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CHINO BASIN WATERMASTER

SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF SAN BERNARDINO

CHINO BASIN MUNICIPAL WATER DISTRICT,

Plaintiff,

v.

CITY OF CHINO, ET AL.,

Defendants.

Case No. RCV RS 51010

[Assigned for All Purposes to the Honorable Gilbert G. Ochoa]

DECLARATION OF PETER KAVOUNAS IN SUPPORT OF CHINO BASIN WATERMASTER'S MOTION FOR COURT APPROVAL OF UPDATE TO WATERMASTER SAFE YIELD RESET METHODOLOGY

Date: December 16, 2022
Time: 9:00 a.m.
Dept: S24

[*Filed concurrently herewith: Motion for Court Approval of Update to Watermaster's Safe Yield Reset Methodology; Declarations of Garrett Rapp and Declaration of Bradley J. Herrema in support thereof; and [Proposed] Order*]

DECLARATION OF PETER KAVOUNAS

I, Peter Kavounas, declare:

1. I currently serve as the General Manager of the Chino Basin Watermaster ("Watermaster"). I have served in this capacity since September 4, 2012. I have personal knowledge of the facts stated in this declaration, except where stated on information and belief, and if called as a witness, I could and would competently testify to them under oath. I make this declaration in support of Watermaster's Motion for Court Approval of Update to Safe Yield Reset Methodology.

2. As the General Manager of Watermaster, I am intimately familiar with the actions taken by the Pool Committees, Advisory Committee, and the Watermaster Board, and the directives to staff from the Board. My role as General Manager includes attending all Pool Committee, Advisory Committee, and Watermaster Board meetings.

3. As a part of Watermaster's responsibilities, Watermaster must recalculate and reset the Safe Yield of the Chino Basin (the "Basin") every ten years. This requirement is outlined in the Optimum Basin Management Program Implementation Plan. A true and correct copy of the Optimum Basin Management Program Implementation Plan, which is Attachment B to the Peace Agreement, is attached hereto as **Exhibit A**.

4. The previous Safe Yield Reset ("SYR") from July 1, 2010 to June 30, 2020 was conducted using the 2017 Court-approved SYR Methodology outlined in the August 10, 2015 Safe Yield Reset Technical Memorandum. The SYR Methodology is also included as Exhibit A of Watermaster's current Rules and Regulations. A true and correct copy of the Court's April 28, 2017 Order Additional/Final Revised Order for Watermaster's Motion Regarding 2015 Safe Yield Reset Agreement, Amendment of Restated Judgement, Paragraph 6 ("2017 Order") is attached hereto as **Exhibit B**.

5. The SYR Methodology specified in the 2017 Order was reaffirmed by the March 15, 2019 Findings and Order Regarding Amendments to Restated Judgment, Peace Agreement, Peace II Agreement, and Re-Operation Schedule. A true and correct copy of the Court's March 15, 2019 Findings and Order Regarding Amendments to Restated Judgment, Peace Agreement, Peace

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II Agreement, and Re-Operation Schedule is attached hereto as **Exhibit C**.

6. In July 2018, using the same SYR Methodology as the reset for the 2010-2020 period, Watermaster's technical consultant began the technical work necessary for the Safe Yield reset for 2020 ("2020 Reset"). After substantial technical process and stakeholder engagement, in May 2020, the Watermaster Board adopted recommendations to the Court to update the Safe Yield for the period 2021 through 2030 to 131,000 acre-feet per year. The 2020 methodology, public comments, and Watermaster responses are also included as Appendix F to the 2020 Safe Yield Recalculation Final Report. A true and correct copy of Appendix F to the 2020 Safe Yield Recalculation Final Report is attached hereto as **Exhibit D**.

7. During the 2020 Reset process, peer review comments specifically recommended that the SYR Methodology be modified to include an "uncertainty analysis," described as a widely accepted Best Management Practice. The comments also provided input as to what it would look like and identified several benefits to the parties.

8. The City of Chino also opposed Watermaster's 2020 SYR Motion, arguing for changes to the SYR Methodology, including the recommendation to update the methodology to address uncertainty in the Safe Yield Reset modeling process.

9. As a result of the comments submitted during the 2020 Reset, the 2022 Safe Yield Reset Methodology Update ("2022 SYRMU") was drafted and includes, along with other changes, an uncertainty analysis.

10. Watermaster included revisions of the SYR Methodology to incorporate an "uncertainty analysis" in the budget for fiscal year 2021/22 and provided parties the opportunity to comment on the proposed budget from March 23, 2021 to May 13, 2021. Watermaster also hosted two budget workshops in April 2021.

11. The FY 2021/2022 budget was adopted by the Board as approved by the Advisory Committee in May 2021 without funds for the Safe Yield Court Order Implementation – including the development of the 2022 SYRMU. The budget was approved without the funds for the Safe Yield Court Order Implementation by request of the Monte Vista Water District who requested those funds be considered separately.

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12. In July 2021, the Watermaster Board approved a budget amendment and directed staff to resolve outstanding issues raised by the Appropriative Pool regarding the scope and budget of the Safe Yield Court Order Implementation.

13. Watermaster staff and technical consultants met with representatives from the Appropriative Pool on August 3, 2021 to resolve issues raised with the scope and budget for the Safe Yield Court Order Implementation.

14. Following a special Appropriative Pool Committee meeting in August 2021, the Advisory Committee and Watermaster Board approved a budget amendment in September 2021, which provided for development of an initial technical memorandum describing the issue of model uncertainty and its application to the Chino Valley Model and to facilitate peer review meetings prior to developing the 2022 SYRMU.

15. Watermaster released an overview of the potential updates to the SYR Methodology on October 21, 2021 and, on October 26, 2021, held a peer review workshop to gather feedback from the Parties regarding the scope of the 2022 SYRMU.

