,947	-178	-4%
Mar	6,973	6,631	-342	-5%
Apr	3,961	3,688	-272	-7%
May	744	463	-281	-38%
Jun	329	120	-210	-64%
Jul	154	116	-37	-24%
Aug	48	19	-29	-61%
Sep	22	5	-17	-78%



BN	Baseline	Alternative 1	Change in SMR Flow	
Month	af/m	af/m	af/m	%
Oct	3	3	0	-9%
Nov	306	125	-181	-59%
Dec	368	167	-201	-55%
Jan	690	346	-344	-50%
Feb	923	719	-204	-22%
Mar	992	733	-259	-26%
Apr	325	271	-54	-17%
May	103	89	-14	-14%
Jun	17	7	-9	-56%
Jul	4	4	0	-9%
Aug	3	2	0	-5%
Sep	2	2	0	-3%

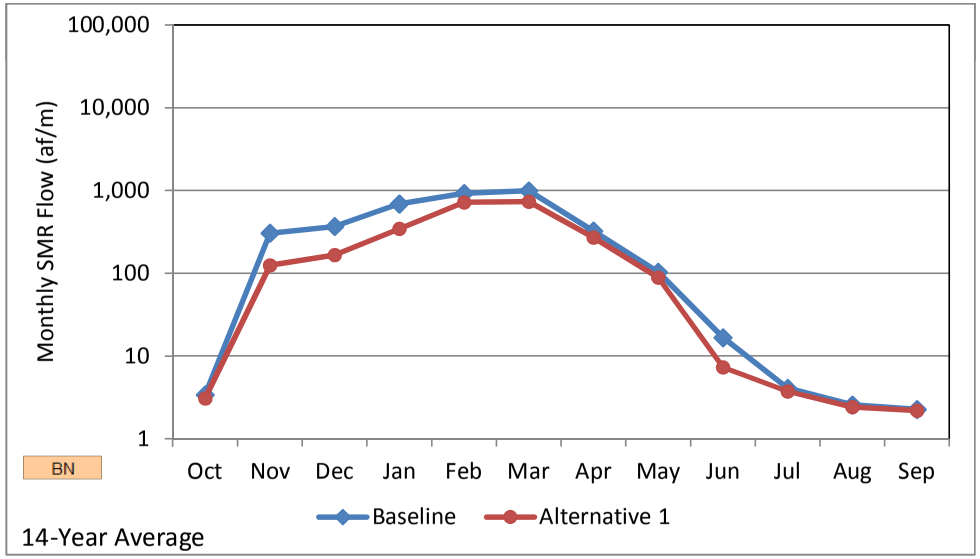


Table B-2. Baseline and Alternative 1 Comparison of Monthly SMR Flow at Lower Ysidora Narrows (cont.)

VD/ED Month	Baseline af/m	Alternative 1 af/m	Change in SMR Flow af/m	%
Oct	3	3	0	15%
Nov	38	67	29	76%
Dec	34	10	-23	-69%
Jan	275	235	-40	-15%
Feb	70	62	-8	-12%
Mar	24	29	5	22%
Apr	33	41	8	24%
May	7	9	1	18%
Jun	4	5	1	19%
Jul	2	3	0	15%
Aug	29	35	6	21%
Sep	13	15	2	14%

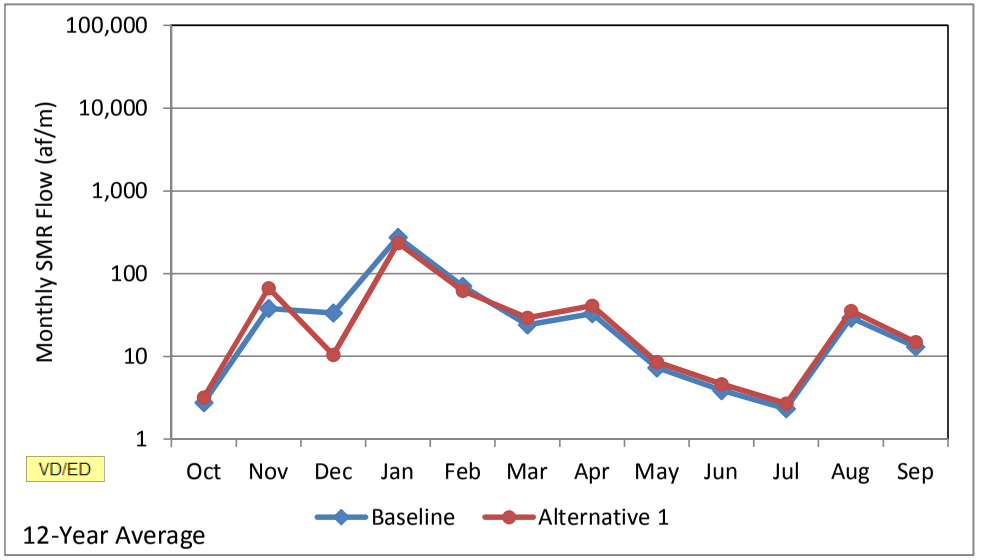
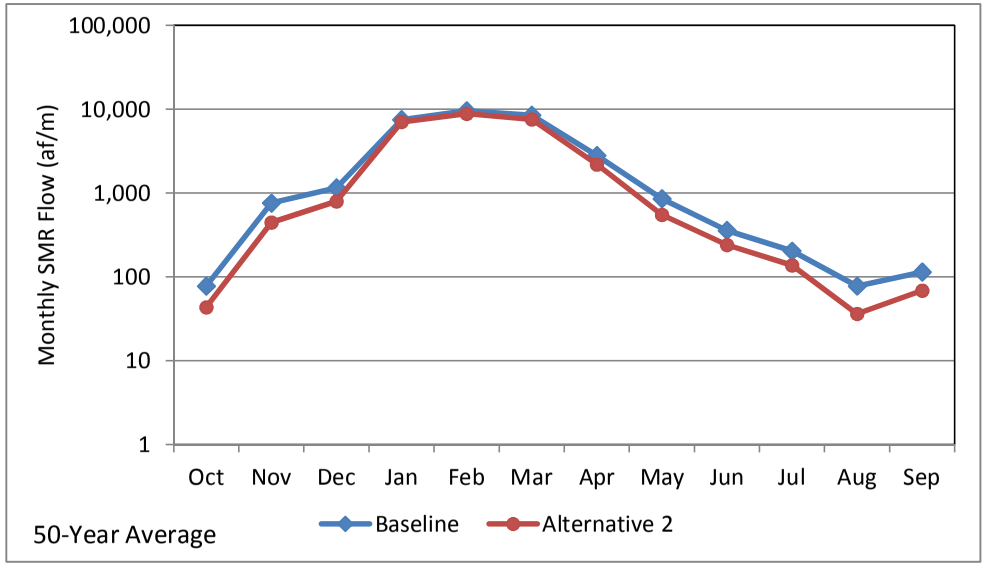


Table B-3. Baseline and Alternative 2 Comparison of Monthly SMR Flow at Lower Ysidora Narrows

All Years Month	Baseline af/m	Alternative 2 af/m	Change in SMR Flow af/m	%
Oct	78	43	-34	-44%
Nov	761	445	-316	-41%
Dec	1,154	796	-358	-31%
Jan	7,515	7,078	-437	-6%
Feb	9,601	8,831	-770	-8%
Mar	8,499	7,588	-911	-11%
Apr	2,807	2,192	-615	-22%
May	858	550	-308	-36%
Jun	359	240	-119	-33%
Jul	204	137	-66	-33%
Aug	78	36	-41	-53%
Sep	114	69	-46	-40%



VW Month	Baseline af/m	Alternative 2 af/m	Change in SMR Flow af/m	%
Oct	57	24	-33	-58%
Nov	374	79	-295	-79%
Dec	1,655	1,086	-569	-34%
Jan	34,007	32,957	-1,050	-3%
Feb	44,934	42,930	-2,004	-4%
Mar	34,020	31,559	-2,461	-7%
Apr	8,446	6,929	-1,517	-18%
May	3,356	2,436	-920	-27%
Jun	1,415	1,046	-370	-26%
Jul	866	627	-239	-28%
Aug	309	117	-192	-62%
Sep	577	324	-253	-44%

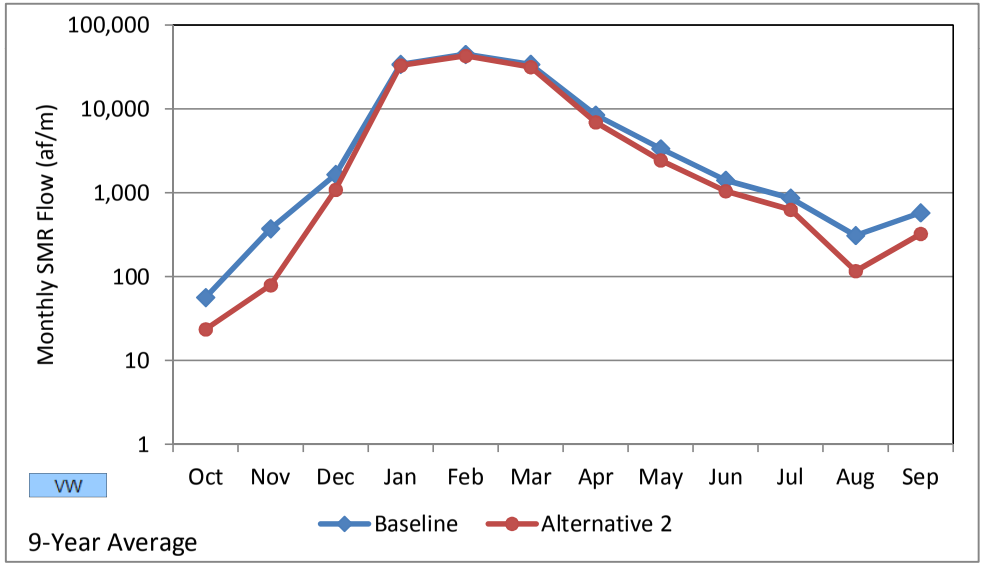
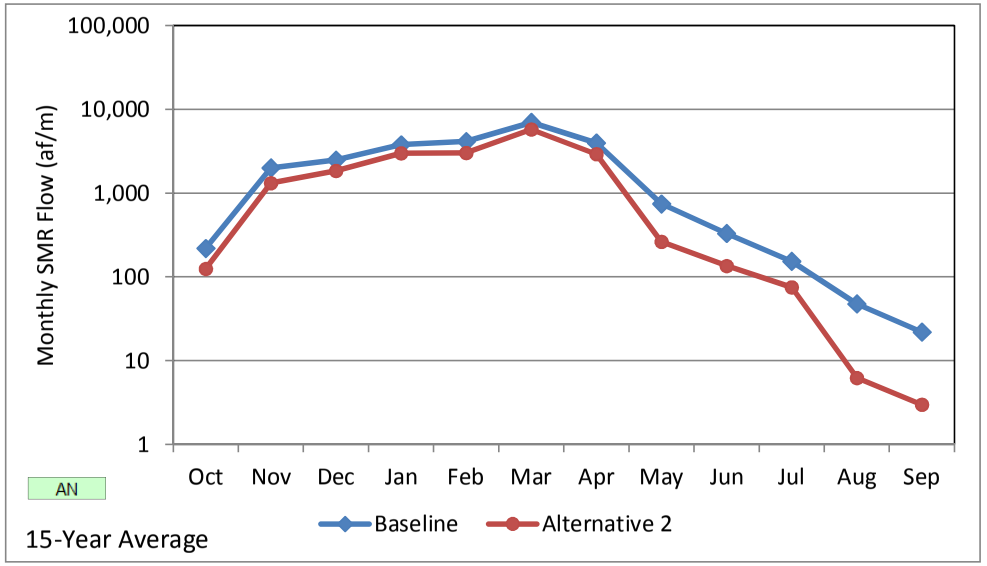


Table B-3. Baseline and Alternative 2 Comparison of Monthly SMR Flow at Lower Ysidora Narrows (cont.)

AN	Baseline	Alternative 2	Change in SMR Flow	
Month	af/m	af/m	af/m	%
Oct	219	125	-95	-43%
Nov	1,998	1,314	-684	-34%
Dec	2,483	1,839	-644	-26%
Jan	3,781	2,984	-797	-21%
Feb	4,126	3,010	-1,116	-27%
Mar	6,973	5,744	-1,229	-18%
Apr	3,961	2,919	-1,042	-26%
May	744	262	-482	-65%
Jun	329	135	-195	-59%
Jul	154	75	-78	-51%
Aug	48	6	-41	-87%
Sep	22	3	-19	-86%



BN	Baseline	Alternative 2	Change in SMR Flow	
Month	af/m	af/m	af/m	%
Oct	3	3	0	-13%
Nov	306	69	-237	-78%
Dec	368	164	-203	-55%
Jan	690	523	-167	-24%
Feb	923	511	-412	-45%
Mar	992	518	-474	-48%
Apr	325	140	-185	-57%
May	103	41	-62	-60%
Jun	17	22	5	32%
Jul	4	4	-1	-13%
Aug	3	2	0	-5%
Sep	2	2	0	-5%

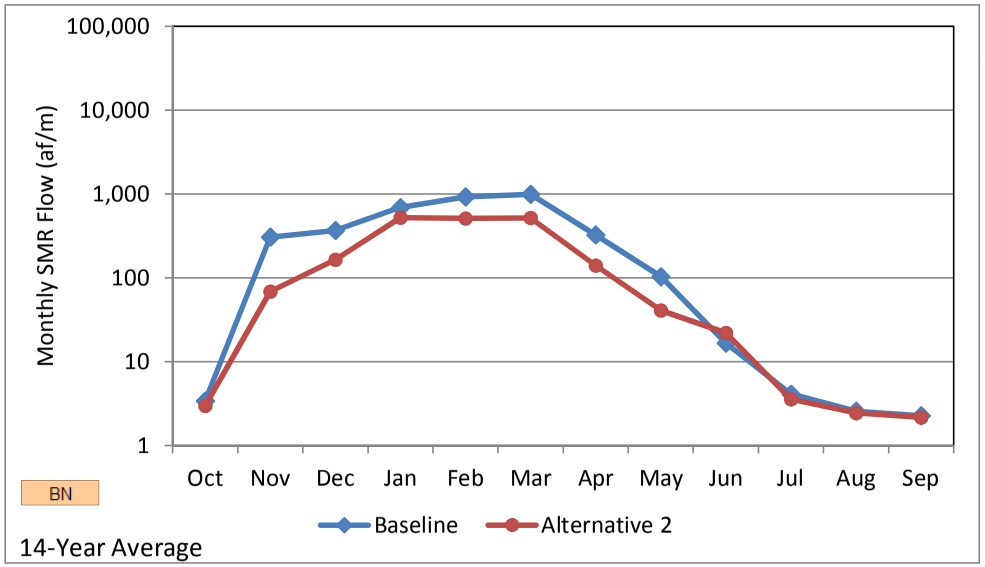
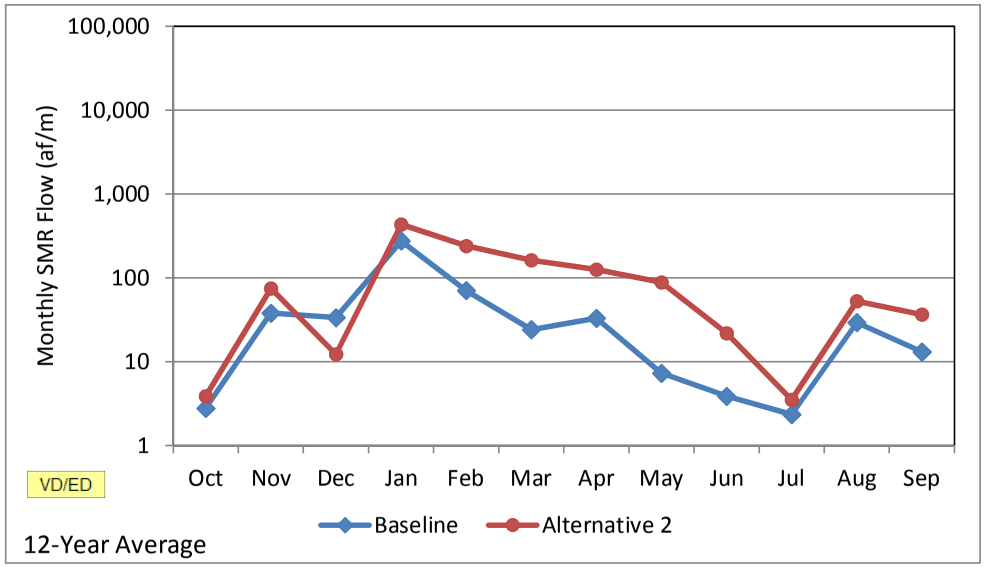


Table B-3. Baseline and Alternative 2 Comparison of Monthly SMR Flow at Lower Ysidora Narrows (cont.)

VD/ED Month	Baseline af/m	Alternative 2 af/m	Change in SMR Flow af/m	Change in SMR Flow %
Oct	3	4	1	40%
Nov	38	75	37	97%
Dec	34	12	-21	-63%
Jan	275	433	158	57%
Feb	70	240	169	240%
Mar	24	162	138	573%
Apr	33	125	92	280%
May	7	88	81	1112%
Jun	4	22	18	464%
Jul	2	4	1	50%
Aug	29	53	23	80%
Sep	13	37	23	179%



Attachment 1

Baseline Run: Lower Santa Margarita River Surface and Groundwater Model

Draft: for negotiation purposes

TABLE 1 BASELINE RUN; using TM 1.1 Streamflow
LOWER SANTA MARGARITA RIVER GROUNDWATER MODEL

Hydrologic Condition

HC	Cnt	Oct to Apr Strflw
VW	9	Very Wet > 58,032
AN	15	Above Normal > 15,957
BN	14	Below Normal < 15,957
VD	5	Very Dry < 5,781
ED	7	Extremely Dry (2nd+ VD)

8,400 AFY 50-Year Average Annual Production

Model Year	HC	Oct-Apr HC descrip	Groundwater Production * UY Total af/WY	CH Total af/WY	LY Total af/WY	LSMR Total af/WY	CWRMA Emergency Water af/WY
1	VW	Very Wet	3,520	5,280	-	8,800	-
2	BN	Below Normal	4,016	4,784	-	8,800	-
3	BN	Below Normal	4,488	4,312	-	8,800	-
4	VD	Very Dry	4,258	4,091	-	8,349	-
5	ED	Extremely Dry	3,626	3,483	-	7,109	603
6	ED	Extremely Dry	3,231	3,105	-	6,336	400
7	AN	Above Normal	3,379	4,219	-	7,598	-
8	VD	Very Dry	3,786	4,564	-	8,349	-
9	ED	Extremely Dry	3,626	3,483	-	7,109	600
10	ED	Extremely Dry	3,231	3,105	-	6,336	2,055
11	BN	Below Normal	3,875	3,723	-	7,598	591
12	VD	Very Dry	4,258	4,091	-	8,349	-
13	ED	Extremely Dry	3,626	3,483	-	7,109	-
14	ED	Extremely Dry	3,231	3,105	-	6,336	-
15	AN	Above Normal	3,379	4,219	-	7,598	-
16	AN	Above Normal	3,520	5,280	-	8,800	-
17	BN	Below Normal	4,016	4,784	-	8,800	-
18	VW	Very Wet	3,992	4,808	-	8,800	-
19	BN	Below Normal	4,016	4,784	-	8,800	-
20	BN	Below Normal	4,488	4,312	-	8,800	-
21	VD	Very Dry	4,258	4,091	-	8,349	-
22	BN	Below Normal	4,269	4,102	-	8,371	-
23	BN	Below Normal	4,488	4,312	-	8,800	-
24	BN	Below Normal	4,488	4,312	-	8,800	-
25	VD	Very Dry	4,258	4,091	-	8,349	-
26	ED	Extremely Dry	3,626	3,483	-	7,109	-
27	VW	Very Wet	3,379	4,219	-	7,598	-
28	AN	Above Normal	3,520	5,280	-	8,800	-
29	VW	Very Wet	3,520	5,280	-	8,800	-
30	AN	Above Normal	3,520	5,280	-	8,800	-
31	AN	Above Normal	3,520	5,280	-	8,800	-
32	VW	Very Wet	3,520	5,280	-	8,800	-
33	AN	Above Normal	3,520	5,280	-	8,800	-
34	AN	Above Normal	3,520	5,280	-	8,800	-
35	AN	Above Normal	3,520	5,280	-	8,800	-
36	BN	Below Normal	4,016	4,784	-	8,800	-
37	AN	Above Normal	3,992	4,808	-	8,800	-
38	BN	Below Normal	4,016	4,784	-	8,800	-
39	BN	Below Normal	4,488	4,312	-	8,800	-
40	VW	Very Wet	3,992	4,808	-	8,800	-
41	AN	Above Normal	3,520	5,280	-	8,800	-
42	VW	Very Wet	3,520	5,280	-	8,800	-
43	AN	Above Normal	3,520	5,280	-	8,800	-
44	VW	Very Wet	3,520	5,280	-	8,800	-
45	AN	Above Normal	3,520	5,280	-	8,800	-
46	AN	Above Normal	3,520	5,280	-	8,800	-
47	VW	Very Wet	3,520	5,280	-	8,800	-
48	BN	Below Normal	4,016	4,784	-	8,800	-
49	BN	Below Normal	4,488	4,312	-	8,800	-
50	AN	Above Normal	3,992	4,808	-	8,800	-
		Min	3,231	3,105	-	6,336	-
		Max	4,488	5,280	-	8,800	2,055
		Median	3,626	4,784	-	8,800	-
		Average	3,803	4,564	-	8,367	85

* *Note: groundwater pumping limited by vested water rights.*

TABLE 1 BASELINE RUN; using TM 1.1 Streamflow
LOWER SANTA MARGARITA RIVER GROUNDWATER MODEL

Average Annual Pumping

	Yearly Count	UY Total af/WY	CH Total af/WY	LY Total af/WY	LSMR Total af/WY	CWRMA Emergency Water af/WY
VW	9	3,609	5,057	-	8,666	-
AN	15	3,564	5,075	-	8,640	-
BN	14	4,226	4,457	-	8,683	42
VD	5	4,164	4,186	-	8,349	-
ED	7	3,457	3,321	-	6,778	523

Average Monthly Pumping

%	Month	UY Total af/m	CH Total af/m	LY Total af/m	LSMR Total af/m	CWRMA Emergency Water af/m
8.3%	Oct	316	379	-	695	16
7.1%	Nov	270	324	-	593	20
5.9%	Dec	224	269	-	493	20
6.2%	Jan	236	283	-	519	2
5.6%	Feb	212	255	-	467	2
7.8%	Mar	296	355	-	651	2
7.9%	Apr	302	362	-	664	2
8.6%	May	328	393	-	721	4
10.0%	Jun	381	457	-	839	4
11.4%	Jul	434	521	-	956	4
10.9%	Aug	416	500	-	916	4
10.2%	Sep	388	465	-	853	4
100%	Avg Anl	3,803	4,564	-	8,367	85

TABLE 2 BASELINE Run (using TM 1.1 Streamflow) Pumping Summaries

	Subbasin	Building #	State ID	# mos Q	% of 600 mos	% of Subbasin	80% Utilization af/m	Potential 100% Yield gpm
1	UY	2673	10/4-7A2	600	100%	21%	110	1,000
2	UY	26072	10/4-7A3	600	100%	21%	110	1,000
3	UY	2602	10/4-7R2	600	100%	21%	110	1,000
4	UY	26018	10/4-18B1	600	100%	19%	99	900
5	UY	26071	10/4-7H3	600	100%	17%	88	800
6	CH	23093	10/4-18E3	600	100%	20%	121	1,100
7	CH	23073	10/4-18M5	600	100%	21%	132	1,200
8	CH	23063	10/5-13R2	600	100%	20%	121	1,100
9	CH	330925	10/5-23G4	600	100%	5%	31	283
10	CH	23001	10/5-23J1	600	100%	22%	137	1,250
11	CH	330924	10/5-23K2	600	100%	7%	41	375
12	CH	330923	10/5-23K3	600	100%	5%	30	275
13	LY	2200	10/5-26F1				181	1,650
14	LY	2D3	11/5-2D3				55	500
15	LY	2D4	11/5-2D4				55	500

UY/CH Well Capacity:	**1,127 af/m**	**10,283 gpm**

% Pumping in Subbasin for Camp Supply

May through April		**DRY <4**			**WET >4**		
		51%	**49%**	**0%**	**40%**	**60%**	**0%**
mo	Anl %	UY	CH	LY	UY	CH	LY
MAY	8.6%	4.4%	4.2%	-	3.4%	5.2%	-
JUN	10.0%	5.1%	4.9%	-	4.0%	6.0%	-
JUL	11.4%	5.8%	5.6%	-	4.6%	6.9%	-
AUG	10.9%	5.6%	5.4%	-	4.4%	6.6%	-
SEP	10.2%	5.2%	5.0%	-	4.1%	6.1%	-
OCT	8.3%	4.2%	4.1%	-	3.3%	5.0%	-
NOV	7.1%	3.6%	3.5%	-	2.8%	4.3%	-
DEC	5.9%	3.0%	2.9%	-	2.4%	3.5%	-
JAN	6.2%	3.2%	3.0%	-	2.5%	3.7%	-
FEB	5.6%	2.8%	2.7%	-	2.2%	3.4%	-
MAR	7.8%	4.0%	3.8%	-	3.1%	4.7%	-
APR	7.9%	4.0%	3.9%	-	3.2%	4.8%	-

Max Pumping in Subbasin adding wells as needed

	UY	CH	LY	Total
# exst wells	5	7	-	(afm)
af/m (80%)	515	612	-	1,127
avg af/well	103	87	-	
% of total	46%	54%		

TABLE 3 Baseline Run (TM 1.1 strflw) Annual Pumping by Well
Annual Well Production (AF/Y)