16. Watermaster's consultant incorporated feedback received at the October 2021 peer review workshop and during the subsequent October 29, 2021 to November 11, 2021 comment period into the revised scope and budget reviewed at the November 2021 Pool and Advisory Committee meetings and Board meeting.

17. The Advisory Committee approved, and the Watermaster Board adopted, the final 2022 SYRMU scope and budget in November 2021.

18. The proposed 2022 SYRMU was presented to the three Pool Committees on September 8, 2022 for their recommendation and advice. The Appropriative Pool Committee discussed the matter and, after consideration in confidential session, requested that Watermaster allow thirty more days to provide advice and assistance, without expressing any further questions or concerns. The Overlying (Non-Agricultural) Pool Committee and the Overlying (Agricultural) Pool Committee members engaged in discussion with Watermaster staff but did not take action to offer any advice or assistance.

19. Following the September 8, 2022 Pool Committee meetings, Watermaster staff met

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with the Appropriative Pool leadership to discuss and better understand its request for additional time and provided additional information to answer questions in advance of the September 15, 2022 Advisory Committee meeting.

20. The proposed 2022 SYRMU was presented to the Advisory Committee at its regular meeting on September 15, 2022, where it recommended that the Watermaster Board approve and direct staff to file the proposed methodology with the Court.

21. The Advisory Committee motion regarding the 2022 SYRMU was passed by a 65.344% majority volume vote; the dissenting parties expressed that their opposition was due to a desire for thirty additional days to consider the item, without stating any substantive concerns or voicing any questions about the final 2022 SYRMU.

22. At its regularly scheduled meeting on September 22, 2022, the Watermaster Board approved the 2022 SYRMU unanimously and directed counsel to file a motion with the Court for approval. A true and correct copy of the September 22, 2022 Safe Yield Reset Methodology Update Power Point presented to the Watermaster Board is attached hereto as **Exhibit E**.

23. At the time of the Board's consideration of the 2022 SYRMU during its September 22, 2022 regular meeting, no Party spoke to oppose the Watermaster Board's approval.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Dated this 15th day of November, 2022, at Rancho Cucamonga, California.

P. Kavounas

PETER KAVOUNAS

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EXHIBIT A

IMPLEMENTATION PLAN
OPTIMUM BASIN MANAGEMENT PROGRAM
FOR THE
CHINO BASIN

INTRODUCTION

This document describes the implementation plan for the Chino Basin Optimum Basin Management Program (OBMP). The goals and objectives for the OBMP are described in Section 3 of the Phase 1 OBMP report dated August 1999. Nine program elements were developed during the OBMP Phase 1 process to meet the goals of the OBMP. The program elements described herein include:

- Program Element 1 – Develop and Implement Comprehensive Monitoring Program
- Program Element 2 – Develop and Implement Comprehensive Recharge Program
- Program Element 3 – Develop and Implement Water Supply Plan for the Impaired Areas of the Basin
- Program Element 4 – Develop and Implement Comprehensive Groundwater Management Plan for Management Zone 1
- Program Element 5 – Develop and Implement Regional Supplemental Water Program
- Program Element 6 – Develop and Implement Cooperative Programs with the Regional Water Quality Control Board, Santa Ana Region (Regional Board) and Other Agencies to Improve Basin Management
- Program Element 7 – Develop and Implement Salt Management Program
- Program Element 8 – Develop and Implement Groundwater Storage Management Program
- Program Element 9 – Develop and Implement Storage and Recovery Programs

The scope of the program elements was developed by the Chino Basin stakeholders. Each program element contains a series of comprehensive actions and plans to implement those actions. Some of the program elements have been combined because they overlap and have synergies between them.

The parties to the PEACE Agreement (Peace Agreement) dated June 29, 2000, support and consent to Watermaster proceeding with this Implementation Plan in a manner that is consistent with the Peace Agreement and the Judgment. It is the intention of the parties that this Implementation Plan be interpreted consistently with the Peace Agreement and that all terms in this Implementation Plan be interpreted consistently with like terms contained in the Peace Agreement. To the extent there is a conflict between the Peace Agreement and this Implementation plan, the Peace Agreement shall Control.

Program Element 1 – Develop and Implement Comprehensive Monitoring Program

A. <u>Groundwater Level Monitoring Program</u>

<u>Description.</u> Watermaster began a process to develop a comprehensive groundwater level monitoring program in the spring of 1998. The process consists of two parts – an initial survey followed by long-term monitoring at a set of key wells. The initial survey consists of collecting groundwater level data at all wells in the Basin from which groundwater level measurements can be obtained for fall 1999, spring 2000, fall 2000, spring 2001, and fall 2001. Watermaster staff expects that they will measure groundwater levels in the initial survey at about 400 wells in the overlying agricultural pool and about 100 other wells from the other pools and unassigned monitoring wells. The data from the initial survey will be mapped and reviewed.

Based on this review and Watermaster management needs, a long-term monitoring program will be developed after the fall of 2001 survey. The long-term monitoring program will use about half of the wells in the overlying agricultural pool used in the initial survey plus all wells in the other pools and unassigned wells monitored under the direction of the Regional Board and others. Key wells located in agricultural areas will be replaced as necessary if the original well is destroyed when the agricultural land surrounding the well is converted to other use.

Watermaster will develop a groundwater level measurement protocol for use by all cooperating entities. Groundwater levels will be obtained by the following entities:

- Overlying Agricultural Pool – Watermaster staff
- Overlying Non-agricultural Pool – pool member or Watermaster staff
- Appropriative Pool – pool member or Watermaster staff
- Other wells – Watermaster staff will obtain data from Regional Board or owners.