		Building #:	2673	26072	2602	26018	26071
		Max Annual Pumping	955	955	955	859	764
		Potential w/ 80% Util	1,315	1,315	1,315	1,184	1,052
		Potential Well Yield (gpm)	1,000	1,000	1,000	900	800
Settlement Year	HC		UY 10/4-7A2 (af/y)	UY-VOC 10/4-7A3 (af/y)	UY 10/4-7R2 (af/y)	UY 10/4-18B1 (af/y)	UY 10/4-7H3 (af/y)
1	VW		749	749	749	674	599
2	BN		854	854	854	769	684
3	AN		955	955	955	859	764
4	VD		906	906	906	815	725
5	ED		771	771	771	694	617
6	ED		688	688	688	619	550
7	AN		719	719	719	647	575
8	VD		806	806	806	725	644
9	ED		771	771	771	694	617
10	ED		688	688	688	619	550
11	BN		824	824	824	742	660
12	VD		906	906	906	815	725
13	ED		771	771	771	694	617
14	ED		688	688	688	619	550
15	AN		719	719	719	647	575
16	AN		749	749	749	674	599
17	BN		854	854	854	769	684
18	VW		849	849	849	764	680
19	BN		854	854	854	769	684
20	BN		955	955	955	859	764
21	VD		906	906	906	815	725
22	BN		908	908	908	817	727
23	BN		955	955	955	859	764
24	BN		955	955	955	859	764
25	VD		906	906	906	815	725
26	ED		771	771	771	694	617
27	VW		719	719	719	647	575
28	AN		749	749	749	674	599
29	VW		749	749	749	674	599
30	AN		749	749	749	674	599
31	AN		749	749	749	674	599
32	VW		749	749	749	674	599
33	AN		749	749	749	674	599
34	AN		749	749	749	674	599
35	AN		749	749	749	674	599
36	BN		854	854	854	769	684
37	AN		849	849	849	764	680
38	BN		854	854	854	769	684
39	BN		955	955	955	859	764
40	VW		849	849	849	764	680
41	AN		749	749	749	674	599
42	VW		749	749	749	674	599
43	AN		749	749	749	674	599
44	VW		749	749	749	674	599
45	BN		749	749	749	674	599
46	AN		749	749	749	674	599
47	VW		749	749	749	674	599
48	BN		854	854	854	769	684
49	BN		955	955	955	859	764
50	AN		849	849	849	764	680
		Min	688	688	688	619	550
		Max	955	955	955	859	764
		Median	771	771	771	694	617
		Average	809	809	809	728	647

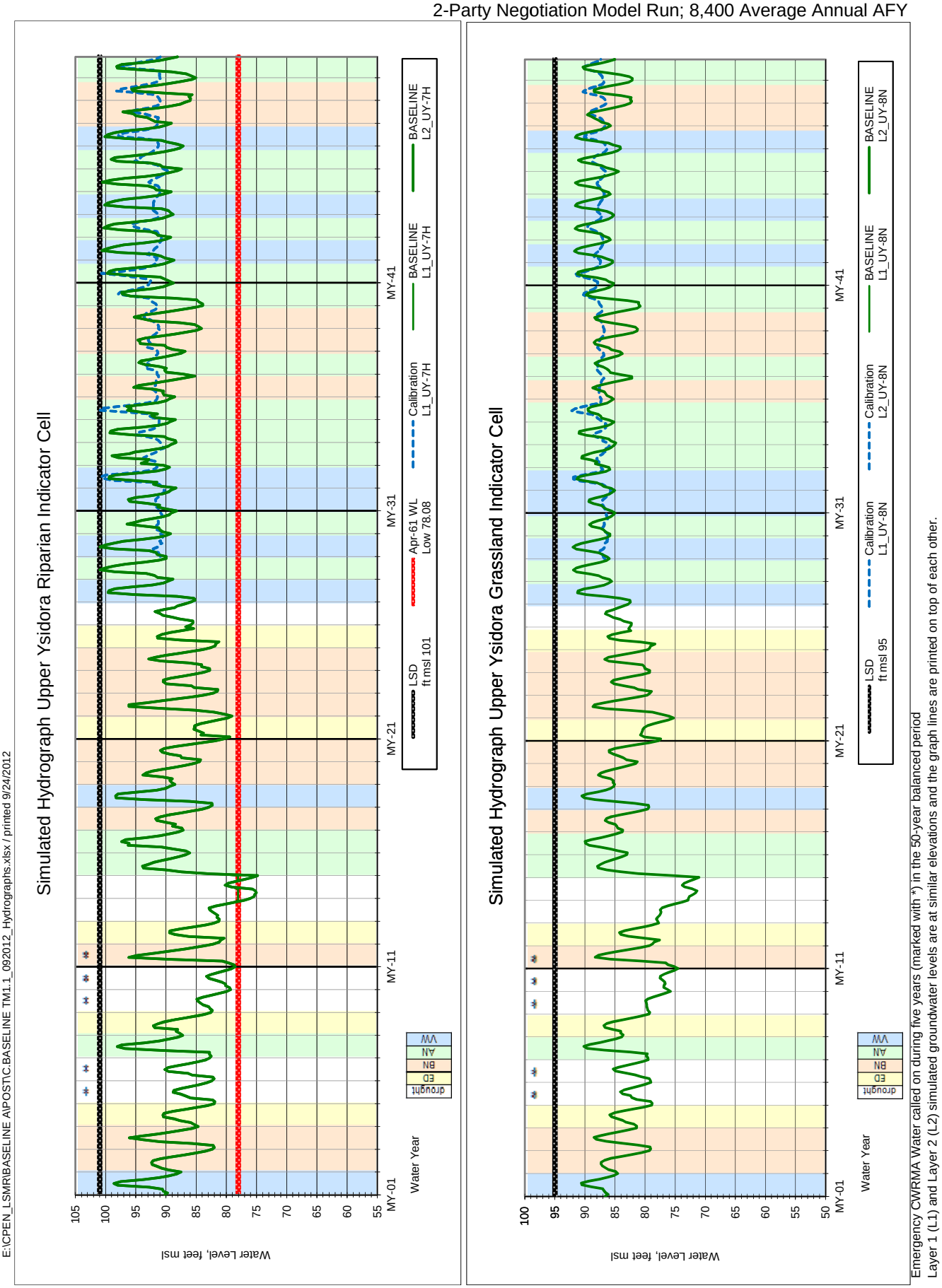
Month	UY 10/4-7A2 (af/m)	UY-VOC 10/4-7A3 (af/m)	UY 10/4-7R2 (af/m)	UY 10/4-18B1 (af/m)	UY 10/4-7H3 (af/m)
Oct	67	67	67	60	54
Nov	57	57	57	52	46
Dec	48	48	48	43	38
Jan	50	50	50	45	40
Feb	45	45	45	41	36
Mar	63	63	63	57	50
Apr	64	64	64	58	51
May	70	70	70	63	56
Jun	81	81	81	73	65
Jul	92	92	92	83	74
Aug	89	89	89	80	71
Sep	82	82	82	74	66
Annual Total	809	809	809	728	647

TABLE 3 Baseline Run (TM 1.1 strflw) Annual Pumping by Well (Continued)

		Building #:	23093	23073	23063	330925	23001	330924	330923
		Max Annual Pumping	761	830	761	782	865	519	761
		Potential w/ 80% Util	1,447	1,578	1,447	1,486	1,644	986	1,447
		Potential Well Yield (gpm)	1,100	1,200	1,100	1,130	1,250	750	1,100
			CH	CH	CH	CH	CH	CH	CH
Settlement Year	HC		10/4-18E3 (af/y)	10/4-18M5 (af/y)	10/5-13R2 (af/y)	10/5-23G4 (af/y)	10/5-23J1 (af/y)	10/5-23K2R (af/y)	10/5-23K3 (af/y)
1	VW		761	830	761	782	865	519	761
2	BN		690	752	690	709	784	470	690
3	AN		622	678	622	639	706	424	622
4	VD		590	643	590	606	670	402	590
5	ED		502	548	502	516	571	342	502
6	ED		448	488	448	460	509	305	448
7	AN		608	663	608	625	691	415	608
8	VD		658	718	658	676	748	449	658
9	ED		502	548	502	516	571	342	502
10	ED		448	488	448	460	509	305	448
11	BN		537	586	537	551	610	366	537
12	VD		590	643	590	606	670	402	590
13	ED		502	548	502	516	571	342	502
14	ED		448	488	448	460	509	305	448
15	AN		608	663	608	625	691	415	608
16	AN		761	830	761	782	865	519	761
17	BN		690	752	690	709	784	470	690
18	VW		693	756	693	712	788	473	693
19	BN		690	752	690	709	784	470	690
20	BN		622	678	622	639	706	424	622
21	VD		590	643	590	606	670	402	590
22	BN		591	645	591	607	672	403	591
23	BN		622	678	622	639	706	424	622
24	BN		622	678	622	639	706	424	622
25	VD		590	643	590	606	670	402	590
26	ED		502	548	502	516	571	342	502
27	VW		608	663	608	625	691	415	608
28	AN		761	830	761	782	865	519	761
29	VW		761	830	761	782	865	519	761
30	AN		761	830	761	782	865	519	761
31	AN		761	830	761	782	865	519	761
32	VW		761	830	761	782	865	519	761
33	AN		761	830	761	782	865	519	761
34	AN		761	830	761	782	865	519	761
35	AN		761	830	761	782	865	519	761
36	BN		690	752	690	709	784	470	690
37	AN		693	756	693	712	788	473	693
38	BN		690	752	690	709	784	470	690
39	BN		622	678	622	639	706	424	622
40	VW		693	756	693	712	788	473	693
41	AN		761	830	761	782	865	519	761
42	VW		761	830	761	782	865	519	761
43	AN		761	830	761	782	865	519	761
44	VW		761	830	761	782	865	519	761
45	BN		761	830	761	782	865	519	761
46	AN		761	830	761	782	865	519	761
47	VW		761	830	761	782	865	519	761
48	BN		690	752	690	709	784	470	690
49	BN		622	678	622	639	706	424	622
50	AN		693	756	693	712	788	473	693
		Min	448	488	448	460	509	305	448
		Max	761	830	761	782	865	519	761
		Median	690	752	690	709	784	470	690
		Average	658	718	658	676	748	449	658

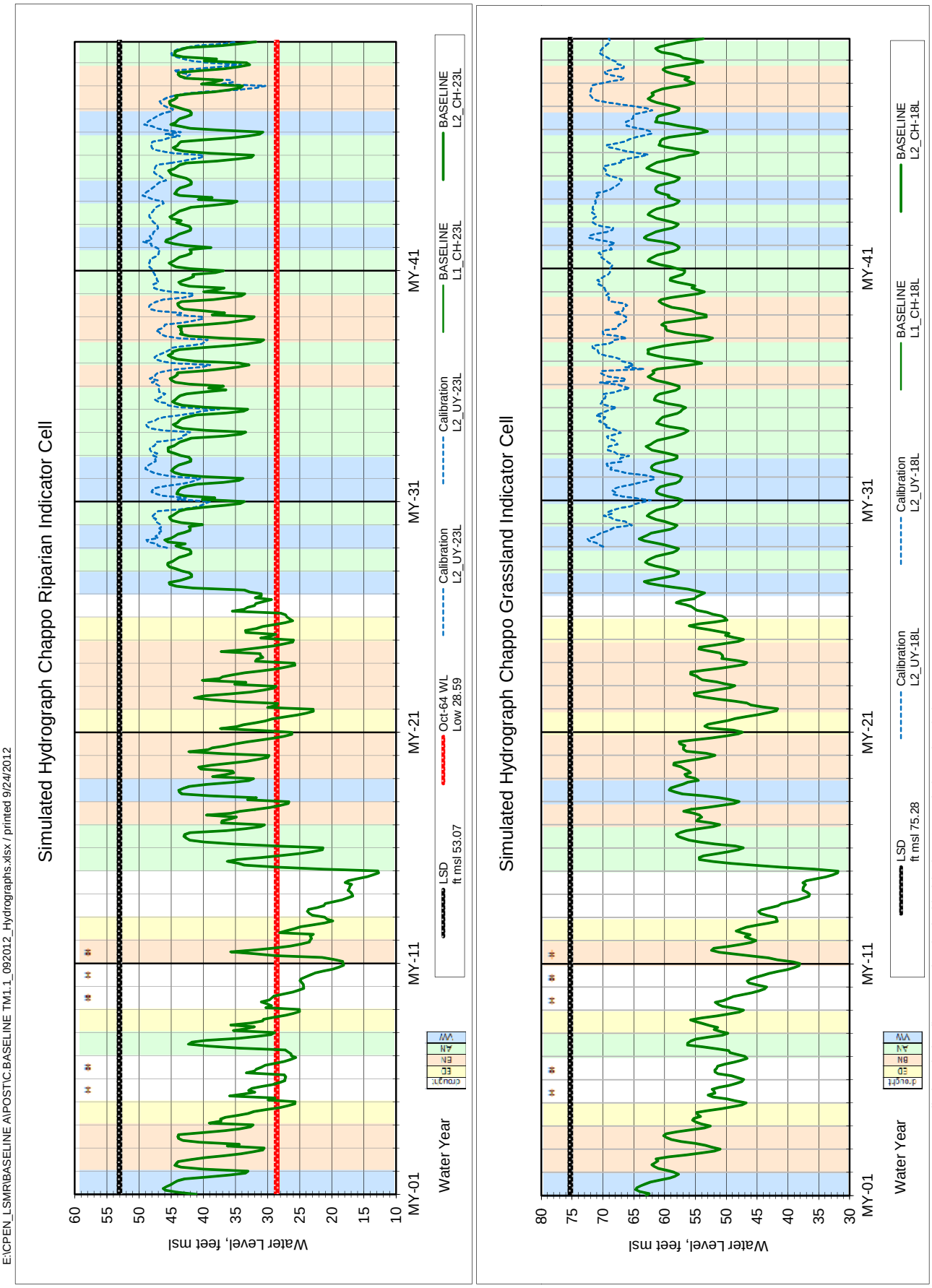
Month	CH 10/4-18E3 (af/m)	CH 10/4-18M5 (af/m)	CH 10/5-13R2 (af/m)	CH 10/5-23G4 (af/m)	CH 10/5-23J1 (af/m)	CH 10/5-23K2R (af/m)	CH 10/5-23K3 (af/m)
Oct	55	60	55	56	62	37	55
Nov	47	51	47	48	53	32	47
Dec	39	42	39	40	44	26	39
Jan	41	45	41	42	46	28	41
Feb	37	40	37	38	42	25	37
Mar	51	56	51	53	58	35	51
Apr	52	57	52	54	59	36	52
May	57	62	57	58	64	39	57
Jun	66	72	66	68	75	45	66
Jul	75	82	75	77	85	51	75
Aug	72	79	72	74	82	49	72
Sep	67	73	67	69	76	46	67
Annual Total	658	718	658	676	748	449	658

FIGURE 1 Baseline (TM1.1 strflw) and Calibration Hydrographs
2-Party Negotiation Model Run; 8,400 Average Annual AFY



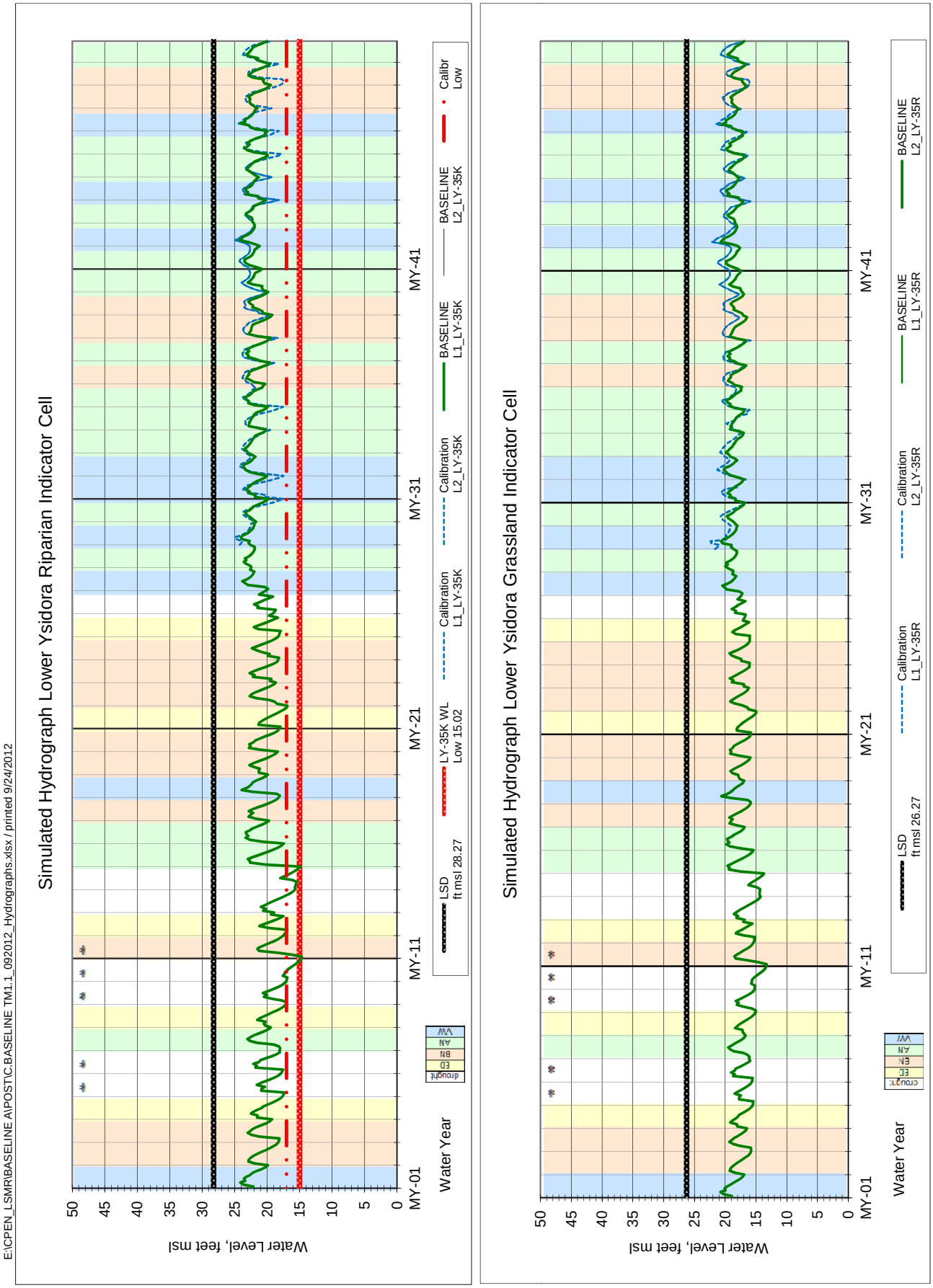
Emergency CWRMA Water called on during five years (marked with *) in the 50-year balanced period
Layer 1 (L1) and Layer 2 (L2) simulated groundwater levels are at similar elevations and the graph lines are printed on top of each other.

FIGURE 2 Baseline (TM1.1 strflw) and Calibration Hydrographs
2-Party Negotiation Model Run; 8,400 Average Annual AFY



Emergency CWRMA Water called on during five years (marked with *) in the 50-year balanced period.
Layer 1 (L1) and Layer 2 (L2) simulated groundwater levels are at similar elevations and the graph lines are printed on top of each other.

FIGURE 3 Baseline (TM1.1 strflw) and Calibration Hydrographs
2-Party Negotiation Model Run; 8,400 Average Annual AFY



Emergency CWRMA Water called on during five years (marked with *) in the 50-year balanced period.
Layer 1 (L1) and Layer 2 (L2) simulated groundwater levels are at similar elevations and the graph lines are printed on top of each other.

FIGURE 4 Baseline and Calibration Streamflow
2-Party Negotiation Model Run; Baseline 8,400 Average Annual AFY

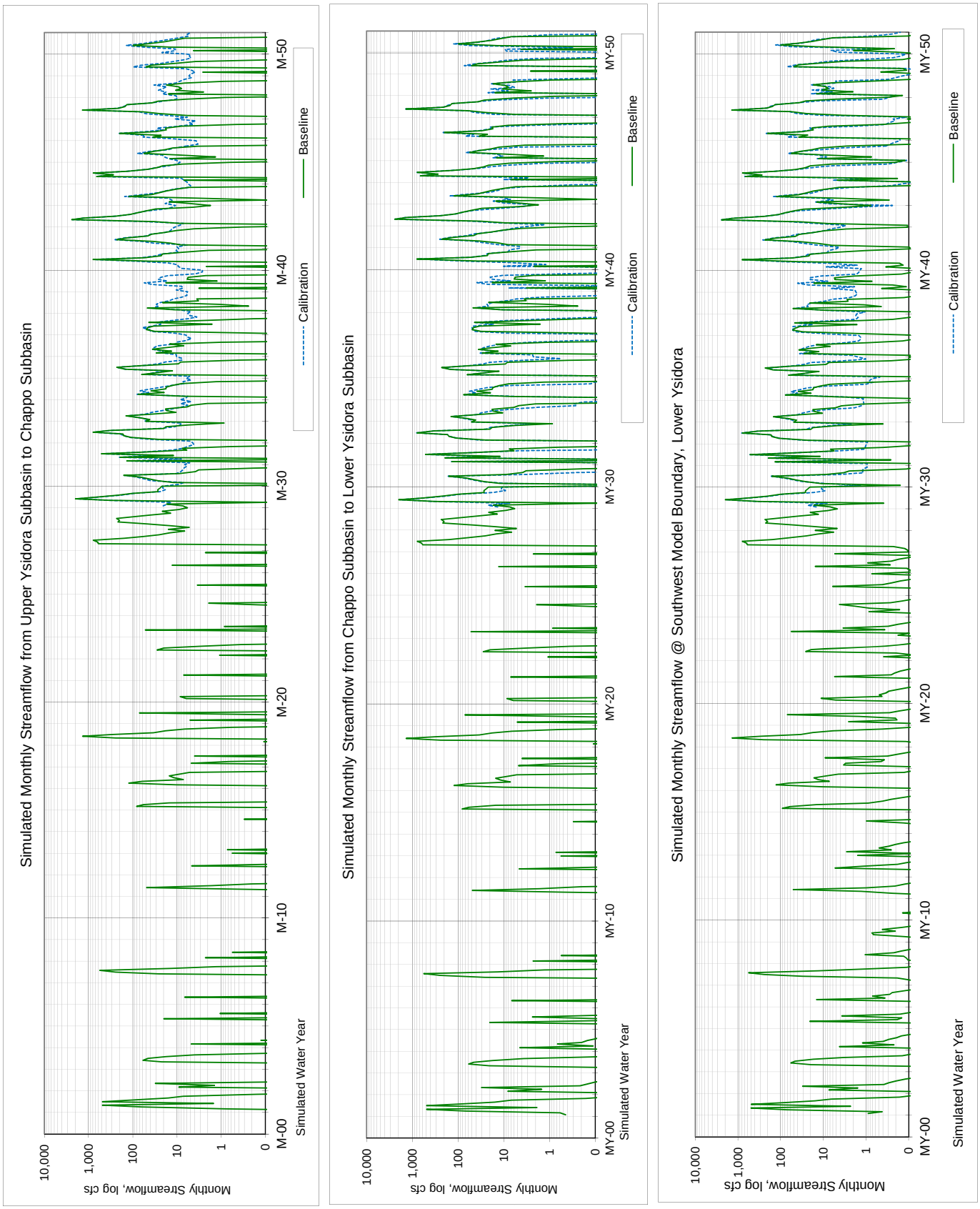


TABLE 4 2-Party Negotiation Baseline Model Run; 8,400 Average Annual AFY

Average Hydrologic Condition Water Budget (af/y)

% Time Exceedence	*> 76%*	*76% to 50%*	*50% to 19%*	*< 19%*
# Years	*12*	*14*	*15*	*9*
	Very & Extrm Dry	Below Normal	Above Normal	Very Wet
Inflow:				
Santa Margarita River Inflow	5,500	11,600	32,800	132,900
Subsurface Underflow	600	600	600	600
Lake O'Neill Spill and Release	700	1,400	1,700	2,100
Fallbrook Creek	100	400	1,400	3,800
Title 22 Water	0	0	0	0
Minor Tributary Drainages	1,600	1,500	2,400	4,900
Areal Precipitation	500	400	700	1,600
Total Inflow:	9,000	15,900	39,600	145,900
Outflow:				
Santa Margarita River Outflow	500	3,800	24,800	130,000
Subsurface Underflow	0	100	100	100
Groundwater Pumping	7,400	8,700	8,600	8,700
Evapotranspiration	1,300	2,400	3,000	3,300
Diversions to Lake O'Neill	900	1,800	2,300	2,700
Total Outflow:	10,100	16,800	38,800	144,800
Net Simulated Change of Groundwater in Storage:	-1,100	-700	700	1,100
	-	(200)	100	-

Median Hydrologic Condition Water Budget (af/y)

% Time Exceedence	*> 76%*	*76% to 50%*	*50% to 19%*	*< 19%*
# Years	*12*	*14*	*15*	*9*
	Very & Extrm Dry	Below Normal	Above Normal	Very Wet
Inflow:				
Santa Margarita River Inflow	5,800	12,300	26,700	121,300
Subsurface Underflow	600	600	600	600
Lake O'Neill Spill and Release	800	1,300	2,000	2,300
Fallbrook Creek	100	300	1,100	3,500
Title 22 Water	0	0	0	0
Minor Tributary Drainages	1,500	1,400	2,500	4,700
Areal Precipitation	400	300	500	1,600
Outflow:				
Santa Margarita River Outflow	400	3,400	19,600	117,300
Subsurface Underflow	0	100	100	100
Groundwater Pumping	7,100	8,800	8,800	8,800
Evapotranspiration	1,300	2,400	3,100	3,300
Diversions to Lake O'Neill	900	1,700	2,500	2,700
Net Simulated Change of Groundwater in Storage:	-1,400	-1,200	300	900

Average Subbasin Water Budget (af/y)

	Upper Ysidora	Chappo	Lower Ysidora	SMR Basin	
Inflow:					
Santa Margarita River Inflow	38,300	34,800	31,400	38,300	85%
Subsurface Underflow *	600	1,200	400	600	1%
Lake O'Neill Spill and Release	1,500	-	-	1,500	3%
Fallbrook Creek	1,200	-	-	1,200	3%
Title 22 Water	-	-	0	0	0%
Minor Tributary Drainages	600	1,100	700	2,400	5%
Areal Precipitation	200	300	200	800	2%
Total Inflow:	42,400	37,400	32,700	44,800	
Outflow:					
Santa Margarita River Outflow	34,800	31,400	32,000	32,000	71%
Subsurface Underflow *	1,200	400	100	100	0%
Groundwater Pumping	3,800	4,600	0	8,400	19%
Evapotranspiration *	700	1,100	700	2,500	6%
Diversions to Lake O'Neill	1,900	-	-	1,900	4%
Total Outflow:	42,400	37,500	32,800	44,900	
Net Simulated Change of Groundwater in Storage: *	0	0	0	-100	
	-	(100)	(100)	-	

Note: * Subbasin Averages are based on the last rate of the stress period
Values are rounded to the nearest 100 acre-feet, which may result in a summation rounding error

Median Subbasin Water Budget (af/y)

	Upper Ysidora	Chappo	Lower Ysidora	SMR Basin
Inflow:				
Santa Margarita River Inflow	16,700	11,400	7,900	16,700
Subsurface Underflow *	600	1,100	400	600
Lake O'Neill Spill and Release	1,500	-	-	1,500
Fallbrook Creek	600	-	-	600
Title 22 Water	-	-	-	0
Minor Tributary Drainages	600	900	600	2,100
Areal Precipitation	200	200	200	500
Outflow:				
Santa Margarita River Outflow	11,400	7,900	7,800	7,800
Subsurface Underflow *	1,100	400	100	100
Groundwater Pumping	3,600	4,800	0	8,800
Evapotranspiration *	800	1,200	800	2,700
Diversions to Lake O'Neill	2,000	-	-	2,000
Net Simulated Change of Groundwater in Storage: *	-100	-200	0	0

Note: The sum of median values does not reflect the change of groundwater in storage.
Median values are not cummulative.
* Subbasin Medians are based on the last rate of the stress period
Values are rounded to the nearest 100 acre-feet

TABLE 5 Baseline Run Annual Water Budget Summary												
Lower Santa Margarita River Groundwater Model								Baseline w TM1.1strflw 092012				
Modflow Volumetric Budget Output and Streamflow								9/21/12				
Annual Surface Water Budget												
							GAGE					LSMR
MY		SMR Flow In	LON Diversion	Ponds Diversion	Release & Spill	Str Gain+ / Loss-	SMR @ UY->CH	Str Gain+ / Loss-	SMR @ CH->LY	Str Gain+ / Loss-	SMR Flow Out	Str Gain+ / Loss-
1	VW	72,916	-2754	-6575	1,399	-2,030	70,886	-1,500	69,386	1,655	71,041	-1,875
2	BN	9,851	-1646	-3545	1,552	-3,969	5,882	-3,374	2,508	-26	2,482	-7,369
3	AN	19,081	-1468	-5437	1,058	-6,424	12,657	-3,957	8,701	-228	8,472	-10,609
4	VD	6,075	-1440	-2315	1,120	-5,014	1,061	-773	288	125	413	-5,662
5	ED	6,672	-908	-1410	971	-4,415	2,256	-979	1,277	270	1,547	-5,124
6	ED	4,277	-710	-1593	387	-4,214	63	348	411	596	1,007	-3,270
7	AN	59,305	-1596	-6986	383	-5,915	53,390	-2,832	50,558	479	51,037	-8,267
8	VD	6,521	-1361	-2683	1,217	-4,409	2,112	-1,946	166	-47	119	-6,402
9	ED	4,099	-1013	-1048	1,016	-3,401	697	-694	3	150	152	-3,946
10	ED	4,629	-848	-1609	519	-4,534	94	-94	-	33	33	-4,595
11	BN	11,484	-902	-5045	501	-6,308	5,176	-2,340	2,836	157	2,993	-8,491
12	VD	5,622	-580	-2104	434	-5,012	610	-318	292	208	499	-5,123
13	ED	3,321	-573	-1160	285	-3,321	-	43	43	226	269	-3,052
14	ED	3,589	-300	-1583	234	-3,589	-	18	18	71	89	-3,500
15	AN	20,522	-2438	-5035	551	-8,303	12,220	-2,957	9,262	897	10,159	-10,363
16	AN	22,816	-1985	-6917	1,558	-3,995	18,821	-4,087	14,734	732	15,466	-7,350
17	BN	6,199	-1426	-2565	1,196	-4,187	2,012	-1,444	568	472	1,040	-5,159
18	VW	117,031	-2248	-7919	1,642	-2,455	114,576	-2,849	111,726	1,314	113,040	-3,990
19	BN	12,744	-2305	-3811	1,680	-5,063	7,680	-3,051	4,629	-51	4,578	-8,166
20	BN	6,645	-1257	-2416	1,190	-4,280	2,364	-1,476	889	225	1,114	-5,531
21	VD	7,214	-1614	-1401	1,009	-5,407	1,807	-1,374	433	-40	393	-6,821
22	BN	13,310	-1576	-6098	1,206	-6,514	6,796	-3,761	3,035	-201	2,835	-10,475
23	BN	9,953	-1385	-2536	1,037	-5,504	4,449	-1,223	3,226	512	3,738	-6,215
24	BN	7,708	-1613	-3881	1,115	-5,725	1,984	-1,861	123	388	511	-7,197
25	VD	7,560	-797	-3217	1,010	-5,607	1,953	-1,754	199	268	467	-7,093
26	ED	6,746	-1217	-2413	576	-4,661	2,085	-1,157	928	476	1,404	-5,342
27	VW	138,265	-2906	-8290	2,063	-220	138,046	-2,391	135,654	1,827	137,481	-784
28	AN	61,252	-2721	-11307	2,352	-2,734	58,519	-4,627	53,891	323	54,215	-7,038
29	VW	195,725	-2739	-11207	2,413	1,176	196,901	-2,302	194,599	1,704	196,304	578
30	AN	27,995	-2749	-5856	2,126	-3,796	24,199	-4,619	19,580	-27	19,553	-8,442
31	AN	61,581	-2697	-5904	2,204	-1,738	59,842	-4,022	55,820	458	56,278	-5,302
32	VW	105,365	-2720	-8572	2,385	268	105,632	-4,111	101,521	736	102,258	-3,107
33	AN	28,766	-2714	-8555	2,173	-3,529	25,238	-4,155	21,082	191	21,273	-7,493
34	AN	21,480	-2702	-7839	2,094	-4,538	16,942	-5,111	11,831	-232	11,599	-9,881
35	AN	38,995	-2197	-7066	1,812	-1,512	37,483	-4,444	33,039	445	33,483	-5,512
36	BN	13,900	-2115	-4177	1,524	-3,343	10,557	-3,405	7,152	3	7,155	-6,745
37	AN	18,856	-1744	-5158	1,293	-2,851	16,004	-3,371	12,633	413	13,047	-5,809
38	BN	12,534	-1767	-4681	1,311	-3,453	9,080	-3,746	5,334	82	5,416	-7,118
39	BN	12,024	-2156	-5634	1,717	-5,858	6,166	-4,086	2,080	-277	1,803	-10,221
40	VW	66,151	-2779	-7721	2,318	-3,995	62,155	-4,729	57,427	61	57,488	-8,663
41	AN	40,738	-2711	-8745	2,263	-3,800	36,938	-5,082	31,855	86	31,941	-8,797
42	VW	256,836	-2723	-10492	2,325	1,608	258,444	-2,932	255,512	994	256,506	-330
43	AN	23,081	-2752	-10335	2,268	-4,354	18,727	-4,644	14,084	24	14,107	-8,974
44	VW	122,236	-2675	-9801	2,233	-930	121,305	-3,624	117,681	1,001	118,682	-3,553
45	BN	17,853	-2748	-9355	2,043	-4,544	13,309	-4,337	8,972	-177	8,795	-9,058
46	AN	26,690	-1995	-7991	1,461	-3,483	23,208	-3,232	19,975	496	20,472	-6,218
47	VW	121,259	-2716	-9884	2,559	-781	120,477	-4,230	116,247	1,080	117,327	-3,932
48	BN	13,194	-2744	-7175	2,078	-4,938	8,257	-4,024	4,233	-151	4,082	-9,112
49	BN	15,504	-1815	-5717	1,199	-5,757	9,746	-3,440	6,306	-229	6,077	-9,427
50	AN	20,633	-2478	-7882	2,028	-5,489	15,144	-4,015	11,129	9	11,139	-9,495
	avg	38,336	-1,920	-5,613	1,462	**-3,857**	34,479	**-2,801**	31,678	**350**	32,028	**-6,308**
	med	16,678	-1,990	-5,676	1,430	-4,200	11,388	-3,142	7,926	216	7,814	-6,574
AVERAGES												
VD/ED	12	5,527	-947	-1,878	731	-4,465	1,062	-723	338	195	533	-4,994
BN	14	11,636	-1,818	-4,760	1,382	-4,960	6,676	-2,969	3,706	52	3,758	-7,877
AN	15	32,786	-2,330	-7,401	1,708	-4,164	28,622	-4,077	24,545	271	24,816	-7,970
VW	9	132,865	-2,696	-8,940	2,149	-818	132,047	-3,185	128,862	1,152	130,014	-2,851
	50											
MEDIANS												
VD/ED	12	5,849	-878	-1,601	774	-4,475	879	-734	244	179	403	-5,123
BN	14	12,279	-1,706	-4,429	1,258	-5,001	6,481	-3,389	3,131	(12)	3,366	-7,767
AN	15	26,690	-2,478	-7,066	2,028	-3,800	23,208	-4,087	19,580	323	19,553	-8,267
VW	9	121,259	-2,723	-8,572	2,318	-781	120,477	-2,932	116,247	1,080	117,327	-3,107
	50											

TABLE 5 Baseline Run Annual Water Budget Summary (continued)

Lower Santa Margarita River Groundwater Model

Modflow Volumetric Budget Output

Annual Groundwater Budget Model Run: Baseline w TM1.1strflw 092012

	INFLOW:					OUTFLOW:					
MY	Storage	Recharge	Stream Leakance	GHB	TOTAL GW IN	Storage	Wells	ET	Stream Leakance	GHB	TOTAL GW OUT
1	5,164	7,622	6,809	603	20,199	3,165	8,800	3,366	4,819	67	20,217
2	5,332	3,729	5,833	604	15,498	2,899	8,800	2,526	1,236	50	15,511
3	5,481	5,637	8,434	609	20,160	6,492	8,800	2,519	2,315	48	20,174
4	5,757	2,598	4,810	608	13,773	3,329	8,349	1,712	343	51	13,784
5	4,657	1,708	6,361	618	13,344	4,682	7,107	1,440	79	45	13,353
6	4,364	2,323	4,741	615	12,043	4,075	6,336	1,400	197	52	12,059
7	4,752	7,578	8,111	606	21,047	7,452	7,599	2,247	3,702	56	21,056
8	5,976	2,831	4,814	607	14,227	3,570	8,349	1,637	650	44	14,250
9	3,960	1,398	4,793	619	10,770	2,404	7,110	1,149	77	47	10,786
10	3,517	1,724	3,092	625	8,959	1,756	6,336	814	37	31	8,974
11	5,822	5,500	7,893	612	19,827	8,843	7,596	1,452	1,906	42	19,839
12	5,262	2,376	5,769	621	14,028	4,357	8,349	1,183	110	43	14,042
13	4,679	1,393	3,180	627	9,879	1,687	7,110	944	107	48	9,896
14	3,687	1,905	3,212	650	9,454	2,392	6,336	674	36	34	9,471
15	4,663	6,067	10,615	612	21,957	10,863	7,596	1,703	1,756	53	21,972
16	4,920	7,514	9,718	598	22,750	6,986	8,802	2,668	4,246	57	22,758
17	5,767	2,874	5,891	607	15,138	3,669	8,799	1,988	640	53	15,149
18	4,885	9,098	9,513	599	24,096	7,753	8,799	2,713	4,789	59	24,114
19	5,418	3,992	6,258	603	16,271	3,749	8,799	2,298	1,396	50	16,292
20	6,182	2,780	5,797	610	15,369	4,203	8,799	1,866	461	52	15,383
21	5,682	1,680	5,760	629	13,751	4,059	8,349	1,237	80	44	13,770
22	6,139	6,437	8,354	607	21,537	8,728	8,372	1,947	2,452	50	21,550
23	5,914	2,987	6,798	618	16,316	5,354	8,799	1,758	376	51	16,339
24	5,450	4,318	6,726	607	17,101	5,606	8,799	1,697	957	53	17,112
25	5,083	3,788	7,328	614	16,813	6,224	8,349	1,547	657	51	16,828
26	4,038	2,826	6,520	607	13,991	4,580	7,107	1,765	496	55	14,003
27	3,818	9,490	9,307	598	23,213	6,784	7,599	3,081	5,696	65	23,224
28	3,763	11,685	7,844	591	23,883	3,730	8,799	3,515	7,787	59	23,890
29	3,829	12,229	7,661	589	24,308	3,898	8,790	3,590	7,966	66	24,311
30	3,861	6,072	7,583	599	18,115	2,764	8,815	3,239	3,262	54	18,135
31	3,914	6,329	8,310	598	19,152	3,988	8,792	3,065	3,258	57	19,159
32	3,910	9,307	8,928	593	22,738	4,858	8,792	3,333	5,698	63	22,744
33	4,548	8,751	7,241	597	21,136	3,398	8,815	3,324	5,565	56	21,158
34	4,343	8,056	8,391	599	21,388	4,378	8,792	3,065	5,110	53	21,398
35	3,910	7,477	8,609	597	20,593	4,504	8,792	3,147	4,102	57	20,604
36	5,257	4,421	6,680	602	16,961	3,111	8,815	2,913	2,096	56	16,991
37	4,545	5,553	8,173	602	18,874	4,949	8,792	2,918	2,142	58	18,859
38	5,230	4,920	7,668	604	18,420	4,617	8,792	2,670	2,282	52	18,413
39	5,266	5,808	7,759	606	19,440	5,585	8,815	2,709	2,307	53	19,470
40	3,845	7,920	9,091	608	21,465	5,904	8,792	2,899	3,813	52	21,462
41	3,673	9,086	8,701	599	22,059	4,020	8,792	3,365	5,829	56	22,063
42	4,132	11,361	7,805	590	23,889	4,300	8,815	3,471	7,247	62	23,895
43	4,222	10,491	7,254	595	22,562	3,510	8,792	3,379	6,839	53	22,574
44	3,955	10,468	8,310	592	23,326	4,614	8,792	3,301	6,591	58	23,357
45	5,409	9,504	6,428	597	21,938	3,643	8,815	3,209	6,240	53	21,961
46	5,406	8,379	7,553	597	21,935	5,112	8,792	2,899	5,083	57	21,944
47	3,563	10,836	9,435	590	24,424	5,650	8,792	3,269	6,630	65	24,407
48	4,669	7,346	6,405	597	19,017	2,824	8,815	3,157	4,190	54	19,039
49	5,923	5,854	6,635	606	19,017	5,149	8,792	2,617	2,440	49	19,048
50	5,142	8,219	7,920	599	21,880	5,785	8,792	2,879	4,364	54	21,875
avg	4,774	6,045	7,136	606	18,561	4,719	8,367	2,425	3,009	53	18,573
med	4,715	5,961	7,440	604	19,296	4,368	8,792	2,669	2,378	53	19,314
AVERAGES											
VD/ED	4,722	2,213	5,032	620	12,586	3,593	7,432	1,292	239	45	12,601
BN	5,556	5,034	6,795	606	17,989	4,856	8,687	2,343	2,070	51	18,007
AN	4,476	7,793	8,297	600	21,166	5,195	8,638	2,929	4,357	55	21,175
VW	4,122	9,815	8,540	596	23,073	5,214	8,664	3,225	5,917	62	23,081
MEDIANS											
VD/ED	4,668	2,114	4,812	618	13,548	3,814	7,110	1,319	109	46	13,561
BN	5,434	4,671	6,657	606	17,761	4,410	8,799	2,412	2,001	52	17,763
AN	4,545	7,578	8,173	599	21,388	4,504	8,792	3,065	4,246	56	21,398
VW	3,910	9,490	8,928	593	23,326	4,858	8,792	3,301	5,698	63	23,357

TABLE 5 Baseline Run Annual Water Budget Summary (continued)

Lower Santa Margarita River Groundwater Model

Modflow Volumetric Budget Output

Annual Groundwater Budget

MY	NET Storage	NET Str Lknc	In-Out	% bal
1	-2,000	1,990	-18.3	-0.09%
2	-2,433	4,597	-13.0	-0.08%
3	1,011	6,119	-13.5	-0.07%
4	-2,427	4,467	-11.1	-0.08%
5	25	6,283	-8.8	-0.07%
6	-289	4,544	-15.6	-0.13%
7	2,700	4,408	-9.5	-0.05%
8	-2,406	4,164	-22.5	-0.16%
9	-1,556	4,716	-15.5	-0.14%
10	-1,761	3,056	-14.9	-0.17%
11	3,021	5,987	-11.8	-0.06%
12	-904	5,659	-14.8	-0.11%
13	-2,991	3,073	-17.1	-0.17%
14	-1,295	3,176	-17.2	-0.18%
15	6,201	8,860	-14.8	-0.07%
16	2,066	5,471	-8.4	-0.04%
17	-2,098	5,251	-10.9	-0.07%
18	2,867	4,724	-18.2	-0.08%
19	-1,669	4,862	-20.8	-0.13%
20	-1,979	5,335	-14.0	-0.09%
21	-1,623	5,680	-18.6	-0.14%
22	2,590	5,902	-12.4	-0.06%
23	-560	6,421	-22.3	-0.14%
24	156	5,769	-11.2	-0.07%
25	1,141	6,671	-15.6	-0.09%
26	542	6,024	-12.4	-0.09%
27	2,966	3,611	-11.4	-0.05%
28	-32	57	-7.6	-0.03%
29	69	-305	-2.7	-0.01%
30	-1,097	4,320	-20.4	-0.11%
31	73	5,053	-6.9	-0.04%
32	948	3,230	-6.6	-0.03%
33	-1,150	1,676	-21.5	-0.10%
34	34	3,281	-9.7	-0.05%
35	595	4,506	-11.3	-0.05%
36	-2,146	4,584	-30.4	-0.18%
37	404	6,031	14.5	0.08%
38	-613	5,386	7.5	0.04%
39	319	5,452	-29.8	-0.15%
40	2,059	5,278	3.0	0.01%
41	347	2,872	-3.7	-0.02%
42	168	558	-6.5	-0.03%
43	-712	416	-11.7	-0.05%
44	659	1,719	-30.8	-0.13%
45	-1,765	188	-23.4	-0.11%
46	-294	2,470	-9.2	-0.04%
47	2,087	2,805	17.2	0.07%
48	-1,846	2,215	-21.8	-0.11%
49	-774	4,194	-30.5	-0.16%
50	643	3,556	5.5	0.03%
avg	-55	4,127	-12.6	-0.08%
med	-4	4,525	-12.7	-0.07%
AVERAGES				
VD/ED	(1,129)	4,793	(15)	(0)
BN	(700)	4,725	(17)	(0)
AN	719	3,940	(9)	(0)
VW	1,091	2,623	(8)	(0)
MEDIANS				
VD/ED	(1,426)	4,630	(16)	(0)
BN	(1,221)	5,293	(17)	(0)
AN	347	4,320	(10)	(0)
VW	948	2,805	(7)	(0)

TABLE 6 Baseline Run Average Monthly Water Budget Summary

Lower Santa Margarita River Groundwater Model

Modflow Volumetric Budget Output and Streamflow

Baseline w TM1.1strflw 092012

9/21/12

Atreamflow

Avg AF/M	SMR Flow In	Diversion	Str Gain+ / Loss-	SMR @ UY->CH	Str Gain+ / Loss-	SMR @ CH->LY	Str Gain+ / Loss-	SMR Flow Out	LSMR Str Gain+ / Loss-
Oct	502	292	-320	182	-110	73	5	78	-425
Nov	1,072	491	261	1,333	-545	787	-26	761	-311
Dec	1,833	526	-550	1,283	-178	1,105	49	1,154	-679
Jan	8,239	834	-740	7,499	-123	7,376	138	7,515	-725
Feb	10,610	1,433	-956	9,654	-159	9,495	106	9,601	-1,009
Mar	9,203	1,477	-543	8,660	-255	8,406	93	8,499	-704
Apr	3,354	1,033	-256	3,097	-321	2,777	30	2,807	-547
May	1,387	705	-175	1,212	-342	870	-12	858	-530
Jun	727	505	-72	655	-279	375	-16	359	-368
Jul	494	128	-68	426	-211	215	-11	204	-291
Aug	421	61	-195	226	-143	82	-5	78	-344
Sep	493	49	-241	251	-135	116	-2	114	-379
Avg Monthly	3,195	628	-321	2,873	-233	2,640	29	2,669	-526
Med Monthly	1,230	516	-249	1,248	-195	829	1	810	-477
Avg Total=Anl	38,336	7,533	-3,857	34,479	-2,801	31,678	350	32,028	-6,308

Lower Santa Margarita River Groundwater Model

Modflow Volumetric Budget Output

Groundwater Model

	INFLOW:					**OUTFLOW:**						OUT-IN	OUT-IN		
Avg AF/M	Storage	Recharge	Stream Leakance	GHB	TOTAL IN	Storage	Wells	ET	Stream Leakance	GHB	TOTAL OUT	NET Storage	NET Str Lknc	In-Out	% bal
Oct	451	31	377	53	912	73	695	129	13	4	914	-379	364	-1.8	-0.19%
Nov	64	459	1,201	51	1,774	1,041	593	99	36	4	1,773	977	1,165	1.4	0.08%
Dec	259	137	665	52	1,112	466	494	90	58	6	1,113	207	607	-0.6	-0.05%
Jan	102	362	909	51	1,423	699	518	107	88	6	1,419	598	821	4.1	0.29%
Feb	72	1,351	717	46	2,186	1,262	468	146	305	6	2,186	1,190	412	-0.3	-0.01%
Mar	97	1,537	665	50	2,350	772	652	220	699	6	2,349	675	-33	1.0	0.04%
Apr	263	1,068	566	49	1,945	275	663	269	733	5	1,945	12	-168	0.3	0.01%
May	425	754	473	50	1,702	69	721	316	593	4	1,703	-355	-120	-1.4	-0.08%
Jun	765	264	403	49	1,481	10	840	311	322	3	1,486	-755	81	-5.6	-0.38%
Jul	890	64	368	51	1,373	2	956	298	119	3	1,378	-888	250	-4.1	-0.30%
Aug	782	10	370	52	1,214	14	916	253	32	3	1,218	-768	338	-3.9	-0.32%
Sep	604	9	424	51	1,088	35	852	187	13	3	1,090	-569	411	-1.6	-0.15%
Avg Monthly	398	504	595	50	1,547	393	697	202	251	4	1,548	-5	344	-1.1	-0.09%
Med Monthly	344	313	519	51	1,452	174	679	204	103	4	1,453	-172	351	-1.0	-0.07%
Avg Total=Anl	4,774	6,045	7,136	606	18,561	4,719	8,367	2,425	3,009	53	18,573	-55	4,127	-12.6	

Attachment 2

Alternative 1: Lower Santa Margarita River Surface and Groundwater Model

TABLE 1 Run 16b Annual Pumping Summary
LOWER SANTA MARGARITA RIVER GROUNDWATER MODEL

Hydrologic Condition

HC	Cnt	Oct to Apr Strflw
VW	9	Very Wet > 58,032
AN	15	Above Normal > 15,957
BN	14	Below Normal < 15,957
VD	5	Very Dry < 5,781
ED	7	Extremely Dry (2nd+ VD)