Implementation Status. Watermaster began implementation of a groundwater level monitoring program in Watermaster fiscal year 1999/00, the current fiscal year, with a budget commitment of approximately $61,000. Additionally, Watermaster began an intensive monitoring effort in the immediate area of the Chino I Desalters. Watermaster is monitoring this area to collect data to analyze the effects of the Desalters pumping. There will be a comparable or greater level of effort and budget commitment through 2001/02. After 2001/02, the budget commitment will be less when it reflects the implementation of a key-well monitoring program.

B. Groundwater Quality Monitoring Program

Description. Watermaster began the process to develop a comprehensive water quality monitoring program in July 1999. As with the groundwater level monitoring program, the water quality monitoring program will consist of an initial survey and a long-term monitoring effort. The initial survey will consist of:

- collection of all water quality data from appropriators' or non-agricultural pool members' wells that are tested by appropriators or non-agricultural pool members;

- collection of all water quality data from the Regional Board for water quality monitoring efforts that are conducted under their supervision; and

- collection and analysis of at least one water quality sample at all (or a representative set of) other production wells in the Basin. Assumed maximum number of wells to be sampled by Watermaster in the initial survey is 600.

Groundwater quality samples will be obtained by the following entities:

- Overlying Agricultural Pool – Watermaster staff
- Overlying Non-Agricultural Pool – pool member
- Appropriative Pool – pool member
- Other wells – Watermaster staff will obtain data from Regional Board or owners

Re-sampling and analysis will be done at wells sampled by Watermaster if volatile organic compounds (VOCs) are detected. These data will be mapped and reviewed. Based on this review and Watermaster management goals in the OBMP, a long-term monitoring program will be developed and implemented in the fall of 2002. The long-term monitoring program will contain a minimum set of key wells that can be periodically monitored to assess water quality conditions in the Basin over time.

Implementation Status. Watermaster began implementation of a groundwater quality monitoring program in fiscal year 1999/00 with a budget commitment of about $250,000 and will commit the same or greater level of effort through 2001/02. After 2001/02, the budget commitment will be less reflecting the implementation of a key well monitoring program.

C. Production Monitoring Program

Description. The wells that Produce more than 10 acre-ft/yr in the Agricultural Pool will have in-line totalizing flow meters or other metering devices from which Watermaster will be able to estimate groundwater production in the Basin as provided in Article V of the Peace Agreement. To accomplish this, agricultural wells will be equipped with in-line totalizing flow meters or other suitable metering devices in each case in which it is prudent and feasible to do so.. Production records from wells owned by appropriators and overlying non-agricultural pool members will be reported quarterly as has been done in the past. Watermaster staff will monitor the meters of wells owned by agricultural pool members at least once a year during the period of mid-May through June, if necessary. Watermaster staff will digitize all production records in Watermaster's database and use this information in the administration of the Judgment.

In addition to the above, all Producers will provide Watermaster on an annual basis with a *water use and disposal survey* form that describes the sources of water used by each Producer and how that water is disposed of after use. The purpose of the form is to provide information to Watermaster that will enable accurate salt budget estimates as described in *Program Element 6 – Develop and Implement Cooperative Programs with the Regional Board and Other Agencies to Improve Basin Management*, and for other water resources management investigations that may be undertaken by Watermaster in the future as part of implementing the OBMP.

Groundwater production estimates and water use and disposal survey forms will be obtained by the following entities:

- Overlying Agricultural Pool – Watermaster meters. Pool members read meters and will prepare and submit water use and disposal survey forms

- Overlying Non-Agricultural Pool – pool members will read their meters and prepare and submit the water use and disposal survey forms

- Appropriative Pool – pool members will read their meters and prepare and submit the water use and disposal survey forms.

Implementation Status. Watermaster developed and began implementation of a more comprehensive production monitoring program for the overlying agricultural pool in fiscal year 1999/00. The meter installation program will take place over a three-year period starting in fiscal year 2000/01 with a budget commitment of $200,000 not including staff and contract meter installation. The water use and disposal forms are in development in the current fiscal year and will be used in subsequent years starting in 2000/01.

D. **Surface Water Discharge and Quality Monitoring**.

Description. Currently, water quality is measured at all existing recharge and retention basins that contribute or have the potential to contribute significant recharge to the Basin. Water level sensors will be installed in those recharge and retention basins that contribute significant recharge to the Chino Basin. These facilities are listed in Table 4-3 of the OBMP Phase 1 Report. New water level sensors may be required at a cost of $200,000. Water level data acquisition and water quality sampling will be done by Watermaster staff. The annual cost of laboratory analysis and interpretation of water level/discharge and water quality data is estimated to be as high as $45,000.

Watermaster needs to assess the existing surface water discharge and associated water quality monitoring programs for the Santa Ana River and its Chino Basin tributaries to determine the adequacy of the existing monitoring programs for characterizing historical ambient conditions and their utility in detecting water quality impacts from future Chino Basin management activities. If possible, Watermaster will exercise best efforts to contract with the agencies conducting these programs to modify their programs to accommodate Watermaster.

Implementation Status. Watermaster will take the lead in completing the following activities:

- Watermaster will exercise best efforts to install water level sensors in those existing recharge and retention facilities that have conservation storage and potential for storm water recharge. This activity will begin in Watermaster fiscal year 2000/01.

- Watermaster staff will obtain grab samples approximately every two weeks for all basins during the rainy season and have these samples analyzed. This activity has been occurring since 1997/98, is budgeted in the current fiscal year, and will continue in the future at some level reflecting the water resources management goals of Watermaster. Current fiscal year budget is $38,250. In addition, Watermaster staff will supplement its storm water quality data by obtaining information from other agencies that are required to collect such data.