10,800 AFY 50-Year Average Annual Production, May through April

			GW Production			Water Allocation			
Model Year	HC	Oct-Apr HC descrip	UY Total af/WY	CH Total af/WY	LSMR Total af/WY	CPEN af/WY	FPUD af/WY	Additional Water af/WY	CWRMA Emergency Water af/WY
1	VW	Very Wet	8,644	4,958	13,602	7,822	*5,780*	-	-
2	BN	Below Normal	7,546	3,976	11,522	*7,702*	*3,820*	-	-
3	BN	Below Normal	5,333	3,269	8,602	*7,642*	*960*	-	-
4	VD	Very Dry	4,482	2,747	7,230	*6,730*	*500*	-	-
5	ED	Extremely Dry	3,484	2,136	5,620	*5,359*	*261*	-	603
6	ED	Extremely Dry	3,152	1,932	5,084	*5,084*	-	-	400
7	AN	Above Normal	5,655	3,515	9,170	*6,450*	*2,720*	-	-
8	VD	Very Dry	5,919	3,033	8,952	*6,730*	*2,223*	-	-
9	ED	Extremely Dry	3,285	2,014	5,299	*5,299*	-	-	600
10	ED	Extremely Dry	3,115	1,909	5,024	*5,024*	-	-	2,055
11	BN	Below Normal	4,092	2,508	6,600	*6,450*	*150*	-	591
12	VD	Very Dry	4,575	2,804	7,380	*6,730*	*650*	-	-
13	ED	Extremely Dry	3,411	2,090	5,501	*5,239*	*263*	-	-
14	ED	Extremely Dry	2,867	1,757	4,624	*4,624*	-	-	-
15	AN	Above Normal	5,392	3,358	8,750	*6,350*	*2,400*	-	-
16	AN	Above Normal	8,529	4,793	13,322	*7,722*	*5,600*	-	-
17	BN	Below Normal	6,443	3,384	9,827	*7,517*	*2,310*	-	-
18	VW	Very Wet	7,933	5,496	13,430	*7,582*	*5,848*	-	-
19	BN	Below Normal	7,463	3,949	11,412	*7,532*	*3,880*	-	-
20	BN	Below Normal	5,501	3,371	8,872	*7,617*	*1,255*	-	-
21	VD	Very Dry	4,442	2,723	7,165	*6,415*	*750*	-	-
22	BN	Below Normal	4,646	2,848	7,494	*6,614*	*880*	-	-
23	BN	Below Normal	5,656	3,466	9,122	7,822	*1,300*	-	-
24	BN	Below Normal	5,625	3,447	9,072	*7,772*	*1,300*	-	-
25	VD	Very Dry	4,684	2,871	7,555	*6,630*	*925*	-	-
26	ED	Extremely Dry	3,682	2,257	5,939	*5,359*	*580*	-	-
27	VW	Very Wet	7,510	5,980	13,490	*6,450*	*4,046*	*2,994*	-
28	AN	Above Normal	9,305	5,817	15,122	7,822	*5,980*	*1,320*	-
29	VW	Very Wet	8,838	6,814	15,652	7,822	*5,460*	*2,370*	-
30	AN	Above Normal	9,155	5,647	14,802	7,822	*5,980*	*1,000*	-
31	AN	Above Normal	8,705	4,877	13,582	7,822	*5,120*	*640*	-
32	VW	Very Wet	8,774	6,583	15,357	7,822	*5,460*	*2,075*	-
33	AN	Above Normal	9,401	5,881	15,282	7,822	*5,980*	*1,480*	-
34	AN	Above Normal	8,413	4,689	13,102	7,822	*5,120*	*160*	-
35	AN	Above Normal	8,488	4,934	13,422	7,822	*5,120*	*480*	-
36	BN	Below Normal	7,120	3,722	10,842	7,822	*3,020*	-	-
37	AN	Above Normal	7,027	4,675	11,702	7,822	*3,400*	*480*	-
38	BN	Below Normal	7,120	3,722	10,842	7,822	*3,020*	-	-
39	BN	Below Normal	5,656	3,466	9,122	7,822	*1,300*	-	-
40	VW	Very Wet	7,432	6,250	13,682	7,822	*3,740*	*2,120*	-
41	AN	Above Normal	9,236	6,316	15,552	7,822	*5,980*	*1,750*	-
42	VW	Very Wet	8,866	6,976	15,842	7,822	*5,460*	*2,560*	-
43	AN	Above Normal	9,155	5,757	14,912	7,822	*5,980*	*1,110*	-
44	VW	Very Wet	8,838	6,704	15,542	7,822	*5,460*	*2,260*	-
45	AN	Above Normal	9,145	5,337	14,482	7,822	*5,980*	*680*	-
46	AN	Above Normal	8,705	5,037	13,742	7,822	*5,120*	*800*	-
47	VW	Very Wet	8,729	6,763	15,492	7,822	*5,460*	*2,210*	-
48	BN	Below Normal	7,658	4,044	11,702	7,822	*3,880*	-	-
49	BN	Below Normal	5,656	3,466	9,122	7,822	*1,300*	-	-
50	AN	Above Normal	7,027	4,515	11,542	7,822	*3,400*	*320*	-
		Min	2,867	1,757	4,624	4,624	-	-	-
		Max	9,401	6,976	15,842	7,822	5,980	2,994	2,055
		Median	7,074	3,835	11,127	7,797	3,210	-	-
		Average	6,630	4,172	10,802	7,163	3,102	536	85

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TABLE 1 Run 16b Annual Pumping Summary
LOWER SANTA MARGARITA RIVER GROUNDWATER MODEL

Average Annual Pumping

	Yearly Count	UY Total af/WY	CH Total af/WY	LSMR Total af/WY	CPEN af/WY	FPUD af/WY	Additional Water af/WY	CWRMA Emergency Water af/WY
VW	9	8,396	6,281	14,676	7,643	*5,190*	*1,843*	-
AN	15	8,223	5,010	13,232	7,626	*4,925*	*681*	-
BN	14	6,108	3,474	9,582	7,556	*2,027*	-	*42*
VD	5	4,820	2,836	7,656	6,647	*1,010*	-	-
ED	7	3,285	2,014	5,299	5,141	*158*	-	*523*

Average Monthly Pumping

%	Month	UY Total af/m	CH Total af/m	LSMR Total af/m	CPEN af/m	FPUD af/m	Additional Water af/m	CWRMA Emergency Water af/m
7.7%	Oct	523	304	827	614	*168*	45	16
6.9%	Nov	474	267	742	524	*177*	41	20
6.6%	Dec	469	245	714	473	*238*	3	20
7.3%	Jan	518	274	792	466	*297*	29	2
7.2%	Feb	507	272	780	414	*306*	59	2
8.3%	Mar	564	333	897	511	*311*	75	2
9.1%	Apr	596	388	984	582	*306*	95	2
9.4%	May	585	429	1,014	659	*331*	24	4
9.6%	Jun	597	443	1,040	699	*313*	27	4
10.0%	Jul	620	462	1,082	780	*265*	37	4
9.4%	Aug	609	407	1,016	751	*216*	49	4
8.5%	Sep	568	347	915	691	*175*	50	4
100%	Avg Anl	6,630	4,172	10,802	7,163	3,102	536	85

TABLE 2 Run 16b Pumping Summaries

	Subbasin	Building #	State ID	# mos Q	% of 600 mos		80% Utilization af/m	Potential 100% Yield gpm		
1	UY	2673R	10/4-7A2	600	100%	UY	99	1,000	existing	
2	UY-VOC	26072	10/4-7A3	600	100%	UY-VOC	110	1,000	existing	repair
3	UY	26002	10/4-7R2	600	100%	UY	110	1,000	existing	rehabilitate
4	UY	26018	10/4-18B1	503	84%	UY	99	900	existing	rehabilitate
5	UY	26071	10/4-7H3	412	69%	UY	77	800	existing	
6	UY	uyNEW_1	UY-4A	356	59%	UY	110	1,000	new	
7	UY	uyNEW_2	UY-2A	260	43%	UY	110	1,000	new	
8	UY	uyNEW_3	UY-1B	209	35%	UY	77	700	new	
9	CH	23093	10/4-18E3R	600	100%	CH	93	1,100	existing	
10	CH	330925	10/5-23G7	600	100%	CH	124	1,130	existing	
11	CH	23001	10/5-23J1	600	100%	CH	137	1,250	existing	ES replcmnt
12	CH	R330924	CH-5A	182	30%	CH	82	750	existing	ES replcmnt
13	CH	23063	10/5-13R3	140	23%	CH	110	1,100	existing	rehabilitate
14	CH	23073	10/4-18M5	100	17%	CH	132	1,200	existing	rehabilitate
15	CH	330923	10/5-23K3	43	7%	CH	121	1,100	existing	
16	CH	chNEW_1	CH-1B	14	2%	CH	110	1,000	new	

Well Capacity:	**1,697 af/m**	**16,030 gpm**

% Pumping in Subbasin

		62%	38%	0%	68%	32%	0%
mo	Anl %	UY	CH	LY	UY	CH	LY
MAY	9.1%	5.7%	3.5%	-	6.2%	2.9%	-
JUN	9.7%	6.0%	3.7%	-	6.6%	3.1%	-
JUL	10.8%	6.7%	4.1%	-	7.4%	3.5%	-
AUG	10.5%	6.5%	4.0%	-	7.1%	3.4%	-
SEP	9.7%	6.0%	3.7%	-	6.6%	3.1%	-
OCT	8.7%	5.4%	3.3%	-	5.9%	2.8%	-
NOV	7.4%	4.6%	2.8%	-	5.0%	2.4%	-
DEC	6.6%	4.1%	2.5%	-	4.5%	2.1%	-
JAN	6.5%	4.0%	2.5%	-	4.4%	2.1%	-
FEB	5.8%	3.6%	2.2%	-	3.9%	1.8%	-
MAR	7.1%	4.4%	2.7%	-	4.8%	2.3%	-
APR	8.1%	5.0%	3.1%	-	5.5%	2.6%	-

Max Pumping in Subbasin adding wells as needed

	UY		CH	LY	Total
# exst wells	5	# exst wells	7		(afm)
first 3 wells	318	first 3 wells	354	-	672
+26018	416	+23073	436	-	853
+26071	**493**	+330925	546	-	1,039
+UY-4A	603	+330923	677	-	1,280
+UY-2A	712	+330924	**798**	-	1,510
+UY-1B	789	1 adntl well	908	-	1,697

TABLE 3 Run 16b Annual Pumping by Well
Annual Well Production (AF/Y)

		Building #:	2673R	26072	26002	26018	26071	uyNEW_1	uyNEW_2	uyNEW_3
		Max Annual Pumping	1,175	1,306	1,306	1,175	914	1,306	1,306	914
		Potential w/ 80% Util	1,184	1,315	1,315	1,184	921	1,315	1,315	921
		Potential Well Yield (gpm)	900	1,000	1,000	900	700	1,000	1,000	700
			UY	UY-VOC	UY	UY	UY	UY	UY	UY
Settlement Year	HC		10/4-7A2 (af/y)	10/4-7A3 (af/y)	10/4-7R2 (af/y)	10/4-18B1 (af/y)	10/4-7H3 (af/y)	UY-4A (af/y)	UY-2A (af/y)	UY-1B (af/y)
1	VW		1,133	1,259	1,259	1,133	881	1,259	1,051	669
2	BN		1,129	1,254	1,254	1,129	878	938	743	222
3	BN		1,036	1,151	1,151	1,036	478	481	0	0
4	VD		1,029	1,143	1,143	1,029	138	0	0	0
5	ED		1,008	1,121	1,121	235	0	0	0	0
6	ED		929	1,032	1,032	159	0	0	0	0
7	AN		987	1,096	1,096	645	377	538	538	377
8	VD		1,049	1,165	1,165	1,049	495	707	290	0
9	ED		970	1,078	1,078	159	0	0	0	0
10	ED		917	1,019	1,019	159	0	0	0	0
11	BN		954	1,060	1,060	463	360	195	0	0
12	VD		1,034	1,149	1,149	1,034	208	0	0	0
13	ED		1,009	1,121	1,121	161	0	0	0	0
14	ED		865	961	961	81	0	0	0	0
15	AN		970	1,078	1,078	490	381	544	544	307
16	AN		1,140	1,267	1,267	1,140	887	1,267	959	601
17	BN		1,073	1,193	1,193	1,073	835	874	202	0
18	VW		1,144	1,271	1,271	1,144	753	870	870	609
19	BN		1,112	1,236	1,236	1,112	865	1,020	729	152
20	BN		1,071	1,190	1,190	1,071	612	367	0	0
21	VD		1,064	1,182	1,182	876	138	0	0	0
22	BN		1,028	1,142	1,142	604	345	386	0	0
23	BN		1,079	1,199	1,199	1,079	619	480	0	0
24	BN		1,092	1,213	1,213	1,092	629	384	0	0
25	VD		1,024	1,138	1,138	1,024	269	90	0	0
26	ED		1,044	1,160	1,160	319	0	0	0	0
27	VW		1,090	1,211	1,211	868	675	964	964	527
28	AN		1,172	1,303	1,303	1,172	912	1,303	1,303	837
29	VW		1,157	1,286	1,286	1,157	900	1,286	1,077	688
30	AN		1,163	1,293	1,293	1,163	905	1,293	1,293	754
31	AN		1,141	1,268	1,268	1,141	887	1,268	1,059	675
32	VW		1,149	1,277	1,277	1,149	894	1,277	1,069	682
33	AN		1,175	1,306	1,306	1,175	914	1,306	1,306	914
34	AN		1,121	1,246	1,246	1,121	872	1,246	1,037	523
35	AN		1,131	1,256	1,256	1,131	879	1,256	1,048	530
36	BN		1,078	1,198	1,198	1,078	838	1,091	496	144
37	AN		1,120	1,244	1,244	1,120	651	732	538	377
38	BN		1,078	1,198	1,198	1,078	838	1,091	496	144
39	BN		1,079	1,199	1,199	1,079	619	480	0	0
40	VW		1,137	1,264	1,264	1,137	664	848	658	460
41	AN		1,164	1,293	1,293	1,164	905	1,293	1,293	831
42	VW		1,161	1,290	1,290	1,161	903	1,290	1,081	691
43	AN		1,163	1,293	1,293	1,163	905	1,293	1,293	754
44	VW		1,157	1,286	1,286	1,157	900	1,286	1,077	688
45	AN		1,162	1,291	1,291	1,162	904	1,291	1,291	753
46	AN		1,141	1,268	1,268	1,141	887	1,268	1,059	675
47	VW		1,153	1,281	1,281	1,153	896	1,281	1,072	614
48	BN		1,113	1,236	1,236	1,113	865	1,129	743	222
49	BN		1,079	1,199	1,199	1,079	619	480	0	0
50	AN		1,120	1,244	1,244	1,120	651	732	538	377
		Min	865	961	961	81	0	0	0	0
		Max	1,175	1,306	1,306	1,175	914	1,306	1,306	914
		Median	1,091	1,212	1,212	1,086	670	859	538	222
		Average	1,082	1,202	1,202	930	601	744	554	316

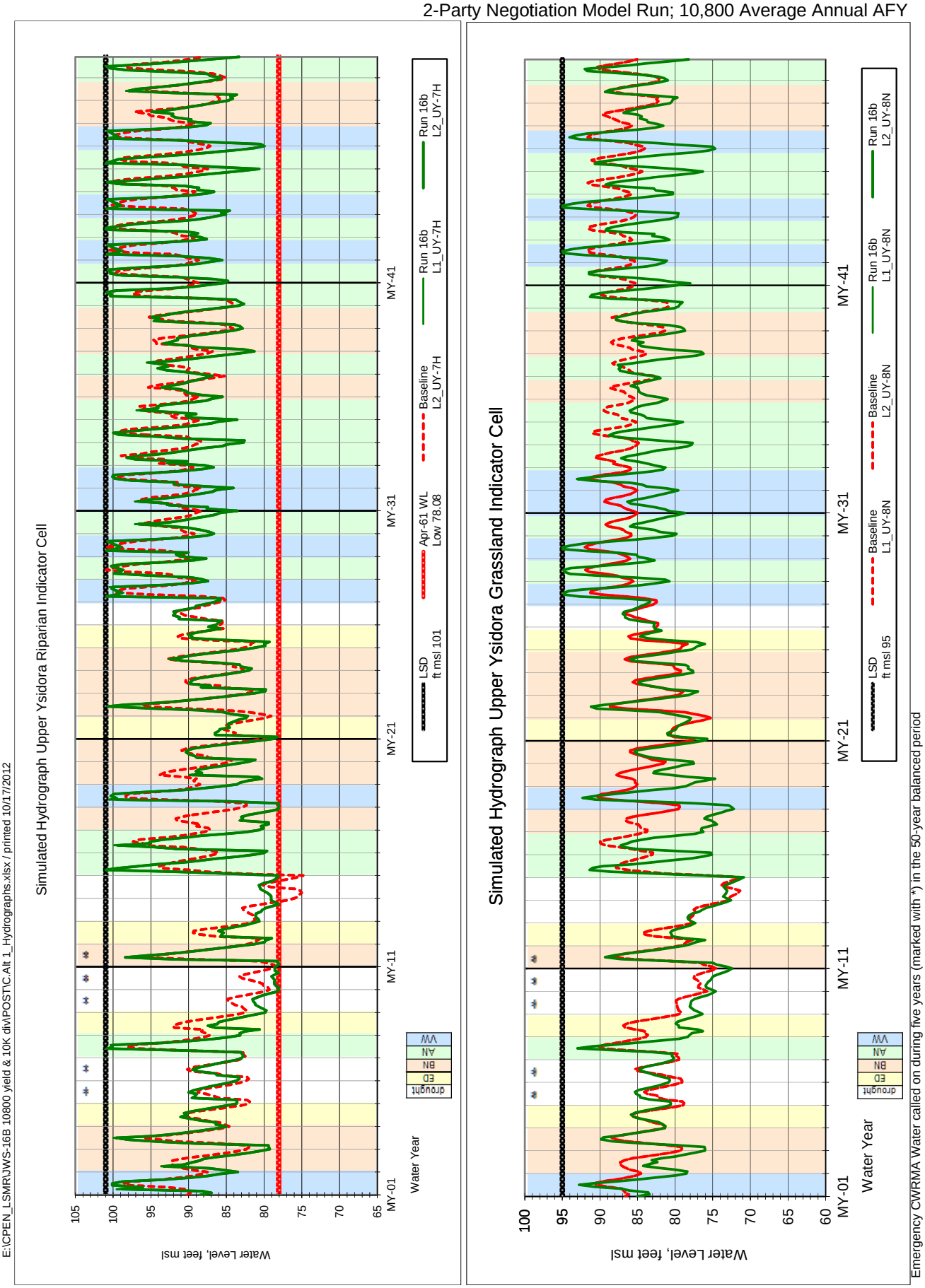
Month	UY 10/4-7A2 (af/m)	UY-VOC 10/4-7A3 (af/m)	UY 10/4-7R2 (af/m)	UY 10/4-18B1 (af/m)	UY 10/4-7H3 (af/m)	UY UY-4A (af/m)	UY UY-2A (af/m)	UY UY-1B (af/m)
Oct	88	98	98	68	53	65	44	9
Nov	87	97	97	69	48	47	19	9
Dec	90	100	100	73	36	51	19	2
Jan	88	98	98	73	38	52	50	22
Feb	85	94	94	71	38	54	52	19
Mar	90	99	99	78	51	57	53	36
Apr	92	102	102	82	58	65	57	38
May	95	105	105	80	58	53	53	37
Jun	92	102	102	79	55	77	53	37
Jul	93	103	103	93	57	81	53	37
Aug	92	102	102	88	56	78	53	37
Sep	90	100	100	76	54	64	50	33
Annual Total	1,082	1,202	1,202	930	601	744	554	316

TABLE 3 Run 16b Annual Pumping by Well (Continued)

	Building #:	23093	330925	23001	R330924	23063	23073	330923	chNEW_1
	Max Annual Pumping	1,035	1,376	1,522	830	908	854	567	204
	Potential w/ 80% Util	1,118	1,486	1,644	986	1,315	1,578	1,447	1,315
	Potential Well Yield (gpm)	850	1,130	1,250	750	1,000	1,200	1,100	1,000
		CH	CH	CH	CH	CH	CH	CH	CH
Settlement Year	HC	10/4-18E3R (af/y)	10/5-23G7 (af/y)	10/5-23J1 (af/y)	CH-5A (af/y)	10/5-13R3 (af/y)	10/4-18M5 (af/y)	10/5-23K3 (af/y)	CH-1B (af/y)
1	VW	969	1,288	1,425	505	403	367	0	0
2	BN	987	1,313	1,452	136	89	0	0	0
3	BN	860	1,144	1,265	0	0	0	0	0
4	VD	723	961	1,063	0	0	0	0	0
5	ED	562	747	826	0	0	0	0	0
6	ED	508	676	748	0	0	0	0	0
7	AN	713	948	1,049	298	288	219	0	0
8	VD	798	1,061	1,174	0	0	0	0	0
9	ED	530	704	779	0	0	0	0	0
10	ED	502	668	739	0	0	0	0	0
11	BN	660	877	971	0	0	0	0	0
12	VD	738	981	1,085	0	0	0	0	0
13	ED	550	731	809	0	0	0	0	0
14	ED	462	615	680	0	0	0	0	0
15	AN	672	893	988	298	288	219	0	0
16	AN	983	1,306	1,445	452	389	219	0	0
17	BN	891	1,184	1,310	0	0	0	0	0
18	VW	928	1,234	1,365	581	686	592	110	0
19	BN	980	1,303	1,441	136	89	0	0	0
20	BN	887	1,179	1,305	0	0	0	0	0
21	VD	716	952	1,054	0	0	0	0	0
22	BN	749	996	1,102	0	0	0	0	0
23	BN	912	1,213	1,341	0	0	0	0	0
24	BN	907	1,206	1,334	0	0	0	0	0
25	VD	755	1,004	1,111	0	0	0	0	0
26	ED	594	790	873	0	0	0	0	0
27	VW	883	1,174	1,299	678	691	612	444	198
28	AN	1,033	1,373	1,519	757	688	448	0	0
29	VW	978	1,300	1,438	670	804	853	567	204
30	AN	1,030	1,369	1,514	598	688	448	0	0
31	AN	987	1,312	1,451	520	389	219	0	0
32	VW	990	1,316	1,455	601	712	854	450	204
33	AN	1,030	1,369	1,515	830	688	448	0	0
34	AN	976	1,298	1,435	373	389	219	0	0
35	AN	968	1,287	1,423	444	377	332	104	0
36	BN	961	1,278	1,414	68	0	0	0	0
37	AN	932	1,239	1,370	295	285	342	214	0
38	BN	961	1,278	1,414	68	0	0	0	0
39	BN	912	1,213	1,341	0	0	0	0	0
40	VW	961	1,278	1,414	464	619	743	567	204
41	AN	1,035	1,376	1,522	680	694	582	426	0
42	VW	990	1,316	1,456	681	908	853	567	204
43	AN	1,030	1,370	1,515	599	689	449	104	0
44	VW	979	1,301	1,439	671	805	854	450	204
45	AN	1,012	1,346	1,489	583	576	331	0	0
46	AN	977	1,299	1,437	511	377	332	104	0
47	VW	982	1,306	1,444	603	804	853	567	204
48	BN	1,005	1,337	1,478	136	89	0	0	0
49	BN	912	1,213	1,341	0	0	0	0	0
50	AN	925	1,229	1,360	289	277	332	104	0
	Min	462	615	680	0	0	0	0	0
	Max	1,035	1,376	1,522	830	908	854	567	204
	Median	926	1,232	1,362	136	89	0	0	0
	Average	860	1,143	1,264	270	276	234	96	28

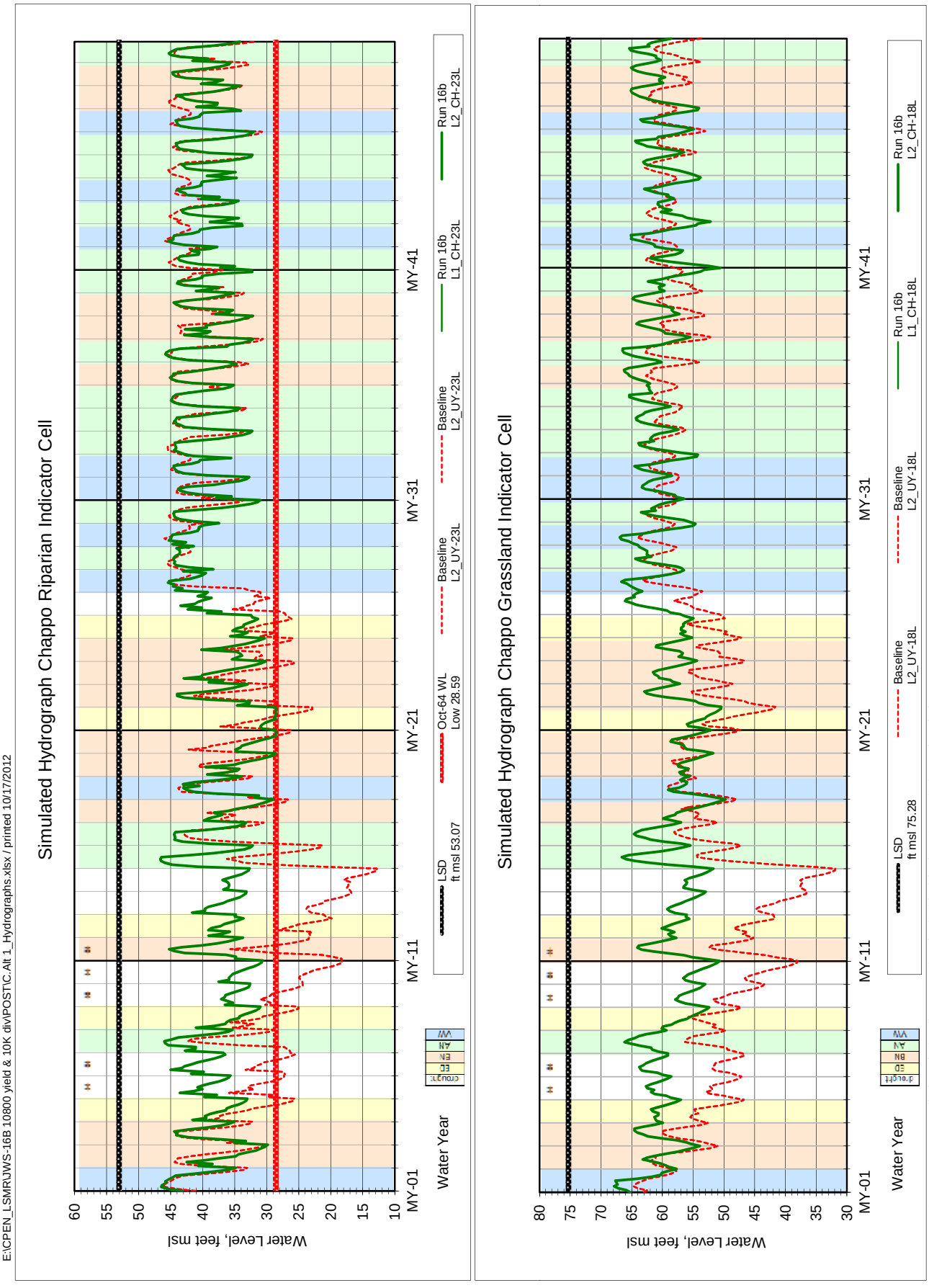
Month	CH 10/4-18E3R (af/m)	CH 10/5-23G7 (af/m)	CH 10/5-23J1 (af/m)	CH CH-5A (af/m)	CH 10/5-13R3 (af/m)	CH 10/4-18M5 (af/m)	CH 10/5-23K3 (af/m)	CH CH-1B (af/m)
Oct	70	93	103	8	11	14	4	0
Nov	65	86	95	10	13	0	0	0
Dec	64	85	94	1	0	0	0	0
Jan	68	90	100	15	2	0	0	0
Feb	66	87	97	13	9	0	0	0
Mar	70	94	104	29	23	13	0	0
Apr	73	97	108	37	43	29	0	0
May	75	99	110	36	49	33	28	0
Jun	75	99	110	35	47	56	21	0
Jul	78	103	114	34	46	55	18	14
Aug	80	107	118	38	18	17	15	14
Sep	77	102	113	14	15	18	9	0
Annual Total	860	1,143	1,264	270	276	234	96	28