- In the current fiscal year, Watermaster will review the surface water discharge and associated water quality monitoring programs for the Santa Ana River and the lower Chino Basin tributaries, and compare what is available from these programs to what is needed for Watermaster investigations under the OBMP. A supplementary /cooperative monitoring program will be developed based on this review and will be implemented by Watermaster during fiscal year 2000/01. The cost of the initial assessment of surface water data for the Santa Ana River is estimated to be $15,000.

E. Ground Level Monitoring Program

Description. Watermaster is interested in determining if and how much subsidence has occurred in the Basin. Watermaster will conduct an analysis of historical ground level surveys and remote sensing data to make this determination. The analysis consists of the following tasks:

- Historical survey data collected and/or on file by federal, state, and local agencies will be compiled, mapped, and reviewed to estimate total subsidence for as long a period as possible.

- Synthetic aperture radar (SAR) imagery was obtained by the City of Chino as part of its own subsidence investigations and was provided to Watermaster for its review and use. Watermaster converted this to maps to estimate recent subsidence (1993 to 1999) in the Management Zone 1.

- Based on the above information, a network of ground elevation stations in subsidence-prone areas will be developed and periodic surveys of these stations will be done. The frequency of periodic surveys will be established for the Basin as a whole with more frequent surveys done for some areas of the Basin. The estimated cost of this effort is not certain.

- Watermaster will summarize and distribute the ground level monitoring data through the normal Watermaster process.

Implementation Status. Watermaster has budgeted about $36,000 for the above tasks in the fiscal year 2000/01. These tasks will be accomplished in the current fiscal year. Watermaster will budget for additional ground level surveys in subsequent years based on the results of the current year efforts.

F. Well Construction, Abandonment and Destruction Monitoring

Description. Watermaster maintains a database on wells in the Basin and Watermaster staff makes periodic well inspections. Watermaster staff sometimes finds a new well during routine well inspections. The near-term frequency of inspection is expected to increase due to the groundwater level, quality and production monitoring programs. Watermaster needs to know when new wells are constructed as part of its administration of the Judgment. Valuable information for use in managing the Chino Basin is usually developed when wells are constructed including: well design, lithologic and geophysical logs, groundwater level and quality data, and aquifer stress test data. Producers generally notify Watermaster when they construct a new well but seldom, if ever, provide the information listed above. Watermaster has not generally asked for these data. Well owners must obtain permits from the appropriate county and state agencies to drill a well and to put the well in use. Watermaster is developing cooperative agreements with the counties of Los Angeles, Orange, Riverside, and San Bernardino, and the California Department of Health Services (DHS) to ensure that the appropriate entities know that a new well has been constructed. Watermaster staff will make best efforts to obtain well design, lithologic and geophysical logs, groundwater level and quality data, and aquifer stress test data.

The presence of abandoned wells is a threat to groundwater supply and a physical hazard. Watermaster staff will review its database, make appropriate inspections, consult with well owners, and compile a list of abandoned wells in the Chino Basin. The owners of the abandoned wells will be requested to properly destroy their wells following the ordinances developed by the county in which the abandoned well is located. Watermaster staff will update its list of abandoned wells annually and provide this list to the counties for follow-up and enforcement.

Implementation Status. In Watermaster fiscal year 1999/2000, Watermaster staff began the process of formulating agreements with county and state agencies to notify each other regarding construction of new wells and to obtain construction related information. In 2000/01, Watermaster will continue this process and finalize these agreements. That year and every year thereafter, Watermaster will also prepare a list of abandoned wells and forward that list to the counties for their action. Watermaster will follow up with the counties to ensure that abandoned wells are destroyed.

Implementation Actions and Schedule.

First Three Years (2000/01 to 2003/03).

Watermaster shall exercise best efforts to undertake the following actions in the first three years, commencing fiscal year 2000/01:

- Complete initial survey for the groundwater level program and develop long-term program.
- Complete initial survey for groundwater quality program and develop long-term program.
- Complete initial meter installation program for overlying agricultural pool.
- Complete initial ground level survey.
- Complete installation of water level sensors in recharge and retention facilities.
- Complete Santa Ana River surface water monitoring adequacy analysis.
- Continue surface water discharge and quality monitoring at recharge and retention facilities.
- Develop agreements with county and state agencies regarding notification of new well drilling. Well construction and related information will be requested as new wells are identified.

- Annually prepare a list of abandoned wells and forward it to the counties for their action. Follow up with the counties to ensure that abandoned wells are destroyed.

Years Four to Ten (2003/04 to 2010/11).

Watermaster shall exercise best efforts to undertake the following actions in years four through ten, commencing fiscal year 2002/03:

- Start and continue long-term groundwater level monitoring program, cause key wells to be relocated and constructed as necessary.

- Start and continue long-term groundwater quality monitoring program, cause key wells to be relocated and constructed as necessary.

- Continue production monitoring.

- Conduct remote sensing analysis using synthetic aperture radar or other techniques at least every ten years (2010/11) or sooner, if necessary.

- Continue ground level survey.

- Continue surface water discharge and quality monitoring in the Santa Ana River.

- Continue surface water discharge and quality monitoring at recharge and retention facilities.

- Well construction and related information will be requested as new wells are identified.

- Annually prepare a list of abandoned wells and forward it to the counties for their action. Follow up with the counties to ensure that abandoned wells are destroyed.

Years Eleven to Fifty (2011/12 to 2049/50).

Watermaster shall exercise best efforts to undertake the following actions in years eleven to fifty, commencing fiscal year 2011/12:

- Continue long-term groundwater level monitoring program, cause key wells to be relocated as necessary.
- Continue long-term groundwater quality monitoring program, cause key wells to be relocated as necessary.
- Continue production monitoring.
- Conduct remote sensing analysis using synthetic aperture radar or other technique at least every ten years (2020/21, 2030/31, 2040/41, 2050/51) or sooner, if necessary.
- Continue ground level survey.
- Participate as necessary in the Santa Ana River surface water monitoring.
- Continue surface water discharge and quality monitoring at recharge and retention facilities.
- Well construction related information will be requested as new wells are identified.
- Annually prepare a list of abandoned wells and forward it to the counties for their action. Follow up with the counties to ensure that abandoned wells are destroyed.

Watermaster will share the results of all these activities with the parties and relevant governmental agencies.

PROGRAM ELEMENT 2 -- DEVELOP AND IMPLEMENT COMPREHENSIVE RECHARGE PROGRAM

Watermaster will facilitate the development of physical recharge capacity in the Chino Basin. Recharge facilities will be sized and located to balance long term production and recharge. Watermaster will seek to maximize recharge so that each Producer will be able to Produce both the quantity and quality of water to meet its water supply needs to the greatest extent possible from the water that underlies the Producer's area of benefit.

INTRODUCTION

The need for a comprehensive recharge program is described in the OBMP Phase 1 report dated August 1999.

OBMP Program Element 2 -- Develop and Implement Comprehensive Recharge Program contains action items listed in the OBMP goals matrix (Table 3-8; OBMP Phase 1 Report, August 1999).

Increasing the yield of the Chino Basin by increasing the capture and recharge of storm flow will improve ambient water quality and increase the assimilative capacity of the Chino Basin. Increasing the capture of storm flow will reduce the cost of mitigation requirements for recharge of recycled water. The RWQCB Basin Plan assumes that a certain average annual quantity of storm flow (2300 acre-feet) will be recharged each year. The volume of recycled water that can be used in the Basin, without total dissolved solids (TDS) mitigation, is numerically tied to the average annual quantity of storm flow that recharges the Basin. A decrease in the recharge of storm flow will result in a decrease in the volume of recycled water that will be permitted in the Basin without TDS mitigation. Likewise, an increase in the recharge of storm flow will result in an increase in the volume of recycled water that will be permitted in the Basin without TDS mitigation. Therefore, the volume of recharge from storm flow has a dramatic impact on the future and cost of recycled water recharge.

The annual replenishment obligation will grow from the current level of about 30,000 to about 75,000 acre-feet per year (acre-ft/yr) over the next 20 to 30 years (ultimate conditions). For ultimate conditions, as much as 31,000 acre-ft/yr of the replenishment obligation could be satisfied by transfer of unProduced rights in the Appropriative pool consistent with the Peace Agreement leaving a net replenishment obligation of about 44,000 acre-ft/yr. Currently, Watermaster has access to spreading facilities with a current capacity of about 29,000 acre-ft/yr when imported water from Metropolitan is available. Assuming replenishment water is available seven out of ten years, the average annual recharge capacity of recharge facilities expected to be available to Watermaster is about 20,000 acre-ft year. The in-lieu recharge potential for the Chino Basin is about 57,000 acre-ft/yr and is expected to remain constant over the next 20 to 30 years based on the water supply plan included in this OBMP. Assuming in-lieu replenishment water is available seven out of ten years, the average annual in-lieu recharge capacity available to Watermaster is about 40,000 acre-ft/yr. The replenishment obligation, and available recharge capacity for current and year 2020 are listed below (acre-ft/yr):

	Year 2000	Year 2020
Replenishment Obligation	31,000	75,000
Replenishment Capacity		
Underproduction	20,000	31,000
Physical Recharge	20,000	20,000
In-lieu Recharge	40,000	40,000
Subtotal	80,000	91,000
Surplus Replenishment Capacity	49,000	16,000

The surplus recharge capacity could be used up quickly by future replenishment needs and implementation of storage and recovery programs. The availability of in-lieu recharge capacity for in-lieu replenishment listed above is not a certainty. In the present mode of basin management, in-lieu recharge capacity is available on an ad hoc basis and requires the cooperation of water supply agencies that have access to supplemental water. If a substantial storage and recovery program is implemented, a major component of it may be satisfaction of repelenishment obligations by in-lieu recharge.

In-lieu recharge can be counted on in the short term but cannot be assumed available for ultimate conditions. The safest and most conservative way to ensure that recharge capacity will be available is for Watermaster to develop physical recharge capacity that will meet ultimate replenishment obligations. The estimated annual replenishment obligation for the Chino Basin for ultimate conditions is about 75,000 acre-ft/yr. The physical recharge requirement is equal to the ultimate replenishment obligation (75,000 acre-ft/yr) minus the under production (31,000 acre-ft/yr) and is equal to 44,000 acre-ft/yr. Watermaster will need an annual physical recharge capacity of about 63,000 acre-ft/yr (63,000~44,000/0.7). The distribution of physical recharge capacity by management zone was determined during the development of the *Program Environmental Impact Report for the OBMP* (Tom Dodson and Associates, 2000). The physical recharge capacity by management zone for the year 2020 is estimated to be:

Management Zone 1	34,000 acre-ft/yr
Management Zone 2	0 acre-ft/yr
Management Zone 3	29,000 acre-ft/yr
Total	63,000 acre-ft/yr

The allocation of recharge capacity to management zones is based on balancing recharge and production in each management zone with the ultimate production pattern described in OBMP Program Elements 3 and 5.

The Etiwanda, Montclair and San Sevaine basins are currently used by Watermaster for replenishment. During the development of the OBMP, seventeen additional existing storm water retention basins and one former recycled water percolation facility were identified that could be used to meet future replenishment obligations. These facilities are listed in Table 1. Table 1 also lists the replenishment capacities and improvements required to use these facilities for recharge of supplemental water and storm water. The locations of these basins are shown in Figure 1. These basins are currently used for storm water management and provide some degree of incidental recharge of storm water. From a practical standpoint, these basins will remain in service indefinitely. Because the facilities listed in Table 1 will be available for Watermaster indefinitely, construction of improvements to enable physical recharge for replenishment can be scheduled to meet the actual need. In the short term, in-lieu recharge may be used for replenishment to the extent that in-lieu recharge and transfers can be done consistent with the goals of the OBMP and the "Peace Agreement."