FIGURE 1 Run 16b & Baseline Hydrographs
2-Party Negotiation Model Run; 10,800 Average Annual AFY



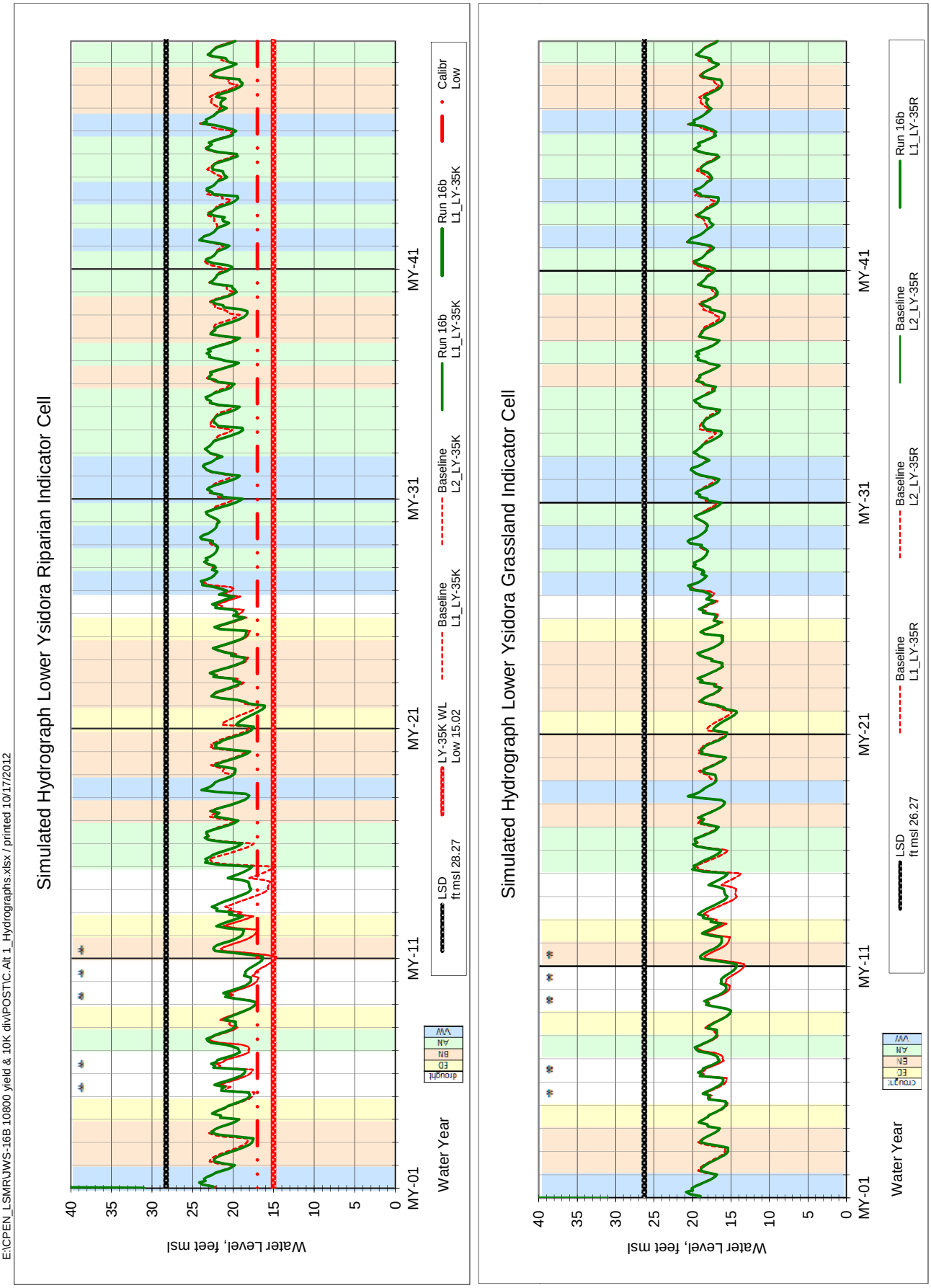
Emergency CWRMA Water called on during five years (marked with *) in the 50-year balanced period
Layer 1 (L1) and Layer 2 (L2) simulated groundwater levels are at similar elevations and the graph lines are printed on top of each other.

FIGURE 2 Run 16b & Baseline Hydrographs
2-Party Negotiation Model Run; 10,800 Average Annual AFY



Emergency CWRMA Water called on during five years (marked with *) in the 50-year balanced period.
Layer 1 (L1) and Layer 2 (L2) simulated groundwater levels are at similar elevations and the graph lines are printed on top of each other.

FIGURE 3 Run 16b & Baseline Hydrographs
2-Party Negotiation Model Run; 10,800 Average Annual AFY



Emergency CWRMA Water called on during five years (marked with *) in the 50-year balanced period.
Layer 1 (L1) and Layer 2 (L2) simulated groundwater levels are at similar elevations and the graph lines are printed on top of each other.

FIGURE 4 Run 16b with 10,000 AFY Diversion and Baseline Streamflow
2-Party Negotiation Model Run; 10,800 Average Annual AFY

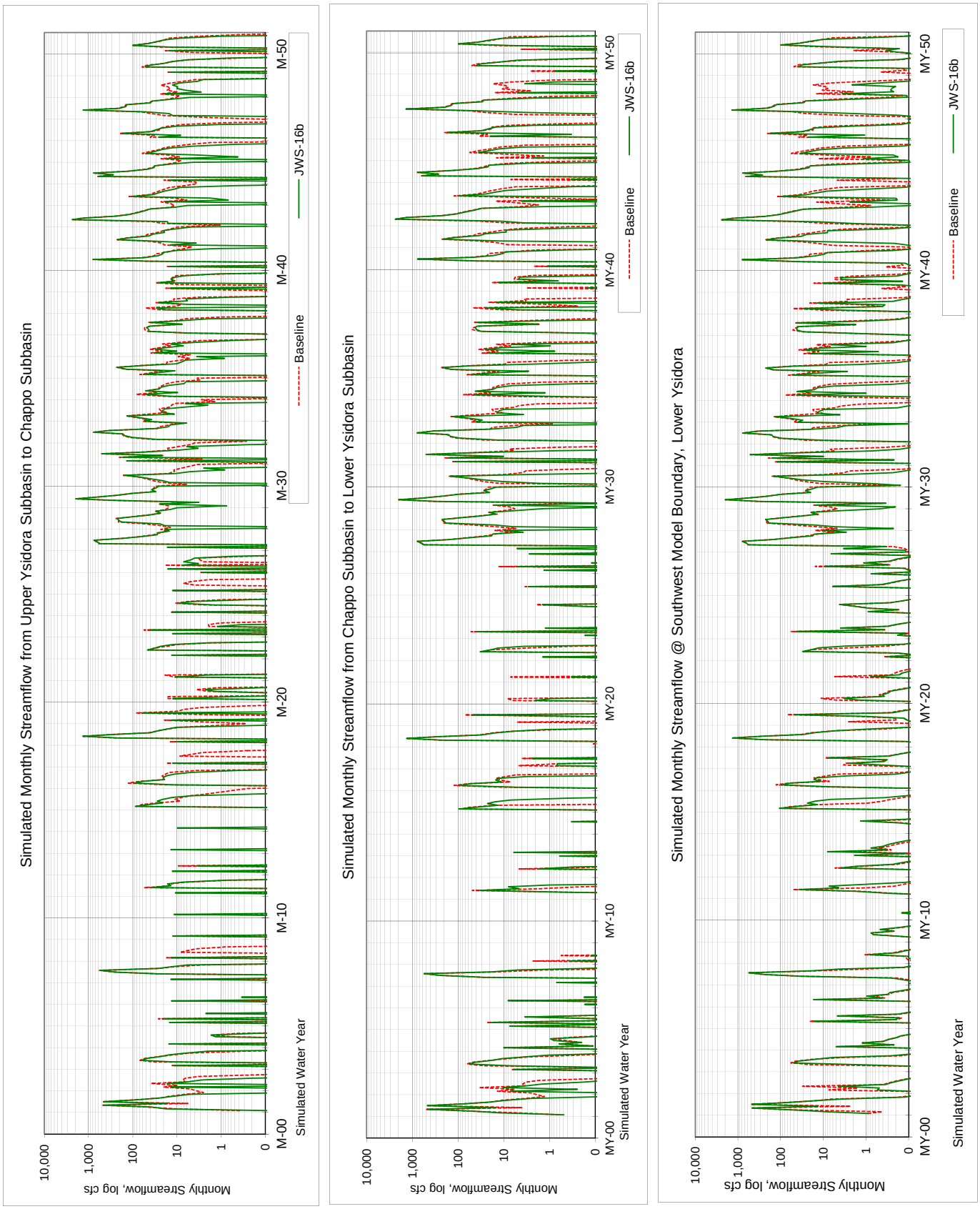


TABLE 4 2-Party Negotiation Model Run 16b; 10,800 AFY Pumping & 10,000 AFY Diversion

Average Hydrologic Condition Water Budget (af/y)

% Time Exceedence	*> 76%*	*76% to 50%*	*50% to 19%*	*< 19%*
# Years	*12*	*14*	*15*	*9*
	Very & Extrm Dry	Below Normal	Above Normal	Very Wet
Inflow:				
Santa Margarita River Inflow	5,500	11,700	32,700	132,900
Subsurface Underflow	600	600	600	600
Lake O'Neill Spill and Release	1,100	1,100	1,100	1,200
Fallbrook Creek	100	400	1,400	3,800
Title 22 Water	0	0	0	0
Minor Tributary Drainages	1,600	1,500	2,400	4,900
Areal Precipitation	600	500	700	1,600
Total Inflow:	9,500	15,800	38,900	145,000
Outflow:				
Santa Margarita River Outflow	500	2,500	21,200	125,000
Subsurface Underflow	0	100	100	100
Groundwater Pumping	6,300	9,600	13,200	14,700
Evapotranspiration	1,700	2,200	2,800	3,300
Diversions to Lake O'Neill	1,500	1,500	1,600	1,600
Total Outflow:	10,000	15,900	38,900	144,700
Net Simulated Change of Groundwater in Storage:	-500	0	-100	400
	-	(100)	100	(100)

Median Hydrologic Condition Water Budget (af/y)

% Time Exceedence	*> 76%*	*76% to 50%*	*50% to 19%*	*< 19%*
# Years	*12*	*14*	*15*	*9*
	Very & Extrm Dry	Below Normal	Above Normal	Very Wet
Inflow:				
Santa Margarita River Inflow	5,800	12,300	26,700	121,300
Subsurface Underflow	600	600	600	600
Lake O'Neill Spill and Release	1,100	1,100	1,200	1,200
Fallbrook Creek	100	300	1,100	3,500
Title 22 Water	0	0	0	0
Minor Tributary Drainages	1,500	1,400	2,500	4,700
Areal Precipitation	400	300	500	1,600
Outflow:				
Santa Margarita River Outflow	500	2,900	15,200	110,600
Subsurface Underflow	0	0	100	100
Groundwater Pumping	5,800	9,100	13,600	15,400
Evapotranspiration	1,600	2,300	2,700	3,000
Diversions to Lake O'Neill	1,500	1,500	1,600	1,600
Net Simulated Change of Groundwater in Storage:	-400	-200	400	300

Average Subbasin Water Budget (af/y)

	Upper Ysidora	Chappo	Lower Ysidora	SMR Basin	
Inflow:					
Santa Margarita River Inflow	38,300	31,900	29,300	38,300	86%
Subsurface Underflow *	600	1,300	400	600	1%
Lake O'Neill Spill and Release	1,100	-	-	1,100	2%
Fallbrook Creek	1,200	-	-	1,200	3%
Title 22 Water	-	-	0	0	0%
Minor Tributary Drainages	600	1,100	700	2,400	5%
Areal Precipitation	200	300	200	800	2%
Total Inflow:	42,000	34,600	30,600	44,400	
Outflow:					
Santa Margarita River Outflow	31,900	29,300	29,700	29,700	67%
Subsurface Underflow *	1,300	400	100	100	0%
Groundwater Pumping	6,500	4,300	0	10,800	24%
Evapotranspiration *	700	900	800	2,400	5%
Diversions to Lake O'Neill	1,600	-	-	1,600	4%
Total Outflow:	42,000	34,900	30,600	44,600	
Net Simulated Change of Groundwater in Storage: *	0	0	0	-100	
	-	(300)	-	(100)	

Note: * Subbasin Averages are based on the last rate of the stress period
Values are rounded to the nearest 100 acre-feet, which may result in a summation rounding error

Median Subbasin Water Budget (af/y)

	Upper Ysidora	Chappo	Lower Ysidora	SMR Basin
Inflow:				
Santa Margarita River Inflow	16,700	8,600	4,900	16,700
Subsurface Underflow *	600	1,300	400	600
Lake O'Neill Spill and Release	1,100	-	-	1,100
Fallbrook Creek	600	-	-	600
Title 22 Water	-	-	-	0
Minor Tributary Drainages	600	900	600	2,100
Areal Precipitation	100	0	6,499	500
Outflow:				
Santa Margarita River Outflow	8,600	4,900	4,700	4,700
Subsurface Underflow *	1,300	400	100	100
Groundwater Pumping	6,800	4,200	0	11,100
Evapotranspiration *	800	1,000	800	2,600
Diversions to Lake O'Neill	1,600	-	-	1,600
Net Simulated Change of Groundwater in Storage: *	-400	-100	0	-100

Note: The sum of median values does not reflect the change of groundwater in storage.
Median values are not cummulative.
* Subbasin Medians are based on the last rate of the stress period
Values are rounded to the nearest 100 acre-feet

TABLE 5 Run 16b Annual Water Budget Summary													
Lower Santa Margarita River Groundwater Model								JWS-16b 10,800 AFY Pumping & 10,000 AFY Diversion					
Modflow Volumetric Budget Output and Streamflow								12/22/11					
Annual Surface Water Budget													
							GAGE						LSMR
MY		SMR Flow In	LON Diversion	Ponds Diversion	Release & Spill	Str Gain+ / Loss-	SMR @ UY->CH	Str Gain+ / Loss-	SMR @ CH->LY	Str Gain+ / Loss-	SMR Flow Out	Str Gain+ / Loss-
1	VW	72,916	-1,543	-12,768	1,152	-5,545	67,371	-952	66,419	1,655	68,074	-4,842
2	BN	9,851	-1,358	-5,516	1,104	-7,522	2,329	-1,946	383	17	400	-9,450
3	BN	19,081	-1,804	-7,680	1,124	-8,261	10,820	-4,012	6,808	-277	6,530	-12,551
4	VD	6,075	-1,324	-2,824	1,122	-4,989	1,087	-752	335	127	462	-5,613
5	ED	6,672	-1,538	-1,599	1,125	-4,475	2,197	-1,144	1,054	318	1,372	-5,300
6	ED	4,277	-1,417	-1,067	1,000	-3,461	816	-302	514	670	1,184	-3,093
7	AN	59,305	-1,724	-8,831	1,080	-6,459	52,846	-2,232	50,613	611	51,225	-8,080
8	VD	6,521	-1,381	-2,856	1,134	-5,724	797	-768	29	70	98	-6,422
9	ED	4,099	-1,522	-549	1,110	-3,365	734	-731	3	158	161	-3,938
10	ED	4,629	-1,717	-740	1,080	-3,941	688	-688	-	37	37	-4,591
11	BN	11,484	-1,432	-5,713	1,126	-6,390	5,094	-2,419	2,675	243	2,918	-8,566
12	VD	5,622	-1,500	-1,309	1,057	-4,681	941	-790	150	319	469	-5,153
13	ED	3,321	-1,471	-277	1,100	-2,500	821	-461	360	253	613	-2,708
14	ED	3,589	-1,461	-431	1,011	-3,006	583	-563	20	105	125	-3,464
15	AN	20,522	-1,781	-8,943	1,111	-7,503	13,019	-1,378	11,641	1,121	12,763	-7,760
16	AN	22,816	-1,556	-10,771	1,167	-8,544	14,272	-2,609	11,663	946	12,609	-10,207
17	BN	6,199	-1,527	-2,487	1,135	-5,462	736	-506	230	486	716	-5,483
18	VW	117,031	-1,613	-13,773	1,160	-6,977	110,054	-3,160	106,894	1,292	108,186	-8,845
19	BN	12,744	-1,612	-4,628	1,135	-8,255	4,488	-1,605	2,884	24	2,908	-9,836
20	BN	6,645	-1,324	-3,416	1,120	-5,639	1,006	-827	179	214	393	-6,252
21	VD	7,214	-1,788	-2,134	1,038	-6,441	773	-753	20	70	90	-7,124
22	BN	13,310	-1,318	-7,699	1,162	-5,785	7,525	-3,446	4,079	-257	3,822	-9,488
23	BN	9,953	-1,768	-3,097	1,068	-6,675	3,278	-888	2,390	546	2,936	-7,017
24	BN	7,708	-1,376	-4,323	1,191	-6,062	1,647	-1,550	97	416	513	-7,195
25	VD	7,560	-1,684	-2,740	1,103	-6,657	903	-735	168	295	463	-7,097
26	ED	6,746	-1,338	-3,279	1,119	-4,141	2,605	-2,034	571	531	1,102	-5,644
27	VW	138,265	-1,693	-18,003	1,204	-3,513	134,753	-2,292	132,461	1,890	134,352	-3,914
28	AN	61,252	-1,595	-22,187	1,189	-9,006	52,246	-5,115	47,131	326	47,458	-13,795
29	VW	195,725	-1,600	-20,316	1,297	-4,468	191,257	-2,610	188,648	1,732	190,380	-5,345
30	AN	27,995	-1,621	-8,538	1,154	-9,172	18,823	-3,654	15,169	75	15,243	-12,752
31	AN	61,581	-1,565	-9,222	1,160	-7,059	54,522	-3,441	51,081	453	51,534	-10,046
32	VW	105,365	-1,569	-14,362	1,247	-5,413	99,952	-4,793	95,159	640	95,800	-9,565
33	AN	28,766	-1,600	-11,999	1,123	-9,069	19,697	-4,126	15,572	318	15,890	-12,877
34	AN	21,480	-1,585	-12,438	1,112	-9,456	12,024	-4,655	7,369	-231	7,138	-14,342
35	AN	38,995	-1,527	-9,383	1,132	-6,802	32,193	-3,808	28,385	436	28,820	-10,175
36	BN	13,900	-1,588	-5,878	1,111	-6,960	6,940	-3,000	3,940	-14	3,926	-9,974
37	AN	18,856	-1,552	-6,754	1,140	-4,485	14,370	-2,790	11,581	429	12,009	-6,846
38	BN	12,534	-1,564	-6,622	1,111	-7,022	5,512	-2,797	2,715	177	2,892	-9,642
39	BN	12,024	-1,485	-7,429	1,138	-7,051	4,973	-3,649	1,323	-246	1,078	-10,946
40	VW	66,151	-1,760	-12,355	1,170	-7,276	58,874	-4,436	54,439	76	54,514	-11,636
41	AN	40,738	-1,581	-15,038	1,163	-10,080	30,658	-5,844	24,814	137	24,951	-15,787
42	VW	256,836	-1,603	-20,281	1,244	-3,940	252,896	-3,652	249,244	1,229	250,473	-6,363
43	AN	23,081	-1,628	-13,783	1,157	-10,069	13,013	-4,411	8,601	-10	8,591	-14,490
44	VW	122,236	-1,552	-19,256	1,181	-6,915	115,321	-4,061	111,260	1,014	112,274	-9,962
45	AN	17,853	-1,586	-11,866	1,142	-9,396	8,456	-3,996	4,460	-181	4,279	-13,573
46	AN	26,690	-1,624	-12,460	1,169	-8,194	18,496	-3,062	15,435	513	15,948	-10,743
47	VW	121,259	-1,570	-17,558	1,244	-7,487	113,772	-4,404	109,368	1,194	110,562	-10,696
48	BN	13,194	-1,618	-8,962	1,134	-8,696	4,498	-3,940	559	-115	444	-12,750
49	BN	15,504	-1,620	-6,760	1,140	-6,842	8,662	-3,347	5,314	-243	5,072	-10,432
50	AN	20,633	-1,578	-10,860	1,179	-7,217	13,417	-3,334	10,083	69	10,152	-10,481
	avg	38,336	-1,563	-8,435	1,138	**-6,481**	31,855	**-2,569**	29,286	**393**	29,679	**-8,657**
	med	16,678	-1,574	-7,689	1,135	-6,739	8,559	-2,700	4,887	274	4,676	-9,148
AVERAGES												
VD/ED	12	5,527	(1,512)	(1,650)	1,083	(4,448)	1,079	(810)	269	246	515	(5,012)
BN	14	11,724	(1,528)	(5,729)	1,129	(6,902)	4,822	(2,424)	2,398	69	2,468	(9,256)
AN	15	32,704	(1,607)	(11,538)	1,145	(8,167)	24,537	(3,630)	20,906	334	21,241	(11,464)
VW	9	132,865	(1,612)	(16,519)	1,211	(5,726)	127,139	(3,373)	123,766	1,191	124,957	(7,908)
	50											
MEDIANS												
VD/ED	12	5,849	(1,486)	(1,454)	1,101	(4,308)	819	(743)	159	205	463	(5,226)
BN	14	12,279	(1,545)	(5,795)	1,130	(6,901)	4,735	(2,608)	2,533	21	2,900	(9,565)
AN	15	26,690	(1,586)	(10,860)	1,154	(8,544)	18,496	(3,654)	15,169	326	15,243	(10,743)
VW	9	121,259	(1,600)	(17,558)	1,204	(5,545)	113,772	(3,652)	109,368	1,229	110,562	(8,845)
	50											

TABLE 5 Run 16b Annual Water Budget Summary (continued)

Lower Santa Margarita River Groundwater Model

Modflow Volumetric Budget Output

Annual Groundwater Budget Model Run: JWS-16b 10,800 AFY Pumping & 10,000 AFY Diversion

	INFLOW:					OUTFLOW:					
MY	Storage	Recharge	Stream Leakance	GHB	TOTAL GW IN	Storage	Wells	ET	Stream Leakance	GHB	TOTAL GW OUT
1	7,659	13,815	6,838	598	28,911	4,831	13,602	3,315	7,119	67	28,934
2	6,770	5,702	5,734	603	18,809	4,162	11,522	1,917	1,188	49	18,838
3	5,228	7,878	8,587	610	22,304	8,106	8,602	2,522	3,039	46	22,315
4	4,716	3,118	4,425	606	12,865	3,186	7,229	2,011	398	51	12,876
5	4,118	1,917	5,898	617	12,550	4,664	5,620	2,135	105	46	12,570
6	4,098	1,820	4,952	616	11,486	3,967	5,085	2,244	154	53	11,503
7	6,095	9,433	7,394	606	23,529	6,958	9,169	2,884	4,464	58	23,534
8	5,815	3,010	4,063	611	13,499	2,828	8,953	1,550	152	44	13,528
9	2,943	923	4,874	630	9,370	2,599	5,298	1,359	81	47	9,384
10	2,883	870	3,655	639	8,048	1,889	5,025	1,070	43	36	8,063
11	5,790	6,194	7,626	618	20,228	9,187	6,600	2,272	2,137	47	20,243
12	4,890	1,607	6,267	626	13,390	4,190	7,378	1,703	83	47	13,401
13	4,341	530	3,678	640	9,190	2,000	5,500	1,522	148	51	9,221
14	3,074	794	3,965	669	8,502	2,599	4,626	1,185	55	45	8,510
15	7,277	9,984	8,150	613	26,024	10,085	8,749	2,569	4,589	58	26,049
16	6,694	11,377	8,843	596	27,511	7,133	13,322	2,684	4,332	58	27,528
17	5,799	2,808	5,638	614	14,859	3,235	9,828	1,621	145	52	14,880
18	6,671	14,940	10,606	603	32,820	10,064	13,430	2,544	6,745	59	32,841
19	6,359	4,809	6,322	606	18,096	4,470	11,412	1,733	461	49	18,125
20	5,636	3,799	5,354	609	15,398	4,527	8,871	1,529	434	51	15,411
21	3,797	2,413	5,165	629	12,004	3,678	7,165	1,081	57	40	12,021
22	6,325	8,058	7,119	603	22,104	8,710	7,495	2,273	3,593	48	22,119
23	6,113	3,561	6,568	619	16,861	5,459	9,121	1,995	257	51	16,883
24	5,248	4,784	6,467	605	17,104	5,278	9,073	1,887	831	54	17,122
25	4,483	3,340	6,657	618	15,099	5,627	7,555	1,579	298	52	15,112
26	3,682	3,717	6,685	606	14,690	5,372	5,939	2,539	803	56	14,709
27	6,536	19,197	8,581	591	34,904	6,816	13,492	3,324	11,221	66	34,919
28	5,992	22,521	9,155	583	38,250	6,455	15,129	3,354	13,267	59	38,264
29	6,892	21,322	8,464	584	37,262	6,164	15,634	3,441	11,956	66	37,261
30	6,054	8,747	8,611	597	24,008	4,024	14,807	2,626	2,505	54	24,016
31	5,321	9,640	9,624	597	25,181	5,944	13,590	2,548	3,069	55	25,207
32	6,189	15,090	10,973	590	32,842	7,314	15,358	3,039	7,084	62	32,858
33	6,221	12,183	8,717	594	27,716	4,559	15,266	2,782	5,051	55	27,713
34	5,611	12,649	8,871	595	27,725	6,263	13,108	2,727	5,588	50	27,736
35	4,784	9,780	9,826	597	24,986	5,647	13,430	2,897	2,989	56	25,020
36	4,449	6,129	7,438	601	18,618	3,776	10,836	2,732	1,221	55	18,620
37	5,691	7,163	7,713	601	21,168	4,428	11,708	2,778	2,199	57	21,171
38	5,673	6,864	7,645	603	20,784	5,921	10,836	2,300	1,680	51	20,787
39	5,255	7,599	6,956	604	20,413	6,203	9,137	2,576	2,475	49	20,439
40	6,635	12,534	9,183	606	28,958	6,740	13,682	2,798	5,702	51	28,975
41	5,774	15,335	10,904	595	32,608	6,818	15,542	2,911	7,282	55	32,608
42	6,974	21,120	8,838	583	37,516	6,433	15,840	3,246	11,949	61	37,529
43	6,726	13,935	8,586	592	29,839	6,104	14,922	2,700	6,093	51	29,870
44	6,979	19,904	9,504	588	36,974	7,622	15,542	3,007	10,751	57	36,978
45	7,966	12,006	7,484	595	28,051	5,969	14,463	2,530	5,023	52	28,037
46	7,874	12,856	8,770	595	30,094	7,645	13,751	2,553	6,152	57	30,158
47	6,152	18,480	10,973	588	36,194	8,379	15,496	3,014	9,240	65	36,194
48	5,165	9,114	7,277	597	22,153	4,752	11,708	2,647	3,028	52	22,187
49	6,015	6,910	6,933	604	20,461	6,015	9,114	2,656	2,642	47	20,474
50	7,231	11,180	7,025	597	26,033	6,221	11,547	2,815	5,395	54	26,032
avg	5,693	8,869	7,392	606	22,560	5,620	10,802	2,394	3,706	53	22,575
med	5,807	7,968	7,416	603	22,129	5,784	11,124	2,551	2,816	52	22,153
AVERAGES											
VD/ED	4,070	2,005	5,024	626	11,724	3,550	6,281	1,665	198	47	11,741
BN	5,702	6,015	6,833	607	19,157	5,700	9,582	2,190	1,652	50	19,175
AN	6,354	11,919	8,645	597	27,515	6,284	13,234	2,757	5,200	55	27,529
VW	6,743	17,378	9,329	592	34,042	7,151	14,675	3,081	9,085	62	34,054
MEDIANS											
VD/ED	4,108	1,869	4,913	622	12,277	3,432	5,779	1,565	126	47	12,295
BN	5,731	6,162	6,944	605	19,518	5,368	9,129	2,272	1,451	50	19,541
AN	6,095	11,377	8,717	596	27,511	6,221	13,590	2,727	5,023	55	27,528
VW	6,671	18,480	9,183	590	34,904	6,816	15,358	3,039	9,240	62	34,919