All the facilities listed in Table 1 for supplemental recharge in Management Zone 1 will need to be constructed to meet replenishment obligations and to balance recharge with production. No new supplemental water recharge facilities are needed in Management Zone 2. Approximately 29,000 acre-ft/yr of new physical recharge capacity will need to be constructed in Management Zone 3 to meet replenishment obligations and to balance long term recharge with production. There is some flexibility in the location of the facilities available in Management Zone 3 and therefore engineering and economic investigations need to be done to select the facilities that should be used for replenishment.

B. NEGOTIATION OF AGREEMENTS

The successful development and implementation of a comprehensive recharge program is not dependent upon Watermaster owning physical assets and real property. Watermaster shall not own recharge projects, including but not limited to spreading grounds, injection wells, or diversion works. It shall never own real property. Watermaster may own water rights in trust for the benefit of the parties to the judgment. However, Watermaster shall arrange, facilitate and provide for recharge by entering into contracts with appropriate persons which may provide facilities and operations for physical recharge of water as required by the Judgment and this Agreement, or pursuant to the OBMP. Any such contracts shall include appropriate terms and conditions, including terms for the location and payment of costs necessary for the operation and maintenance of facilities, if any and terms to ensure that material physical injury to any party to the Judgment or the Basin is mitigated.

Watermaster will pay the cost of preparing the Recharge Master Plan as the next step in the implementation of the OBMP Program Element 2. When the Plan is prepared, Watermaster shall exercise best efforts to negotiate binding agreements that are necessary and prudent under the circumstances with SBCFCD, CBWCD, IEUA or others to implement recharge projects. Watermaster will seek to reach agreements that are consistent with the Judgment and the Peace Agreement. In negotiating any binding agreements, Watermaster will acknowledge, take into account and be directed by the following additional considerations:

1. The flood control functions of the various SBCFCD basins capable of artificial recharge in the Chino Basin will take priority over the artificial recharge function.

2. To the extent that artificial recharge can be incorporated into the operations of the SBCFCD basins without increasing the risk of flood damage and loss of life, artificial recharge will be maximized.

3. Multi-purpose projects will be given high priority and will be considered on a case by case basis.

4. Watermaster, in coordination and consultation with IEUA, CBWCD, SBCFCD or others, will prepare the storm water component of the Recharge Master Plan. Watermaster will coordinate with IEUA, CBWCD, and SBCFCD or others to prepare the supplemental water recharge component of the Recharge Master Plan. All costs for constructing the new supplemental water projects that are identified in Phase 1 and Phase 2 of the Recharge Master Plan shall be borne by Watermaster.

5. Watermaster will prepare Phase 2 of the Recharge Master Plan within three years.

6. Phase 2 of the Recharge Master Plan will Produce a list of recharge projects that will be described as either high priority or low priority projects. Watermaster will coordinate with SBCFCD and will exercise best efforts to implement high priority projects that involve the re-operation of existing facilities with small to no improvements at existing facilities within one year of completion of the Phase 2 Recharge Master Plan and no later than four years.

7. Watermaster will coordinate with SBCFCD and exercise best-efforts to implement high priority projects that involve significant improvement and re-operation of existing facilities within two years of completion of the Phase 2 of the Recharge Master Plan.

8. During the planning of new storm water management facilities, Watermaster will evaluate the value of artificial recharge in a new storm water management project and will include storm water artificial recharge in all new projects where Watermaster determines there is a value to the artificial recharge of storm water.

9. Watermaster will coordinate and facilitate the implementation of new supplemental water projects that are identified in Phase 2 of the Recharge Master Plan. The recharge projects that are envisioned as of the date of the adoption of this Implementation Plan are listed in Table 1. However, other projects will be identified in Phase 2 of the Recharge Master Plan investigations.

10. Watermaster will exercise best efforts to coordinate its activities and those of others to maintain or improve recharge performance at basins in a manner such that there is maximum recharge of storm water and supplemental water. Watermaster will consult and coordinate with SBCFCD, CBWCD and other interested persons in selecting an entity to perform maintenance.

11. SBCFCD requires sufficient advance notice to allow conserved water to be recharged. Watermaster will consult and coordinate with SBCFCD to develop a conservation plan for each of the SBCFCD basins, including a schedule of conservation pool elevations, criteria that define when water can be put into conservation and when water in conservation storage must be released to restore the full flood protection capabilities of the basin.

12. All projects will be the subject of appropriate environmental review and, as necessary, mitigation of impacts.

Watermaster shall take the following further actions consistent with the Peace Agreement to develop and implement its comprehensive recharge program:

1. All recharge of the Chino Basin with supplemental water shall be subject to Watermaster approval.

2. Watermaster will ensure that any person may make application to Watermaster to recharge the Chino Basin with supplemental water, including the exercise of the right to offer to sell in-lieu recharge water to Watermaster as provided in the Judgment and this Agreement in a manner that is consistent with the OBMP and the law. Watermaster shall not approve an application by any party to the Judgment if it is inconsistent with the terms of the Agreement, or will cause any material physical injury to any party to the Judgment or the Basin. Any potential or threatened material physical injury to any Party or the Basin caused by the recharge of supplemental water, shall be mitigated as a condition of approval. In the event the material physical injury cannot be mitigated, the request for recharge of supplemental water must be denied.

3. Watermaster shall administer, direct and conduct the recharge of all water in a manner that is consistent with this Agreement, the OBMP and causes no material physical injury to any party to the Judgment or the Chino Basin. Nothing herein shall be construed as committing a Party to provide supplemental water upon terms and conditions that are not deemed acceptable to that Party.