TABLE 5 Run 16b Annual Water Budget Summary (continued)

Lower Santa Margarita River Groundwater Model

Modflow Volumetric Budget Output

Annual Groundwater Budget

MY	NET Storage	NET Str Lknc	In-Out	% bal
1	-2,828	-281	-23.3	-0.08%
2	-2,607	4,546	-29.9	-0.16%
3	2,878	5,548	-11.6	-0.05%
4	-1,530	4,027	-10.4	-0.08%
5	545	5,793	-20.1	-0.16%
6	-131	4,798	-16.4	-0.14%
7	863	2,930	-5.0	-0.02%
8	-2,987	3,911	-29.2	-0.22%
9	-344	4,792	-14.5	-0.15%
10	-994	3,612	-15.9	-0.20%
11	3,398	5,489	-15.0	-0.07%
12	-700	6,185	-11.4	-0.08%
13	-2,342	3,530	-31.2	-0.34%
14	-475	3,909	-8.0	-0.09%
15	2,808	3,561	-25.3	-0.10%
16	438	4,511	-16.8	-0.06%
17	-2,564	5,494	-21.6	-0.15%
18	3,393	3,861	-21.2	-0.06%
19	-1,889	5,861	-28.6	-0.16%
20	-1,109	4,920	-13.3	-0.09%
21	-119	5,108	-16.6	-0.14%
22	2,385	3,526	-14.9	-0.07%
23	-654	6,311	-22.4	-0.13%
24	30	5,636	-17.6	-0.10%
25	1,143	6,359	-12.4	-0.08%
26	1,690	5,882	-18.8	-0.13%
27	280	-2,640	-14.6	-0.04%
28	464	-4,112	-13.4	-0.03%
29	-728	-3,492	1.2	0.00%
30	-2,029	6,107	-7.5	-0.03%
31	622	6,554	-25.6	-0.10%
32	1,125	3,889	-16.0	-0.05%
33	-1,662	3,666	2.6	0.01%
34	652	3,283	-10.7	-0.04%
35	863	6,837	-33.1	-0.13%
36	-673	6,217	-2.9	-0.02%
37	-1,263	5,514	-3.1	-0.01%
38	248	5,964	-3.3	-0.02%
39	948	4,481	-26.3	-0.13%
40	106	3,480	-16.8	-0.06%
41	1,045	3,623	-0.4	0.00%
42	-542	-3,111	-12.9	-0.03%
43	-622	2,493	-30.8	-0.10%
44	643	-1,247	-3.9	-0.01%
45	-1,997	2,461	14.5	0.05%
46	-230	2,617	-63.6	-0.21%
47	2,227	1,733	-0.2	0.00%
48	-413	4,249	-33.7	-0.15%
49	0	4,291	-12.4	-0.06%
50	-1,010	1,630	1.4	0.01%
avg	-73	3,686	-15.7	-0.09%
med	-125	4,138	-15.0	-0.08%
AVERAGES				
VD/ED	(520)	4,825	(17)	(0)
BN	(2)	5,181	(18)	(0)
AN	(71)	3,445	(14)	(0)
VW	408	244	(12)	(0)
MEDIANS				
VD/ED	(410)	4,795	(16)	(0)
BN	(207)	5,492	(16)	(0)
AN	438	3,561	(11)	(0)
VW	280	(281)	(15)	(0)

TABLE 6 Run 16b Average Monthly Water Budget Summary

Lower Santa Margarita River Groundwater Model — JWS-16b 10,800 AFY Pumping & 10,000 AFY Diversion

Modflow Volumetric Budget Output and Streamflow — 12/22/11

Atreamflow

Avg AF/M	SMR Flow In	Diversion	Str Gain+ / Loss-	SMR @ UY->CH	Str Gain+ / Loss-	SMR @ CH->LY	Str Gain+ / Loss-	SMR Flow Out	LSMR Str Gain+ / Loss-
Oct	502	292	-449	53	-17	36	7	44	-458
Nov	1,072	504	199	1,271	-679	593	-11	582	-490
Dec	1,833	924	-1,011	822	-120	701	52	754	-1,079
Jan	8,239	1,736	-1,477	6,763	-93	6,670	143	6,813	-1,426
Feb	10,610	1,761	-1,115	9,494	-184	9,310	106	9,416	-1,194
Mar	9,203	1,950	-887	8,316	-246	8,070	90	8,160	-1,043
Apr	3,354	1,318	-446	2,908	-290	2,618	27	2,645	-709
May	1,387	879	-336	1,052	-325	726	-9	718	-670
Jun	727	502	-266	461	-231	230	-6	224	-503
Jul	494	48	-94	400	-196	204	-8	196	-298
Aug	421	47	-268	153	-107	46	1	47	-374
Sep	493	39	-331	161	-81	80	1	81	-412
Avg Monthly	3,195	833	-540	2,655	-214	2,440	33	2,473	-721
Med Monthly	1,230	691	-391	937	-190	647	4	650	-587
Avg Total=Anl	38,336	9,998	-6,481	31,855	-2,569	29,286	393	29,679	-8,657

Lower Santa Margarita River Groundwater Model

Modflow Volumetric Budget Output

Groundwater Model

	INFLOW:					**OUTFLOW:**						OUT-IN	OUT-IN		
Avg AF/M	Storage	Recharge	Stream Leakance	GHB	TOTAL IN	Storage	Wells	ET	Stream Leakance	GHB	TOTAL OUT	NET Storage	NET Str Lknc	In-Out	% bal
Oct	557	195	261	53	1,067	110	826	121	8	4	1,068	-447	253	-1.6	-0.15%
Nov	73	552	1,465	51	2,141	1,256	743	96	42	4	2,141	1,183	1,424	0.0	0.00%
Dec	337	471	678	52	1,537	661	714	90	68	6	1,537	323	610	0.0	0.00%
Jan	143	1,301	858	51	2,353	1,206	792	108	241	6	2,353	1,063	618	-0.7	-0.03%
Feb	107	1,645	791	46	2,590	1,143	779	148	512	6	2,588	1,036	279	2.0	0.08%
Mar	151	1,935	707	50	2,843	850	898	224	860	6	2,838	699	-153	4.1	0.14%
Apr	426	1,299	565	48	2,338	230	983	273	847	5	2,338	-196	-283	-0.1	0.00%
May	631	868	476	50	2,026	65	1,015	317	631	4	2,031	-567	-154	-5.5	-0.27%
Jun	803	479	374	49	1,706	12	1,039	306	350	3	1,710	-791	24	-3.9	-0.23%
Jul	960	107	389	52	1,507	9	1,082	290	127	3	1,512	-951	261	-4.8	-0.32%
Aug	860	8	382	52	1,303	27	1,015	245	15	3	1,304	-834	367	-1.6	-0.12%
Sep	645	9	445	51	1,151	53	916	177	5	3	1,154	-592	440	-3.5	-0.31%
Avg Monthly	474	739	616	50	1,880	468	900	200	309	4	1,881	-6	307	-1.3	-0.10%
Med Monthly	491	516	521	51	1,866	170	907	201	184	4	1,871	-321	270	-1.2	-0.08%
Avg Total=Anl	5,693	8,869	7,392	606	22,560	5,620	10,802	2,394	3,706	53	22,575	-73	3,686	-15.7	

Attachment 3

Alternative 2: Lower Santa Margarita River Surface and Groundwater Model

TABLE 1 RUN 13A BASIN YIELD: using TM 1.1 Streamflow
LOWER SANTA MARGARITA RIVER GROUNDWATER MODEL

12,840 AFY 50-Year Average Annual Production

Hydrologic Condition

HC	Cnt	Oct to Apr Strflw
VW	9	Very Wet > 58,032
AN	15	Above Normal > 15,957
BN	14	Below Normal < 15,957
VD	5	Very Dry < 5,781
ED	7	Extremely Dry (2nd+ VD)
	50	

PC	HC	Q Adjst	Anl Q	Cnt	
1	2+ AN @ VW	2,800	16,900	5	10%
2	2+ AN @ AN	1,300	15,400	9	18%
3	Standard	0	14,100	10	20%
4	1st BN	-3,800	10,300	6	12%
5	2ndBN	-5,300	8,800	3	6%
6	3+BN/all Dry	-9,000	5,100	17	34%
				50	100%

MY	HC	Oct-Apr HC descrip	May-Apr Pumping Condition	Gallery Wells (af/y)	UY Total (af/y)	CH Total (af/y)	LY Total (af/y)	Groundwater Production Total (af/y)	Total Basin Yield (af/y)	CWRMA Emergency Water (af/y)	Additional Supply of Water (af/y)
1	VW	Very Wet	3	5,028	8,725	4,371	-	13,096	18,124	-	-
2	BN	Below Normal	4	1,606	7,119	3,451	-	10,570	12,176	-	-
3	BN	Below Normal	3	2,962	5,413	2,383	-	7,796	10,758	-	1,600
4	VD	Very Dry	6	872	4,307	1,656	-	5,963	6,835	-	-
5	ED	Extremely Dry	6	642	3,116	1,208	-	4,323	4,965	100	400
6	ED	Extremely Dry	6	654	3,171	1,275	-	4,446	5,100	2,252	-
7	AN	Above Normal	3	3,045	5,915	2,860	-	8,776	11,821	-	-
8	VD	Very Dry	6	984	5,721	2,786	-	8,507	9,491	-	-
9	ED	Extremely Dry	6	654	3,171	1,275	-	4,446	5,100	150	-
10	ED	Extremely Dry	6	654	3,171	1,275	-	4,446	5,100	350	200
11	BN	Below Normal	6	1,702	3,223	1,275	-	4,498	6,200	1,781	400
12	VD	Very Dry	6	654	3,171	1,275	-	4,446	5,100	1,813	-
13	ED	Extremely Dry	6	654	3,171	1,275	-	4,446	5,100	-	-
14	ED	Extremely Dry	6	654	3,171	1,275	-	4,446	5,100	-	-
15	AN	Above Normal	3	5,233	6,031	2,860	-	8,891	14,125	-	-
16	AN	Above Normal	2	4,616	9,166	4,569	-	13,735	18,351	-	-
17	BN	Below Normal	6	1,098	7,078	3,370	-	10,448	11,547	-	-
18	VW	Very Wet	3	4,896	7,783	3,495	-	11,278	16,174	-	-
19	BN	Below Normal	4	1,955	7,648	3,451	-	11,099	13,054	-	-
20	BN	Below Normal	5	1,064	6,085	2,383	-	8,468	9,532	-	-
21	VD	Very Dry	6	787	3,816	1,726	-	5,542	6,329	-	1,400
22	BN	Below Normal	6	1,951	3,274	1,275	-	4,549	6,500	-	200
23	BN	Below Normal	6	854	3,171	1,275	-	4,446	5,300	-	-
24	BN	Below Normal	6	654	3,171	1,275	-	4,446	5,100	-	-
25	VD	Very Dry	6	654	3,171	1,275	-	4,446	5,100	2,093	-
26	ED	Extremely Dry	6	654	3,171	1,275	-	4,446	5,100	2,417	-
27	VW	Very Wet	3	4,984	5,992	2,860	-	8,853	13,837	-	-
28	AN	Above Normal	2	5,255	9,319	4,833	-	14,152	19,407	-	-
29	VW	Very Wet	1	5,866	9,601	5,362	-	14,963	20,829	-	-
30	AN	Above Normal	2	4,269	9,592	5,011	-	14,602	18,871	-	-
31	AN	Above Normal	2	5,659	9,379	4,995	-	14,375	20,033	-	-
32	VW	Very Wet	1	6,271	9,573	5,296	-	14,870	21,140	-	-
33	AN	Above Normal	2	6,275	9,814	4,993	-	14,807	21,082	-	-
34	AN	Above Normal	2	4,443	9,184	4,702	-	13,887	18,329	-	-
35	AN	Above Normal	2	4,447	9,276	4,768	-	14,044	18,491	-	-
36	BN	Below Normal	4	2,174	8,167	3,648	-	11,815	13,988	-	-
37	AN	Above Normal	3	3,454	7,701	3,495	-	11,196	14,650	-	-
38	BN	Below Normal	4	1,955	7,648	3,451	-	11,099	13,054	-	-
39	BN	Below Normal	5	2,074	6,175	2,383	-	8,558	10,632	3,030	-
40	VW	Very Wet	3	3,292	7,126	3,312	-	10,438	13,730	-	-
41	AN	Above Normal	2	4,439	9,102	4,775	-	13,878	18,317	-	-
42	VW	Very Wet	1	6,370	9,734	5,421	-	15,155	21,525	-	-
43	AN	Above Normal	2	3,969	9,592	5,011	-	14,602	18,571	-	-
44	VW	Very Wet	1	5,866	9,601	5,362	-	14,963	20,829	-	-
45	AN	Above Normal	4	3,665	9,570	5,001	-	14,571	18,236	-	-
46	AN	Above Normal	3	5,055	9,187	4,774	-	13,961	19,016	-	-
47	VW	Very Wet	1	5,558	9,432	5,329	-	14,761	20,320	-	-
48	BN	Below Normal	4	2,011	8,535	3,875	-	12,410	14,420	-	-
49	BN	Below Normal	5	2,286	6,262	2,383	-	8,645	10,932	-	-
50	AN	Above Normal	3	3,421	7,580	3,476	-	11,056	14,477	-	-
			Min	642	3,116	1,208	-	4,323	4,965	0	0
			Max	6,370	9,814	5,421	-	15,155	21,525	3,030	1,600
			Median	**2,624**	**7,122**	**3,411**	**-**	**10,509**	**13,392**		
			% of Median	25.0%	67.8%	32.5%	0.0%				
			Average	**2,965**	**6,666**	**3,208**	**-**	**9,873**	**12,838**	**280**	**84**
			% of Average Total Basin Yield	23.1%	51.9%	25.0%	0.0%				

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LOWER SANTA MARGARITA RIVER GROUNDWATER MODEL

12,840 AFY 50-Year Average Annual Production

Hydrologic Condition

HC	Cnt	Oct to Apr Strflw
VW	9	Very Wet > 58,032
AN	15	Above Normal > 15,957
BN	14	Below Normal < 15,957
VD	5	Very Dry < 5,781
ED	7	Extremely Dry (2nd+ VD)
	50	

PC	HC	Q Adjst	Anl Q	Cnt	
1	2+ AN @ VW	2,800	16,900	5	10%
2	2+ AN @ AN	1,300	15,400	9	18%
3	Standard	0	14,100	10	20%
4	1st BN	-3,800	10,300	6	12%
5	2ndBN	-5,300	8,800	3	6%
6	3+BN/all Dry	-9,000	5,100	17	34%
				50	100%

Average Annual and Median Pumping

AVERAGES	Yearly Count	Gallery Wells (af/y)	UY Total (af/y)	CH Total (af/y)	LY Total (af/y)	Production Groundwater Total (af/y)	Total Basin Yield (af/y)	CWRMA Emergency Water (af/y)	Additional Supply of Water (af/y)
VW	9	5,348	8,619	4,534	-	13,153	18,501	-	-
AN	15	4,483	8,694	4,408	-	13,102	17,585	-	-
BN	14	1,739	5,926	2,563	-	8,489	10,228	344	157
VD/ED	12	710	3,527	1,465	-	4,992	5,702	765	167
	50								
MEDIANS									
VW	9	5,558	9,432	5,296	-	14,761	20,320	-	-
AN	15	4,443	9,187	4,774	-	13,961	18,351	-	-
BN	14	1,953	6,219	2,383	-	8,602	10,845	-	-
VD/ED	12	654	3,171	1,275	-	4,446	5,100	125	-

Average Monthly Pumping

%	Month	Gallery Wells (af/m)	UY Total (af/m)	CH Total (af/m)	LY Total (af/m)	LSMR Total (af/m)	Total Basin Yield (af/m)	CWRMA Emergency Water (af/m)	Additional Supply of Water (af/m)
8%	Oct	84	535	257	-	792	877	4	16
7%	Nov	93	457	223	-	680	772	51	20
6%	Dec	139	385	186	-	571	710	48	12
6%	Jan	323	440	202	-	641	964	21	8
6%	Feb	440	426	187	-	613	1,053	19	-
9%	Mar	549	580	264	-	844	1,393	24	4
9%	Apr	600	608	274	-	881	1,481	24	4
9%	May	106	579	272	-	851	957	42	4
10%	Jun	116	662	317	-	979	1,094	41	-
11%	Jul	200	682	360	-	1,043	1,243	5	4
10%	Aug	162	684	345	-	1,029	1,191	1	4
10%	Sep	154	628	321	-	949	1,103	-	8
	Avg Anl	2,965	6,666	3,208	-	9,873	12,838	280	84

TABLE 2 RUN 13A (using TM 1.1 Streamflow) Pumping Summaries

		Bldg #	State ID #	# mos Q	% of 600 mos	% of Subbasin	80% Utilization af/m	Potential 100% Yield gpm
1	UY	2673	10/4-7A2	600	100%	10%	142	1,000
2	UY	26072	10/4-8D1	600	100%	11%	121	1,100
3	UY	2671	10/4-7H2	600	100%	8%	82	750
4	UY	26018	10/4-18B	600	100%	10%	110	1,000
5	UY	2603	10/4-7R2	600	100%	10%	110	1,000
6	UY	Gallery1	Gallery1	139	23%	*n/a*	252	2,300
7	UY	Gallery2	Gallery2	159	27%	*n/a*	252	2,300
8	UY	Gallery3	Gallery3	139	23%	*n/a*	252	2,300
9	UY	Gallery4	Gallery4	600	100%	*n/a*	252	2,300
10	UY	UY-1	UY-1	362	60%	10%	110	1,000
11	UY	UY-2	UY-2	600	100%	10%	110	1,000
12	UY	UY-3	UY-3	294	49%	10%	110	1,000
13	UY	UY-4	UY-4	178	30%	10%	110	1,000
14	UY	UY-5	UY-5	138	23%	10%	110	1,000
15	CH	2393	10/4-18E3	600	100%	19%	121	1,100
16	CH	2373	10/4-18M4&5	600	100%	25%	153	1,400
17	CH	2363	10/5-13R2	600	100%	21%	132	1,200
18	CH	33925	10/5-23G4	600	100%	21%	132	1,200
19	CH	2301	10/5-23J1	-	0%	0%	0	-
20	CH	33924	10/5-23K2	-	0%	0%	0	-
21	CH	33923	10/5-23K3	-	0%	0%	0	-
22	CH	CH-1	CH-1	600	100%	14%	88	800

% Pumping in Subbasin

	Wet Year Subbasin Split			Dry Year Subbasin Split		
	69%	**31%**	**0%**	**75%**	**25%**	**0%**
mo	Anl %	UY	CH	LY	UY	CH	LY
OCT	8.3%	5.7%	2.6%	0.00%	6.2%	2.1%	0.00%
NOV	7.1%	4.9%	2.2%	0.00%	5.3%	1.8%	0.00%
DEC	5.9%	4.1%	1.8%	0.00%	4.4%	1.5%	0.00%
JAN	6.2%	4.3%	1.9%	0.00%	4.7%	1.6%	0.00%
FEB	5.6%	3.9%	1.7%	0.00%	4.2%	1.4%	0.00%
MAR	7.8%	5.4%	2.4%	0.00%	5.8%	1.9%	0.00%
APR	7.9%	5.5%	2.5%	0.00%	6.0%	2.0%	0.00%
MAY	8.6%	5.9%	2.7%	0.00%	6.5%	2.2%	0.00%
JUN	10.0%	6.9%	3.1%	0.00%	7.5%	2.5%	0.00%
JUL	11.4%	7.9%	3.5%	0.00%	8.6%	2.9%	0.00%
AUG	10.9%	7.6%	3.4%	0.00%	8.2%	2.7%	0.00%
SEP	10.2%	7.0%	3.2%	0.00%	7.6%	2.5%	0.00%

Max monthly pumping in subbasin adding wells as needed

af/m	UY	CH	Total
# exst wells	4	4	8
af/m (80%)	422	537	959
avg af/well	105	134	240
Gallery Wells	1,430		1,430
1 adntl well	1,540	625	2,165
2 adntl well	1,650	712	2,362
3 adntl well	1,759	800	2,559
4 adntl well	1,869	888	2,757
5 adntl well	1,978		2,866

Wet Year Algorithm Monthly Counts

	AN 3000 af/y	VW 6100 af/y	Total	% of 50 yrs
Oct	-	-	-	0%
Nov	-	-	-	0%
Dec	-	-	-	0%
Jan	6	1	7	16%
Feb	6	4	10	22%
Mar	8	5	13	29%
Apr	9	6	15	33%
May	-	-	-	0%
	29	16	45	

TABLE 3 RUN 13A (using TM 1.1 Streamflow) Annual Pumping by Well

Annual Well Production (AF/Y)

Building #:		2673	26072	2671	26018	2603	new	new	new	new	new	new	new	new	new
Max Annual Pumping		0	1,337	911	1,215	1,215	1,215	1,215	1,213	988	789	1,308	2,098	1,308	1,960
Potential w/ 80% Util		1,315	1,447	986	1,315	1,315	1,315	1,315	1,315	1,315	1,315	3,025	3,025	3,025	3,025
Potential Well Yield (gpm)		1,000	1,100	750	1,000	1,000	1,000	1,000	1,000	1,000	1,000	2,300	2,300	2,300	2,300
		UY	UY	UY	UY	UY	UY	UY	UY	UY	UY	UY	UY	UY	UY
		10/4-7A2	10/4-8D1	10/4-7H2	10/4-18B	10/4-7R2	UY-1	UY-2	UY-3	UY-4	UY-5	Gallery1	Gallery2	Gallery3	Gallery4
MY	HC	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)
1	VW	0	1,271	867	1,156	1,156	1,156	1,156	971	594	399	1,004	1,218	1,004	1,801
2	BN	0	1,216	829	1,106	1,106	1,053	1,106	604	100	0	250	0	250	1,106
3	BN	0	1,000	682	909	909	657	909	347	0	0	600	552	600	1,210
4	VD	0	959	654	872	872	80	872	0	0	0	0	0	0	872
5	ED	0	707	482	642	642	0	642	0	0	0	0	0	0	642
6	ED	0	719	490	654	654	0	654	0	0	0	0	0	0	654
7	AN	0	908	619	825	825	506	825	609	399	399	552	714	552	1,226
8	VD	0	1,083	738	984	984	650	984	298	0	0	0	0	0	984
9	ED	0	719	490	654	654	0	654	0	0	0	0	0	0	654
10	ED	0	719	490	654	654	0	654	0	0	0	0	0	0	654
11	BN	0	719	490	654	654	0	654	52	0	0	400	150	400	752
12	VD	0	719	490	654	654	0	654	0	0	0	0	0	0	654
13	ED	0	719	490	654	654	0	654	0	0	0	0	0	0	654
14	ED	0	719	490	654	654	0	654	0	0	0	0	0	0	654
15	AN	0	908	619	825	825	506	825	724	399	399	1,050	1,368	1,050	1,765
16	AN	0	1,306	890	1,187	1,187	1,187	1,187	1,003	609	609	900	1,116	900	1,699
17	BN	0	1,208	824	1,098	1,098	1,050	1,098	601	100	0	0	0	0	1,098
18	VW	0	1,199	818	1,090	1,090	857	1,090	839	399	399	956	1,218	956	1,766
19	BN	0	1,268	865	1,153	1,153	1,153	1,153	704	198	0	300	150	300	1,205
20	BN	0	1,170	798	1,064	1,064	830	1,064	96	0	0	0	0	0	1,064
21	VD	0	866	590	787	787	0	787	0	0	0	0	0	0	787
22	BN	0	719	490	654	654	0	654	103	0	0	400	300	400	851
23	BN	0	719	490	654	654	0	654	0	0	0	100	0	100	654
24	BN	0	719	490	654	654	0	654	0	0	0	0	0	0	654
25	VD	0	719	490	654	654	0	654	0	0	0	0	0	0	654
26	ED	0	719	490	654	654	0	654	0	0	0	0	0	0	654
27	VW	0	908	619	825	825	506	825	686	399	399	1,056	1,218	1,056	1,653
28	AN	0	1,316	897	1,196	1,196	1,196	1,196	1,012	706	602	900	1,663	900	1,792
29	VW	0	1,303	888	1,184	1,184	1,184	1,184	1,093	890	691	1,056	1,948	1,056	1,806
30	AN	0	1,332	908	1,211	1,211	1,211	1,211	1,005	804	701	700	1,309	700	1,560
31	AN	0	1,299	886	1,181	1,181	1,181	1,181	1,090	791	588	1,102	1,663	1,102	1,792
32	VW	0	1,299	886	1,181	1,181	1,181	1,181	1,181	791	691	1,154	2,098	1,154	1,864
33	AN	0	1,334	910	1,213	1,213	1,213	1,213	1,213	804	701	1,200	1,915	1,200	1,960
34	AN	0	1,295	883	1,178	1,178	1,178	1,178	990	807	499	800	1,309	800	1,534
35	AN	0	1,294	882	1,176	1,176	1,176	1,176	988	806	602	700	1,411	700	1,636
36	BN	0	1,305	890	1,186	1,186	1,186	1,186	815	412	0	300	300	300	1,274
37	AN	0	1,199	818	1,090	1,090	857	1,090	757	399	399	650	762	650	1,391
38	BN	0	1,268	865	1,153	1,153	1,153	1,153	704	198	0	300	150	300	1,205
39	BN	0	1,170	798	1,064	1,064	830	1,064	186	0	0	400	150	400	1,124
40	VW	0	1,147	782	1,043	1,043	586	1,043	683	399	399	604	714	604	1,370
41	AN	0	1,295	883	1,178	1,178	1,178	1,178	905	706	602	700	1,411	700	1,628
42	VW	0	1,293	881	1,175	1,175	1,175	1,175	1,084	988	789	1,308	1,948	1,308	1,806
43	AN	0	1,332	908	1,211	1,211	1,211	1,211	1,005	804	701	550	1,309	550	1,560
44	VW	0	1,303	888	1,184	1,184	1,184	1,184	1,093	890	691	1,056	1,948	1,056	1,806
45	AN	0	1,329	906	1,208	1,208	1,208	1,208	1,002	802	698	500	1,207	500	1,458
46	AN	0	1,297	884	1,179	1,179	1,179	1,179	1,088	809	393	800	1,663	800	1,792
47	VW	0	1,291	880	1,174	1,174	1,174	1,174	986	890	691	1,106	1,696	1,106	1,650
48	BN	0	1,337	911	1,215	1,215	1,215	1,215	817	405	203	300	150	300	1,261
49	BN	0	1,170	798	1,064	1,064	830	1,064	273	0	0	400	300	400	1,186
50	AN	0	1,162	793	1,057	1,057	689	1,057	760	503	503	550	864	550	1,457
	Min	0	707	482	642	642	0	642	0	0	0	0	0	0	642
	Max	0	1,337	911	1,215	1,215	1,215	1,215	1,213	988	789	1,308	2,098	1,308	1,960
	Median	0	1,185	808	1,077	1,077	844	1,077	695	399	101	450	426	450	1,244
		0.0%	11.3%	7.7%	10.2%	10.2%	8.0%	10.2%	6.6%	3.8%	1.0%	4.3%	4.1%	4.3%	11.8%
	Average	0	1,080	736	981	981	707	981	567	356	275	494	718	494	1,259
		0.0%	10.9%	7.5%	9.9%	9.9%	7.2%	9.9%	5.7%	3.6%	2.8%	5.0%	7.3%	5.0%	12.7%

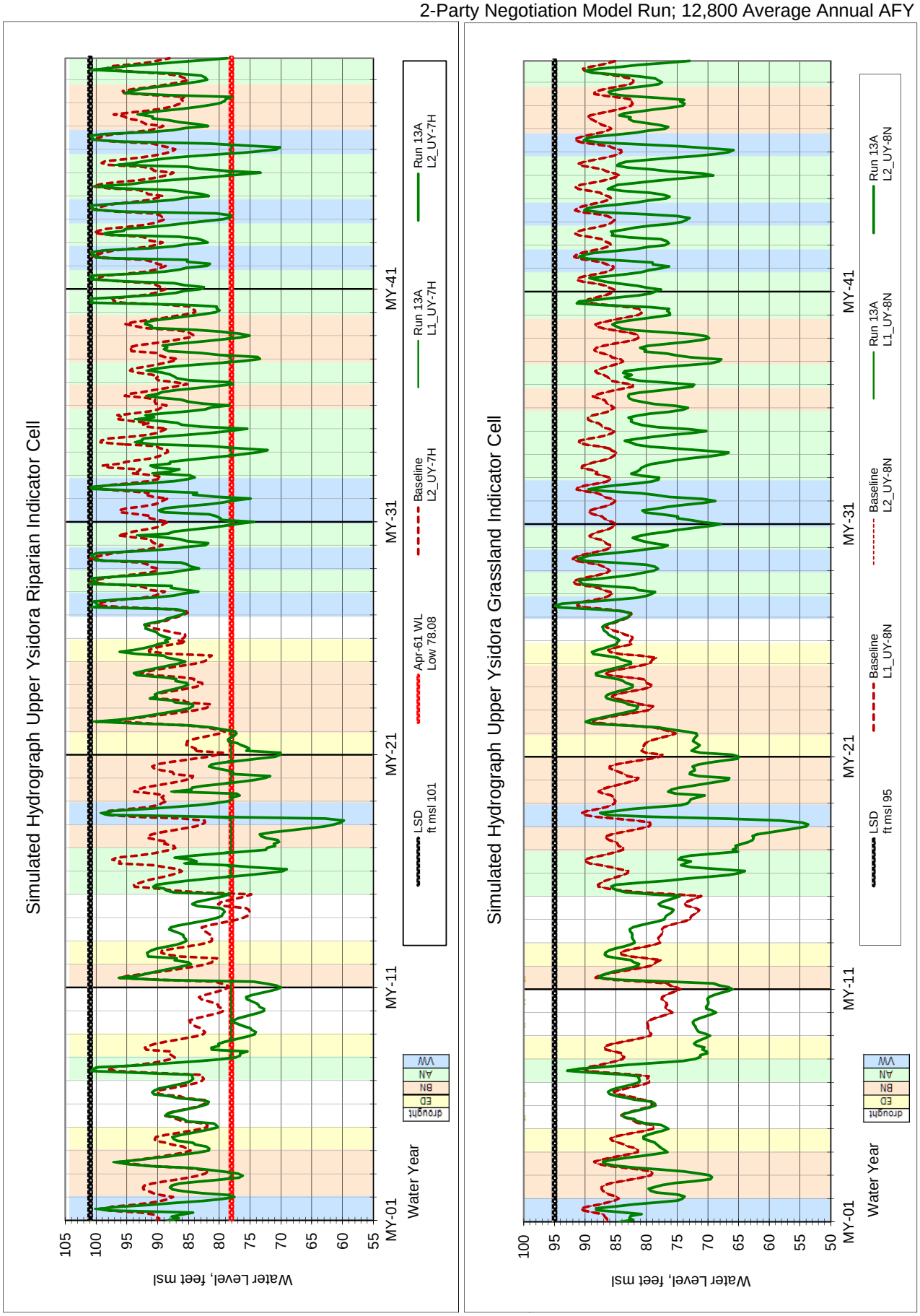
		UY	UY	UY	UY	UY	UY	UY	UY	UY	UY	UY	UY	UY	UY
		10/4-7A2	10/4-8D1	10/4-7H2	10/4-18B	10/4-7R2	UY-1	UY-2	UY-3	UY-4	UY-5	Gallery1	Gallery2	Gallery3	Gallery4
	Month	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)
	Oct	0	88	60	80	80	60	80	46	30	10	2	0	2	80
	Nov	0	84	57	77	77	56	77	30	0	0	8	0	8	77
	Dec	0	76	52	70	70	43	70	5	0	0	26	11	26	76
	Jan	0	83	56	75	75	47	75	23	2	2	72	63	72	115
	Feb	0	76	52	69	69	44	69	39	8	0	103	102	103	132
	Mar	0	89	61	81	81	58	81	62	38	28	130	129	130	160
	Apr	0	91	62	83	83	61	83	66	44	34	138	150	138	173
	May	0	95	65	86	86	68	86	50	31	10	10	0	10	86
	Jun	0	99	67	90	90	69	90	61	49	49	2	22	2	90
	Jul	0	100	68	91	91	67	91	67	59	47	0	109	0	91
	Aug	0	103	70	93	93	70	93	62	49	49	0	68	0	93
	Sep	0	95	65	86	86	64	86	56	46	46	2	64	2	86
	Annual Total	0	1,080	736	981	981	707	981	567	356	275	494	718	494	1,259
		-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 3 RUN 13A (using TM 1.1 Streamflow) Annual Pumping by Well (Continued)

	Building #:	2393	2373	2363	33925	2301	33924	33923	new
	Max Annual Pumping	1,046	1,332	1,141	1,141	0	0	0	761
	Potential w/ 80% Util	1,447	1,841	1,578	1,578	0	0	0	1,052
	Potential Well Yield (gpm)	1,100	1,400	1,200	1,200	0	0	0	800
		CH	CH	CH	CH	CH	CH	CH	CH
		10/4-18E3	10/4-18M4&5	10/5-13R2	10/5-23G4	10/5-23J1	10/5-23K2	10/5-23K3	CH-1
MY	HC	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)
1	VW	844	1,074	920	920	0	0	0	613
2	BN	666	848	727	727	0	0	0	484
3	BN	460	585	502	502	0	0	0	334
4	VD	319	407	349	349	0	0	0	232
5	ED	233	297	254	254	0	0	0	169
6	ED	246	313	268	268	0	0	0	179
7	AN	552	703	602	602	0	0	0	401
8	VD	538	684	586	586	0	0	0	391
9	ED	246	313	268	268	0	0	0	179
10	ED	246	313	268	268	0	0	0	179
11	BN	246	313	268	268	0	0	0	179
12	VD	246	313	268	268	0	0	0	179
13	ED	246	313	268	268	0	0	0	179
14	ED	246	313	268	268	0	0	0	179
15	AN	552	703	602	602	0	0	0	401
16	AN	882	1,122	962	962	0	0	0	641
17	BN	650	828	710	710	0	0	0	473
18	VW	674	858	736	736	0	0	0	490
19	BN	666	848	727	727	0	0	0	484
20	BN	460	585	502	502	0	0	0	334
21	VD	333	424	363	363	0	0	0	242
22	BN	246	313	268	268	0	0	0	179
23	BN	246	313	268	268	0	0	0	179
24	BN	246	313	268	268	0	0	0	179
25	VD	246	313	268	268	0	0	0	179
26	ED	246	313	268	268	0	0	0	179
27	VW	552	703	602	602	0	0	0	401
28	AN	933	1,187	1,018	1,018	0	0	0	678
29	VW	1,035	1,317	1,129	1,129	0	0	0	753
30	AN	967	1,231	1,055	1,055	0	0	0	703
31	AN	964	1,227	1,052	1,052	0	0	0	701
32	VW	1,022	1,301	1,115	1,115	0	0	0	743
33	AN	964	1,226	1,051	1,051	0	0	0	701
34	AN	907	1,155	990	990	0	0	0	660
35	AN	920	1,171	1,004	1,004	0	0	0	669
36	BN	704	896	768	768	0	0	0	512
37	AN	674	858	736	736	0	0	0	490
38	BN	666	848	727	727	0	0	0	484
39	BN	460	585	502	502	0	0	0	334
40	VW	639	813	697	697	0	0	0	465
41	AN	922	1,173	1,005	1,005	0	0	0	670
42	VW	1,046	1,332	1,141	1,141	0	0	0	761
43	AN	967	1,231	1,055	1,055	0	0	0	703
44	VW	1,035	1,317	1,129	1,129	0	0	0	753
45	AN	965	1,228	1,053	1,053	0	0	0	702
46	AN	921	1,173	1,005	1,005	0	0	0	670
47	VW	1,028	1,309	1,122	1,122	0	0	0	748
48	BN	748	952	816	816	0	0	0	544
49	BN	460	585	502	502	0	0	0	334
50	AN	671	854	732	732	0	0	0	488
	Min	233	297	254	254	0	0	0	169
	Max	1,046	1,332	1,141	1,141	0	0	0	761
	Median	658	838	718	718	0	0	0	479
		6.3%	8.0%	6.8%	6.8%	0.0%	0.0%	0.0%	4.6%
	Average	619	788	675	675	0	0	0	450
		6.3%	8.0%	6.8%	6.8%	0.0%	0.0%	0.0%	4.6%

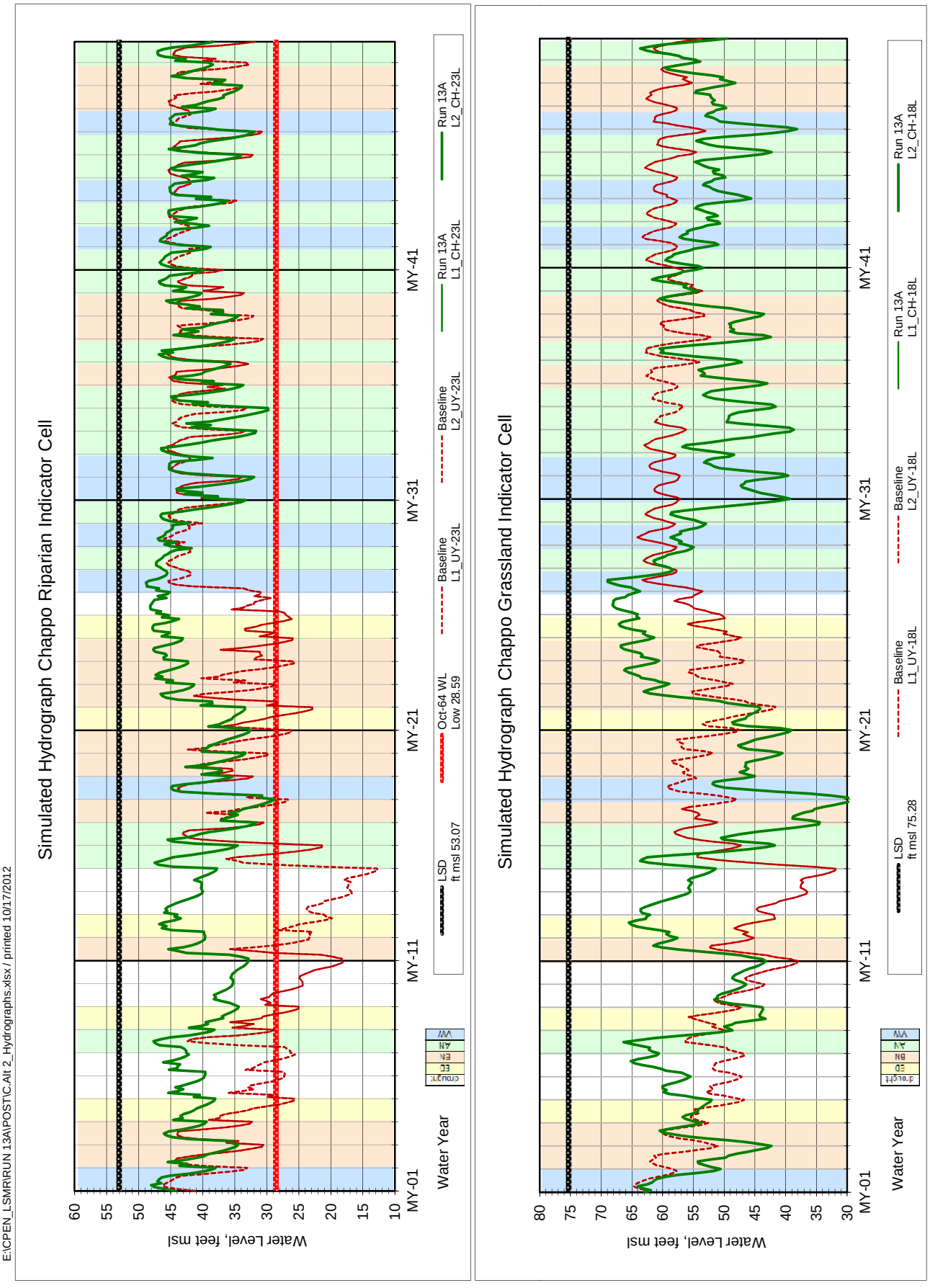
		CH	CH	CH	CH	CH	CH	CH	CH
		10/4-18E3	10/4-18M4&5	10/5-13R2	10/5-13R2	10/5-23J1	10/5-23K2	10/5-23K3	CH-1
	Month	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)
	Oct	50	63	54	54	0	0	0	36
	Nov	43	55	47	47	0	0	0	31
	Dec	36	46	39	39	0	0	0	26
	Jan	39	49	42	42	0	0	0	28
	Feb	36	46	39	39	0	0	0	26
	Mar	51	65	56	56	0	0	0	37
	Apr	53	67	58	58	0	0	0	38
	May	53	67	57	57	0	0	0	38
	Jun	61	78	67	67	0	0	0	44
	Jul	70	89	76	76	0	0	0	51
	Aug	67	85	73	73	0	0	0	48
	Sep	62	79	68	68	0	0	0	45
	Annual Total	619	788	675	675	0	0	0	450
		-	-	-	-	-	-	-	-

FIGURE 1 Run 13A and Baseline Hydrographs using TM1.1 Streamflow
2-Party Negotiation Model Run; 12,800 Average Annual AFY



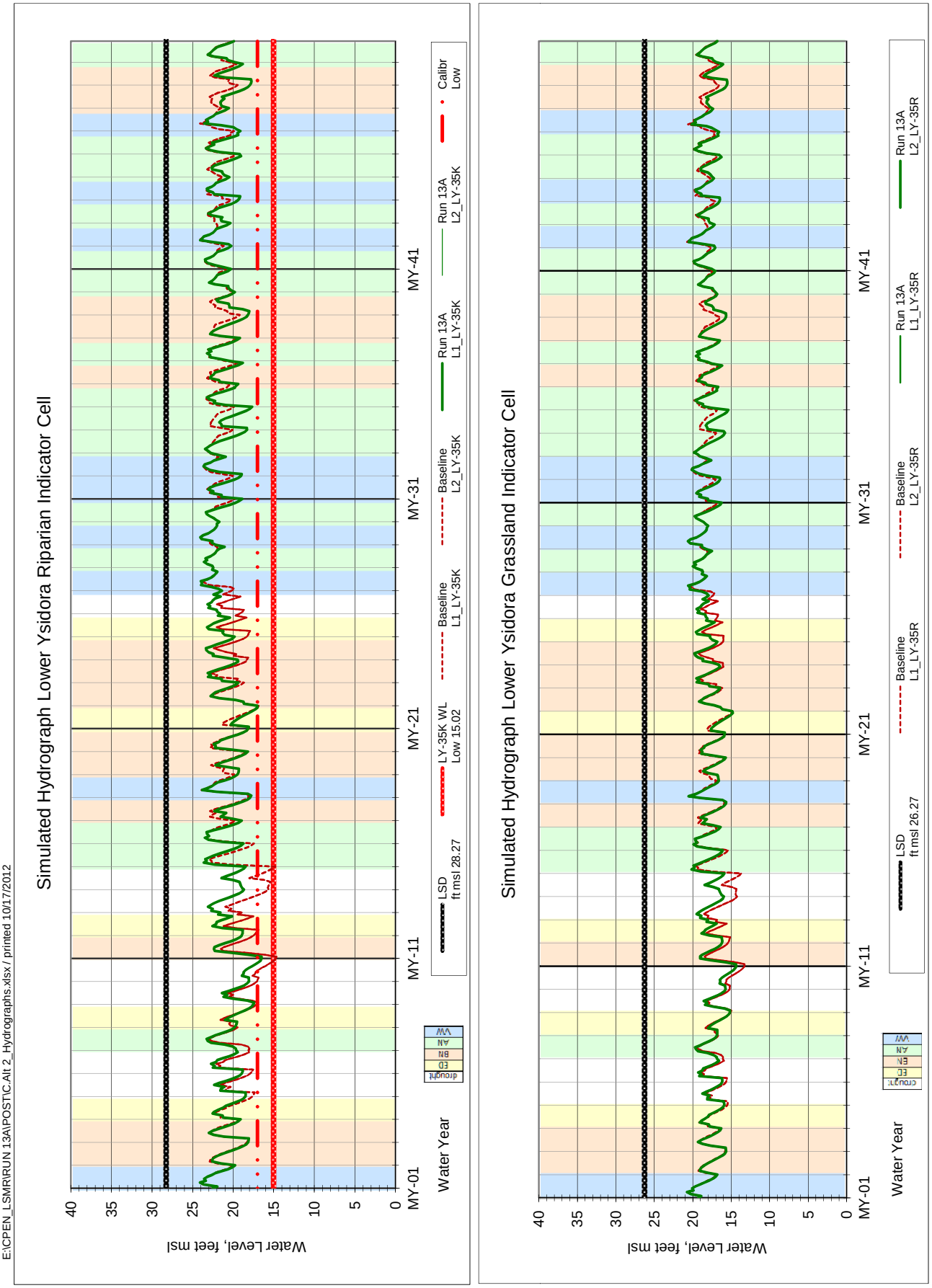
Layer 1 (L1) and Layer 2 (L2) simulated groundwater levels are at similar elevations and the graph lines are printed on top of each other.

FIGURE 2 Run 13A and Baseline Hydrographs using TM1.1 Streamflow
2-Party Negotiation Model Run; 12,800 Average Annual AFY



Layer 1 (L1) and Layer 2 (L2) simulated groundwater levels are at similar elevations and the graph lines are printed on top of each other.

FIGURE 3 Run 13A and Baseline Hydrographs using TM1.1 Streamflow
2-Party Negotiation Model Run; 12,800 Average Annual AFY



Layer 1 (L1) and Layer 2 (L2) simulated groundwater levels are at similar elevations and the graph lines are printed on top of each other.

FIGURE 4 Run 13 A and Baseline Streamflow, TM 1.1
2-Party Negotiation Model Run; 12,800 Average Annual AFY

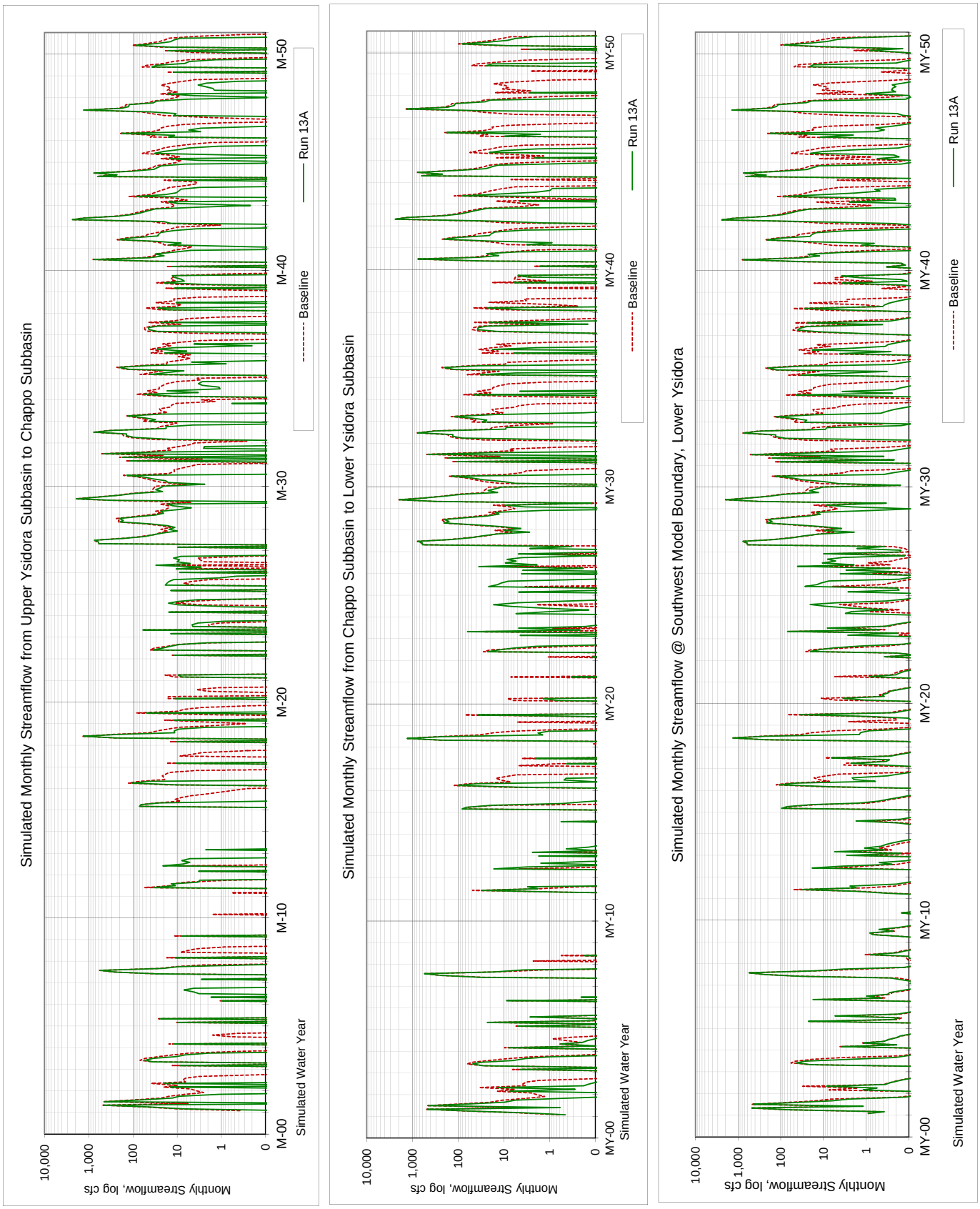


TABLE 4 2-Party Negotiation Gallery Well Model Run 13A; 12,800 Average Annual AFY