4. Watermaster shall undertake recharge using water of the lowest cost and the highest quality, giving preference as far as possible to the augmentation and the recharge of native storm water.

5. In furtherance of its obligations under this Section, for a period of five years, commencing with Fiscal Year 2000-2001, and within each such Fiscal Year Watermaster shall arrange for the physical recharge of supplemental water in the amount of an annual average of 6,500 acre

feet per year in one or more of the areas commonly known as the Montclair, Brooks and Upland spreading facilities.

(i) If for any reason at the end of the five year period, a cumulative total of 32,500 acre-feet of physical recharge has not been accomplished under this subdivision, then recharge shall continue at the above referenced locations at the average annual rate of 6,500 acre-feet until the full 32,500 acre feet of physical recharge has been accomplished;

(ii) The recharged supplemental water shall increase the operating safe yield under the Judgment. The cost and allocation of this supplemental water under this Section 5.1g shall be apportioned pro rata among the members of the Appropriative Pool under the Judgment according to the Producer's share of the initial safe yield;

(iii) The need to continue physical recharge under this paragraph shall be evaluated by Watermaster after the conclusion of Fiscal Year 2004-2005. In evaluating further physical recharge pursuant to this paragraph, Watermaster shall take into account the provisions of this Article, the Judgment and the OBMP among all other relevant factors. Except as to Watermaster's determination of no material physical injury, the rights of each party to the Judgment to purchase or lease water to meet its over production obligation shall be unaffected by this provision;

6. Watermaster shall provide an annual accounting of the amount of replenishment and the location of the specific types of replenishment.

7. Increases in stormwater recharge will be computed when new or enhanced recharge facilities come on line and the parties to the Judgment concur that the new information confirms an increase in recharge at the existing sites without causing a reduction in recharge at

other recharge sites in the basin. Increases in artificial stormwater recharge will be expressed as long term average annual values.

8. Watermaster will determine the baseline stormwater recharge. The baseline estimate of stormwater recharge will be determined by September 30, 2000. In the interim, the baseline will be assumed to be 5600 AF. Watermaster will, at appropriate points in time, review the stormwater recharge performance and redetermine the average annual volume of stormwater recharge and new stormwater recharge above the baseline stormwater recharge.

9. When locating and directing physical recharge, Watermaster shall consider the following guidelines:

   (i) provide long term hydrologic balance within the areas and sub-areas of the basin

   (ii) protect and enhance water quality

   (iii) improve water levels

   (iv) the cost of the recharge water

   (v) any other relevant factors

10. Adopt implementing procedures for the matters set forth above, by December 31, 2000.

11. There are some future projects that are technically and institutionally difficult to implement at this time, e.g., recharge of reclaimed water and injection through wells. A plan to integrate these future projects with those identified in Table 1 will be prepared within two years of the

effective date of the Peace Agreement. The plan will include an implementation schedule consistent with the OBMP and a financing plan.

Watermaster shall exercise its best efforts to:

(a) protect and enhance the safe yield of the Chino Basin through replenishment and recharge;

b) ensure there is sufficient recharge capacity for recharge water to meet the goals of the OBMP and the future water supply needs within the Chino Basin;

c) direct recharge relative to production in each area and sub-area of the basin to achieve long term balance and to promote the goal of equal access to groundwater within all areas and sub-areas of the Chino Basin;

d) evaluate the potential or threat for any material physical injury to any party to the Judgment or the Chino Basin, including, but not limited to, any material physical injury that may result from any transfer of water in storage or water rights which is proposed in place of physical recharge of water to Chino Basin in accordance with the provisions of Section 5.3;

e) establish and periodically update criteria for the use of water from different sources for replenishment purposes;

f) ensure a proper accounting of all sources of recharge to the Chino Basin;

g) recharge the Chino Basin with water in any area where groundwater levels have declined to such an extent that there is an imminent threat of material physical injury to any party to the Judgment or the Basin;

h) maintain long-term hydrologic balance between total recharge and discharge within all areas and sub-areas;

i) Coordinate, facilitate and arrange for the construction of the works and facilities necessary to implement the quantities of recharge identified in the OBMP Implementation Plan.

Implementation Status

The parties to the Peace Agreement have approved Watermaster proceeding as provided above. Implementation measures that follow preparation of the Recharge Master Plan will be predicated on the implementation actions and schedules that are Produced in the Master Plan and the Peace Agreement. However, a strong financial motivation is created for the prompt funding of local recharge projects as soon as possible because the members of the Appropriative Pool under the Judgment will incur replenishment obligations if the safe yield of the Basin is not enhanced by a sufficient quantity to cover the Chino I expansion, and the Chino II Desalters as well as the individual over-production obligations.

Implementation Actions and Schedule

First Three Years (2000/01 to 2002/03).

The following actions will be completed in the first three years commencing fiscal year 2000/01:

- Watermaster advisory committee will form an *ad hoc* committee to coordinate with CBWCD and SBCFCD.
- Implement all high priority recharge projects that involve only re-operation of existing recharge/flood control facilities.
- Complete the Recharge Master Plan.
- Complete design and construction of early action recharge projects identified in the first year of the implementation of the OBMP (potential projects are listed in Table 1 with an A priority and will be proposed for Proposition 13 funding by January 1, 2001).

Years Four to Fifty (2003/04 to 2049/50).

The following actions will be completed in years four through ten, commencing fiscal year 2002/03:

- By year 5 implement all high priority projects that involve construction and re-operation at existing facilities.
- Implement all other recharge projects based on need and available resources.
- Update the comprehensive recharge program every five years.