Average Hydrologic Condition Water Budget (af/y)

% Time Exceedence	*> 76%*	*76% to 50%*	*50% to 19%*	*< 19%*
# Years	*12*	*14*	*15*	*9*
	Very & Extrm Dry	Below Normal	Above Normal	Very Wet
Inflow:				
Santa Margarita River Inflow	6,200	12,000	32,900	132,900
Subsurface Underflow	600	600	600	600
Lake O'Neill Spill and Release	700	1,400	1,700	2,100
Fallbrook Creek	100	400	1,400	3,800
Title 22 Water	0	0	0	0
Minor Tributary Drainages	1,600	1,500	2,400	4,900
Areal Precipitation	600	500	700	1,600
Total Inflow:	9,800	16,400	39,700	145,900
Outflow:				
Santa Margarita River Outflow	1,300	1,800	18,600	120,100
Subsurface Underflow	0	100	100	100
Groundwater Pumping	5,700	10,800	17,100	18,500
Evapotranspiration	2,200	2,200	2,500	3,100
Diversions to Lake O'Neill	900	1,800	2,300	2,700
Total Outflow:	10,100	16,700	40,600	144,500
Net Simulated Change of Groundwater in Storage:	-200	-200	-900	1,500
	(100)	(100)	-	(100)

Median Hydrologic Condition Water Budget (af/y)

% Time Exceedence	*> 76%*	*76% to 50%*	*50% to 19%*	*< 19%*
# Years	*12*	*14*	*15*	*9*
	Very & Extrm Dry	Below Normal	Above Normal	Very Wet
Inflow:				
Santa Margarita River Inflow	6,300	12,900	26,700	121,300
Subsurface Underflow	600	600	600	600
Lake O'Neill Spill and Release	800	1,300	2,000	2,300
Fallbrook Creek	100	300	1,100	3,500
Title 22 Water	0	0	0	0
Minor Tributary Drainages	1,500	1,400	2,500	4,700
Areal Precipitation	400	300	500	1,600
Outflow:				
Santa Margarita River Outflow	400	1,900	12,000	103,800
Subsurface Underflow	0	100	100	100
Groundwater Pumping	5,100	11,200	18,500	20,300
Evapotranspiration	2,100	2,100	2,400	2,900
Diversions to Lake O'Neill	900	1,700	2,500	2,700
Net Simulated Change of Groundwater in Storage:	-200	-600	-800	1,200

Average Subbasin Water Budget (af/y)

	Upper Ysidora	Chappo	Lower Ysidora	SMR Basin	
Inflow:					
Santa Margarita River Inflow	38,600	29,300	27,600	38,600	86%
Subsurface Underflow *	600	1,400	400	600	1%
Lake O'Neill Spill and Release	1,500	-	-	1,500	3%
Fallbrook Creek	1,200	-	-	1,200	3%
Title 22 Water	-	-	0	0	0%
Minor Tributary Drainages	600	1,100	700	2,400	5%
Areal Precipitation	200	300	200	800	2%
Total Inflow:	42,700	32,100	28,900	45,100	
Outflow:					
Santa Margarita River Outflow	29,300	27,600	28,000	28,000	62%
Subsurface Underflow *	1,400	400	100	100	0%
Groundwater Pumping	6,700	3,200	0	9,900	22%
Gallery Well Production	3,000	-	-	3,000	7%
Evapotranspiration *	600	1,000	800	2,400	5%
Diversions to Lake O'Neill	1,900	-	-	1,900	4%
Total Outflow:	42,900	32,200	28,900	45,300	
Net Simulated Change of Groundwater in Storage: *	-100	0	0	-100	
	(100)	(100)	-	(100)	

Median Subbasin Water Budget (af/y)

	Upper Ysidora	Chappo	Lower Ysidora	SMR Basin
Inflow:				
Santa Margarita River Inflow	16,700	5,400	4,100	16,700
Subsurface Underflow *	600	1,300	400	600
Lake O'Neill Spill and Release	1,500	-	-	1,500
Fallbrook Creek	600	-	-	600
Title 22 Water	-	-	-	0
Minor Tributary Drainages	600	900	600	2,100
Areal Precipitation	200	200	200	500
Outflow:				
Santa Margarita River Outflow	5,400	4,100	4,500	4,500
Subsurface Underflow *	1,300	400	100	100
Groundwater Pumping	7,100	3,400	0	13,400
Evapotranspiration *	600	1,000	900	2,300
Diversions to Lake O'Neill	2,000	-	-	2,000
Net Simulated Change of Groundwater in Storage: *	-300	-300	0	-300

Note: * Subbasin Averages are based on the last rate of the stress period
Values are rounded to the nearest 100 acre-feet, which may result in a summation rounding error

Note: The sum of median values does not reflect the change of groundwater in storage.
Median values are not cummulative. Values are rounded to the nearest 100 acre-foot
* Subbasin Medians are based on the last rate of the stress period

TABLE 5 Model Run 13A Annual Water Budget Summary
Lower Santa Margarita River Groundwater Model — RUN 13A w TM1.1strflw
Modflow Volumetric Budget Output and Streamflow — 2/23/12
Annual Surface Water Budget

MY		SMR Flow In	LON Diversion	Ponds Diversion	Release & Spill	Str Gain+ / Loss-	GAGE SMR @ UY->CH	Str Gain+ / Loss-	SMR @ CH->LY	Str Gain+ / Loss-	SMR Flow Out	LSMR Str Gain+ / Loss-
1	VW	72,916	-2754	-9005	1,399	-10,181	62,735	-131	62,604	1,697	64,301	-8,615
2	BN	9,851	-1646	-3545	1,552	-7,832	2,019	-1,333	686	4	690	-9,160
3	AN	20,681	-1468	-6773	1,058	-11,724	8,957	-3,344	5,613	-178	5,435	-15,246
4	VD	6,075	-1440	-2315	1,120	-5,363	712	-463	249	122	371	-5,705
5	ED	6,569	-908	-1410	971	-4,542	2,027	-630	1,397	365	1,762	-4,807
6	ED	6,129	-710	-1593	387	-4,843	1,286	-741	545	689	1,234	-4,895
7	AN	59,305	-1596	-9311	383	-8,401	50,904	-760	50,144	679	50,823	-8,482
8	VD	6,521	-1361	-2859	1,217	-5,863	658	-648	10	86	96	-6,425
9	ED	3,649	-1013	-1048	1,016	-3,177	472	-468	3	167	170	-3,479
10	ED	3,123	-848	-1609	519	-3,123	-	0	-	39	39	-3,085
11	BN	13,074	-902	-6018	501	-9,307	3,767	-1,832	1,935	283	2,218	-10,856
12	VD	7,435	-580	-2267	434	-4,529	2,906	-1,581	1,325	193	1,517	-5,918
13	ED	3,321	-573	-1160	285	-3,187	133	52	185	318	503	-2,818
14	ED	3,589	-300	-1593	234	-3,589	-	33	33	123	156	-3,433
15	AN	20,522	-2438	-5330	551	-10,745	9,778	299	10,076	1,255	11,331	-9,191
16	AN	22,816	-1985	-7341	1,558	-13,151	9,665	-637	9,028	979	10,007	-12,809
17	BN	6,199	-1426	-2565	1,196	-5,554	645	-493	151	475	627	-5,572
18	VW	117,031	-2248	-11669	1,642	-14,156	102,875	-2,535	100,340	1,677	102,016	-15,015
19	BN	12,744	-2305	-4217	1,680	-9,029	3,715	-1,500	2,214	3	2,217	-10,526
20	BN	6,645	-1257	-2416	1,190	-5,986	659	-533	126	258	384	-6,260
21	VD	8,614	-1614	-1401	1,009	-7,568	1,046	-1,025	21	81	101	-8,513
22	BN	13,510	-1576	-7095	1,206	-8,072	5,437	-2,948	2,490	-139	2,351	-11,159
23	BN	9,953	-1385	-2542	1,037	-4,695	5,258	-827	4,431	551	4,982	-4,971
24	BN	7,708	-1613	-3963	1,115	-4,494	3,214	-999	2,215	366	2,581	-5,127
25	VD	9,653	-797	-3611	1,010	-4,439	5,214	-1,427	3,787	221	4,009	-5,645
26	ED	9,163	-1217	-2413	576	-3,882	5,281	-809	4,472	620	5,092	-4,071
27	VW	138,265	-2906	-12948	2,063	-6,498	131,767	312	132,079	1,975	134,054	-4,211
28	AN	61,252	-2721	-16066	2,352	-13,559	47,693	-3,591	44,102	427	44,529	-16,723
29	VW	195,725	-2739	-16536	2,413	-10,839	184,886	-2,097	182,790	1,697	184,487	-11,238
30	AN	27,995	-2749	-6406	2,126	-12,089	15,906	-2,130	13,776	113	13,889	-14,106
31	AN	61,581	-2697	-6807	2,204	-13,402	48,178	-2,272	45,906	465	46,371	-15,210
32	VW	105,365	-2720	-11912	2,385	-13,711	91,654	-4,395	87,259	712	87,971	-17,394
33	AN	28,766	-2714	-8864	2,173	-14,329	14,438	-1,481	12,956	376	13,333	-15,433
34	AN	21,480	-2702	-8476	2,094	-15,431	6,049	-2,968	3,081	-73	3,008	-18,472
35	AN	38,995	-2197	-8109	1,812	-12,505	26,491	-3,208	23,282	338	23,620	-15,375
36	BN	13,900	-2115	-4623	1,524	-9,801	4,100	-2,544	1,556	4	1,560	-12,340
37	AN	18,856	-1744	-5429	1,293	-8,822	10,034	-1,993	8,041	415	8,456	-10,400
38	BN	12,534	-1767	-4732	1,311	-9,272	3,262	-1,609	1,653	250	1,903	-10,630
39	BN	15,053	-2156	-5887	1,717	-10,807	4,246	-3,445	801	-243	558	-14,495
40	VW	66,151	-2779	-11080	2,318	-10,023	56,128	-2,917	53,210	158	53,369	-12,782
41	AN	40,738	-2711	-12043	2,263	-13,781	26,957	-3,690	23,266	182	23,448	-17,290
42	VW	256,836	-2723	-15723	2,325	-11,236	245,600	-2,232	243,367	1,147	244,514	-12,322
43	AN	23,081	-2752	-12099	2,268	-13,745	9,336	-3,575	5,761	46	5,807	-17,274
44	VW	122,236	-2675	-14823	2,233	-13,774	108,462	-3,081	105,381	1,080	106,461	-15,774
45	BN	17,853	-2748	-10619	2,043	-12,648	5,205	-3,111	2,094	-111	1,982	-15,870
46	AN	26,690	-1995	-8838	1,461	-13,389	13,302	-1,830	11,472	561	12,032	-14,658
47	VW	121,259	-2716	-14977	2,559	-14,797	106,462	-3,763	102,699	1,141	103,840	-17,419
48	BN	13,194	-2744	-7414	2,078	-11,342	1,853	-1,689	164	-10	154	-13,040
49	BN	15,504	-1815	-6800	1,199	-10,169	5,335	-2,825	2,510	-187	2,323	-13,180
50	AN	20,633	-2478	-9322	2,028	-10,316	10,317	-2,737	7,580	18	7,598	-13,035
	avg	38,615	-1,920	-6,912	1,462	**-9,274**	29,340	**-1,763**	27,577	**428**	28,006	**-10,609**
	med	16,678	-1,990	-6,590	1,430	-9,912	5,386	-1,649	4,109	271	4,496	-11,008
AVERAGES												
VD/ED	12	6,153	-947	-1,940	731	-4,509	1,645	-642	1,002	252	1,254	-4,899
BN	14	11,980	-1,818	-5,174	1,382	-8,501	3,480	-1,835	1,645	108	1,752	-10,228
AN	15	32,893	-2,330	-8,747	1,708	-12,359	20,533	-2,261	18,272	374	18,646	-14,247
VW	9	132,865	-2,696	-13,186	2,149	-11,691	121,174	-2,315	118,859	1,254	120,113	-12,752
	50											
MEDIANS												
VD/ED	12	6,325	-878	-1,601	774	-4,484	879	-639	217	180	437	-4,851
BN	14	12,909	-1,706	-4,677	1,258	-9,150	3,741	-1,649	1,794	4	1,943	-10,743
AN	15	26,690	-2,478	-8,476	2,028	-13,151	13,302	-2,272	11,472	376	12,032	-15,210
VW	9	121,259	-2,723	-12,948	2,318	-11,236	106,462	-2,535	102,699	1,147	103,840	-12,782
	50											

TABLE 5 Model Run 13A Annual Water Budget Summary (continued)
Lower Santa Margarita River Groundwater Model
Modflow Volumetric Budget Output
Annual Groundwater Budget Model Run: RUN 13A w TM1.1strflw

	INFLOW:					OUTFLOW:					
MY	Storage	Recharge	Stream Leakance	GHB	TOTAL GW IN	Storage	Wells	ET	Stream Leakance	GHB	TOTAL GW OUT
1	8,722	10,069	8,537	615	27,942	4,404	18,124	3,131	2,239	67	27,965
2	7,348	3,740	6,629	614	18,331	4,043	12,174	1,838	240	49	18,344
3	4,951	6,978	10,578	615	23,122	8,752	10,758	2,410	1,155	47	23,122
4	4,498	2,613	4,683	612	12,406	3,351	6,837	2,005	174	51	12,417
5	4,040	1,722	6,074	623	12,460	5,143	4,966	2,206	109	47	12,470
6	3,710	2,344	6,508	612	13,174	5,051	5,099	2,631	339	54	13,173
7	7,576	9,917	5,657	608	23,758	5,546	11,820	2,961	3,378	59	23,764
8	6,265	3,014	4,082	621	13,982	2,980	9,493	1,423	72	44	14,011
9	3,147	1,414	4,433	649	9,644	3,267	5,099	1,271	86	48	9,770
10	3,297	1,731	2,275	673	7,976	1,804	5,101	951	45	37	7,938
11	4,426	6,490	8,650	632	20,198	10,523	6,201	2,164	1,269	47	20,204
12	3,239	2,555	6,850	613	13,257	4,773	5,099	2,780	559	48	13,258
13	4,442	1,405	3,088	618	9,553	1,694	5,101	2,472	250	52	9,570
14	3,526	1,931	3,168	637	9,262	2,332	5,099	1,717	69	49	9,266
15	8,386	6,389	7,734	622	23,131	6,384	14,125	2,241	341	58	23,149
16	8,733	7,964	10,852	625	28,173	7,408	18,538	1,827	348	57	28,179
17	6,954	2,893	5,794	633	16,274	3,393	11,545	1,173	129	52	16,292
18	7,025	12,856	13,985	645	34,511	14,263	16,175	2,158	1,868	58	34,523
19	7,661	4,408	6,912	617	19,598	4,862	13,053	1,561	97	48	19,621
20	6,292	2,798	6,198	627	15,917	4,832	9,532	1,380	135	51	15,930
21	3,214	1,690	7,440	649	12,993	5,427	6,329	1,146	67	42	13,010
22	4,617	7,452	7,819	608	20,496	9,174	6,499	2,546	2,232	50	20,501
23	3,930	3,012	5,840	616	13,399	4,467	5,301	2,927	670	52	13,418
24	3,880	4,426	5,372	604	14,282	4,201	5,099	3,177	1,756	56	14,289
25	3,675	4,201	6,786	607	15,269	4,927	5,101	3,237	1,955	56	15,275
26	2,975	2,849	5,833	604	12,262	2,539	5,099	3,494	1,081	58	12,271
27	6,233	14,167	8,150	606	29,155	5,868	13,843	3,618	5,777	66	29,172
28	5,776	16,430	10,211	600	33,018	4,938	19,399	3,375	5,250	59	33,020
29	5,691	17,557	11,221	601	35,070	5,820	20,822	3,326	5,041	66	35,075
30	8,251	6,635	9,906	610	25,401	3,597	18,893	2,410	459	54	25,414
31	8,090	7,252	14,284	617	30,243	8,003	20,041	1,931	241	55	30,271
32	6,602	12,668	16,919	608	36,798	10,204	21,120	2,649	2,741	61	36,776
33	8,827	9,070	9,917	613	28,427	4,516	21,097	2,146	652	54	28,465
34	7,560	8,703	12,443	617	29,322	7,982	18,480	1,641	1,191	47	29,342
35	6,662	8,540	14,004	610	29,816	8,322	18,572	2,181	673	54	29,802
36	6,800	4,881	10,170	609	22,459	5,978	13,981	2,013	452	54	22,478
37	7,466	5,847	10,721	612	24,646	7,156	14,669	2,401	379	57	24,662
38	7,415	4,977	9,252	615	22,258	6,944	13,039	1,816	413	50	22,263
39	5,048	6,084	10,376	615	22,124	8,219	10,629	2,323	895	48	22,114
40	5,948	11,272	9,343	618	27,181	7,169	13,728	2,938	3,287	52	27,175
41	5,716	12,374	11,478	606	30,174	5,395	18,320	3,060	3,386	56	30,216
42	6,749	16,575	11,823	604	35,751	6,566	21,534	3,049	4,532	61	35,740
43	7,323	12,259	9,688	604	29,874	5,854	18,572	2,668	2,743	51	29,888
44	6,543	15,496	12,810	608	35,457	7,943	20,845	2,785	3,866	56	35,495
45	9,458	10,767	8,173	606	29,004	5,923	18,251	2,339	2,433	51	28,997
46	9,068	9,252	11,180	615	30,115	7,966	19,031	1,995	1,100	56	30,148
47	5,647	15,909	15,266	613	37,436	10,262	20,317	2,725	4,082	64	37,449
48	6,474	7,599	7,140	604	21,816	4,201	14,417	1,928	1,217	51	21,814
49	6,198	6,956	7,920	615	21,690	7,507	10,927	2,156	1,074	43	21,708
50	7,599	9,642	8,104	606	25,950	6,772	13,935	2,805	2,443	53	26,008
avg	6,073	7,355	8,646	617	22,691	5,973	12,837	2,342	1,500	53	22,704
med	6,279	6,795	8,161	613	22,791	5,683	13,391	2,331	985	52	22,800
AVERAGES											
VD/ED	3,836	2,289	5,102	627	11,853	3,607	5,702	2,111	400	49	11,869
BN	6,179	5,463	7,589	615	19,846	6,019	10,761	2,096	929	50	19,855
AN	7,466	9,150	10,450	612	27,678	6,573	17,083	2,404	1,583	54	27,697
VW	6,573	14,063	12,006	613	33,256	8,055	18,501	2,931	3,715	61	33,263
MEDIANS											
VD/ED	3,601	2,137	5,258	620	12,433	3,309	5,100	2,105	141	48	12,444
BN	6,383	4,929	7,479	615	20,347	5,393	11,236	2,084	783	51	20,352
AN	7,576	8,703	10,578	612	28,427	6,772	18,538	2,401	1,100	55	28,465
VW	6,543	14,167	11,823	608	35,070	7,169	20,317	2,938	3,866	61	35,075

TABLE 5 Model Run 13A Annual Water Budget Summary (continued)
Lower Santa Margarita River Groundwater Model
Modflow Volumetric Budget Output
Annual Groundwater Budget

MY	NET Storage	NET Str Lknc	In-Out	% bal
1	-4,317	6,298	-23.0	-0.08%
2	-3,305	6,389	-12.8	-0.07%
3	3,801	9,423	-0.1	0.00%
4	-1,147	4,509	-11.2	-0.09%
5	1,102	5,966	-10.3	-0.08%
6	1,341	6,169	0.9	0.01%
7	-2,029	2,279	-6.4	-0.03%
8	-3,285	4,010	-29.0	-0.21%
9	119	4,347	-126.6	-1.30%
10	-1,492	2,230	37.2	0.47%
11	6,097	7,382	-6.0	-0.03%
12	1,534	6,291	-1.0	-0.01%
13	-2,748	2,838	-16.5	-0.17%
14	-1,194	3,099	-4.2	-0.05%
15	-2,002	7,393	-18.0	-0.08%
16	-1,325	10,503	-5.6	-0.02%
17	-3,561	5,665	-17.9	-0.11%
18	7,238	12,117	-12.2	-0.04%
19	-2,798	6,816	-23.3	-0.12%
20	-1,460	6,063	-13.7	-0.09%
21	2,213	7,374	-17.4	-0.13%
22	4,557	5,587	-5.1	-0.02%
23	537	5,170	-19.1	-0.14%
24	321	3,616	-7.5	-0.05%
25	1,251	4,831	-5.9	-0.04%
26	-436	4,752	-9.3	-0.08%
27	-365	2,373	-16.8	-0.06%
28	-838	4,961	-2.7	-0.01%
29	129	6,180	-4.8	-0.01%
30	-4,653	9,447	-13.5	-0.05%
31	-87	14,043	-28.0	-0.09%
32	3,602	14,178	21.5	0.06%
33	-4,311	9,265	-37.9	-0.13%
34	422	11,251	-19.7	-0.07%
35	1,660	13,331	14.5	0.05%
36	-822	9,718	-19.1	-0.08%
37	-310	10,342	-16.0	-0.06%
38	-471	8,838	-4.7	-0.02%
39	3,170	9,481	9.6	0.04%
40	1,221	6,056	5.9	0.02%
41	-321	8,092	-42.0	-0.14%
42	-184	7,291	10.4	0.03%
43	-1,469	6,944	-14.5	-0.05%
44	1,400	8,944	-37.9	-0.11%
45	-3,535	5,739	6.2	0.02%
46	-1,102	10,080	-32.8	-0.11%
47	4,614	11,185	-13.3	-0.04%
48	-2,273	5,923	2.1	0.01%
49	1,309	6,846	-18.1	-0.08%
50	-826	5,661	-57.2	-0.22%
avg	-101	7,146	-13.4	-0.07%
med	-343	6,343	-12.5	-0.06%
AVERAGES				
VD/ED	(229)	4,701	(16)	(0)
BN	(160)	6,659	(9)	(0)
AN	(893)	8,868	(19)	(0)
VW	1,482	8,291	(8)	(0)
MEDIANS				
VD/ED	(158)	4,631	(10)	(0)
BN	(646)	6,226	(10)	(0)
AN	(838)	9,423	(16)	(0)
VW	1,221	7,291	(12)	(0)

TABLE 6 Gallery Well Model Run 13A Average Monthly Water Budget Summary
Lower Santa Margarita River Groundwater Model RUN 13A w TM1.1strflw
Modflow Volumetric Budget Output and Streamflow 2/23/12

Atreamflow

Avg AF/M	SMR Flow In	Diversion	Str Gain+ / Loss-	SMR @ UY->CH	Str Gain+ / Loss-	SMR @ CH->LY	Str Gain+ / Loss-	SMR Flow Out	LSMR Str Gain+ / Loss-
Oct	506	292	-414	92	-53	39	4	43	-462
Nov	1,124	511	-163	960	-507	454	-8	445	-678
Dec	1,873	526	-1,006	867	-120	748	49	796	-1,077
Jan	8,266	834	-1,290	6,975	-42	6,933	145	7,078	-1,188
Feb	10,626	1,793	-1,814	8,812	-98	8,714	116	8,831	-1,796
Mar	9,229	1,934	-1,581	7,648	-157	7,491	97	7,588	-1,641
Apr	3,380	1,299	-1,022	2,358	-203	2,155	37	2,192	-1,187
May	1,429	866	-664	765	-210	555	-5	550	-879
Jun	764	539	-338	426	-178	248	-8	240	-524
Jul	500	128	-255	244	-102	143	-5	137	-362
Aug	422	61	-339	83	-53	30	6	36	-386
Sep	497	49	-388	109	-41	68	0	69	-428
Avg Monthly	3,218	736	-773	2,445	-147	2,298	36	2,334	-884
Med Monthly	1,276	533	-539	816	-111	504	5	498	-779
Avg Total=Anl	38,615	8,832	-9,274	29,340	-1,763	27,577	428	28,006	-10,609

Lower Santa Margarita River Groundwater Model
Modflow Volumetric Budget Output

Groundwater Model

	INFLOW:					OUTFLOW:									
Avg AF/M	Storage	Recharge	Stream Leakance	GHB	TOTAL IN	Storage	Wells	ET	Stream Leakance	GHB	TOTAL OUT	OUT-IN NET Storage	OUT-IN NET Str Lknc	In-Out	% bal
Oct	605	31	412	54	1,102	94	878	123	7	3	1,105	-512	405	-3.4	-0.31%
Nov	87	479	1,525	52	2,143	1,261	771	95	11	4	2,143	1,174	1,515	0.1	0.01%
Dec	305	142	1,027	53	1,526	703	711	87	19	6	1,526	399	1,009	0.1	0.00%
Jan	178	367	1,312	52	1,910	799	967	105	32	6	1,909	620	1,280	0.5	0.02%
Feb	137	1,687	942	47	2,814	1,508	1,055	142	99	6	2,810	1,371	843	3.6	0.13%
Mar	162	1,992	794	52	3,000	1,033	1,396	218	347	6	2,999	871	448	0.9	0.03%
Apr	420	1,340	582	50	2,393	281	1,471	263	375	5	2,396	-139	207	-3.1	-0.13%
May	427	920	430	52	1,829	201	956	307	358	4	1,827	-226	72	1.6	0.09%
Jun	867	310	401	50	1,628	36	1,095	301	198	3	1,633	-831	203	-5.1	-0.31%
Jul	1,092	68	363	52	1,575	7	1,243	285	42	3	1,581	-1,084	321	-5.5	-0.35%
Aug	995	11	389	53	1,448	9	1,191	240	6	3	1,449	-986	382	-1.3	-0.09%
Sep	798	9	466	52	1,324	40	1,102	177	5	3	1,326	-758	461	-1.8	-0.14%
Avg Monthly	506	613	720	51	1,891	498	1,070	195	125	4	1,892	-8	595	-1.1	-0.09%
Med Monthly	424	338	524	52	1,728	241	1,075	197	37	4	1,730	-182	426	-0.6	-0.04%
Avg Total=Anl	6,073	7,355	8,646	617	22,691	5,973	12,837	2,342	1,500	53	22,704	-101	7,146	-13.4	

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