Program Element 3 – Develop and Implement Water Supply Plan for the Impaired Areas of the Basin, Program Element 5 – Develop and Implement Regional Supplemental Water Program

As urbanization of the agricultural areas of San Bernardino and Riverside counties in the southern half of the Basin occurs, the agricultural water demands will decrease and urban water demands will increase significantly. Future development in these areas is expected to be a combination of urban uses (residential, commercial, and industrial). The cities of Chino, Chino Hills, and Ontario, and the Jurupa Community Services District (JCSD) are expected to experience significant new demand as these purveyors begin serving urban customers in the former agricultural area. Based on current estimates of overlying agricultural pool production, it is expected that at least 40,000 acre-ft/yr of groundwater will need to Produced in the southern part of the Basin to maintain the safe yield.

Based on the data presented in *Optimum Basin Management Program, Phase I Report* (August 1999), municipal and industrial demands are projected to increase 30 percent between 2000 and ultimate build out (assumed to be 2020 in the Phase I report). Several agencies will experience increases in demand exceeding 30 percent, including the cities of Chino, Chino Hills, Norco, Ontario, Cucamonga County Water District (CCWD), Fontana Water Company (FWC), JCSD, and the West San Bernardino County Water District (WSBCWD). Forecasts from municipal and industrial entities indicate that municipal water supply sources for the Chino Basin at build out will consist predominantly of Chino Basin wells through direct use or treatment and use, groundwater and treated surface water from other basins, and MWDSC supplies. There is approximately 48,000 acre-ft/yr of agricultural production in the southern part of the Chino Basin in the year 2000, and this production will reduce to about 10,000 acre-ft/yr in the year 2020 at build-out. This decline in agricultural production must be matched by new production in the southern part of the Basin or the safe yield in the Basin will be reduced. The remaining 10,000 acre-ft/yr of production in the southern part of the Basin will be used by the State of California. Future supplemental water supplies will come from expansion of the CCWD Lloyd Michael water treatment plant (WTP) and the WFA/JPA Agua de Lejos WTP.

Considerable discussion of the alternative water supply plans occurred at the OBMP workshops. The discussions focused, in part, on the assumption and details of each alternative and cost. Based on technical, environmental, and cost considerations, the stakeholders selected the water supply plan described in Table 2. Groundwater production for municipal use will be increased in the southern part of the Basin to: meet the emerging demand for municipal supplies in the Chino Basin, maintain safe yield, and to protect water quality in the Santa Ana River. A preliminary facility plan (Revised Draft Water Supply Plan Phase I Desalting Project Facilities Report) was prepared in June, 2000, that describes the expansion of the Chino I Desalter and the construction of the Chino II Desalter to be built in the JCSD service area (Attachment I). New southern Basin production for municipal use will require desalting prior to use. The cities of Chino, Chino Hills, Ontario and Norco, and the JCSD will maximize their use of groundwater from the southern part of the Basin prior to using other supplies. Chino Desalter No. 1 (the SAWPA Desalters), which is about to start production will have to be expanded from 8 million gallons per day (mgd) to 10 or 12 mgd by 2003. The Chino Desalter No. II will start construction in early 2001 as the Desalters will need to be on-line by 2003 with a capacity of 10 mgd. Both these Desalters will be expanded in the future. The general location of these Desalters, their respective well fields, product water pipelines, and delivery points are shown in Figure 2. Table 3 shows the timetable for the new Desalters capacity along with the salt removal capacity of these Desalters. Watermaster and IEUA have completed a draft project report for the expansion of the No. I, and the construction of Desalter No. II. The facility plan calls for Desalter No. I to be expanded from its existing capacity of 8 mgd to 10 mgd and the construction Desalter No. II with a capacity of 10 mgd by 2003. This facility plan will be submitted as part of an application to SAWPA in July 2000 to obtain Proposition 13 funding for the construction of these Desalters. Construction will start in January 2001 and these facilities will be online in 2003. These two Desalters will remove about 36,000 tons of salt per year from the basin which is about 46 percent of total salt removal capacity of Desalters envisioned in the OBMP (77,000 tons/year).

Imported water use will increase to meet emerging demands for municipal and industrial supplies in the Chino Basin area, Watermaster replenishment, and storage and recovery programs or conjunctive use. Expanded use of imported water in the northern part of the Basin will have a lower priority than maintaining groundwater production in the southern part of the Basin.

Recycled water use (direct use and recharge) will increase to meet emerging demands for non-potable water and artificial recharge. Under the current Basin Plan, all new recycled water use will require mitigation for TDS and nitrogen impacts. Recycled water use will be expanded as soon as practical. The two new Desalters described above and the increase in storm water recharge will provide mitigation for the expanded use of recycled water.

Watermaster is preparing a facilities report to be submitted to SAWPA as part of IEUA's application for funding from Proposition 13.

Implementation Status

Watermaster, working with IEUA, WMWD, OCWD or the Project Committee 14, and Producers, is in the process of finalizing a facilities plan that will result in the expansion of the Chino I Desalter and the construction of the new Chino II Desalter. Construction of these facilities will begin in early 2001(Attachment I).

Implementation Actions and Schedule

First Three Years (2000/01 to 2003/04).

Watermaster shall exercise best efforts to undertake the following actions in the first three years, commencing fiscal year 2000/01:

- Complete the Water Facilities Plan Report for the Expansion of the Chino I Desalter and the construction of the Chino II Desalter. It should be noted that this action is entirely consistent with the OBMP, and is being taken prior to completion of the OBMP.
- Start expansion of the Chino I Desalter and the construction of the Chino II Desalter in early 2001.

Years Four to Fifty (2004/05 to 2049/50).

Watermaster shall exercise best efforts to undertake the following actions in years four to fifty, commencing fiscal year 2004/05:

- Complete construction and start up of the expanded Chino I and new Chino II Desalters.
- Watermaster, IEUA and WMWD will periodically review the Regional Water Supply Plan and the need for new Desalter capacity in the southern water-quality impaired part of the Basin, and initiate the construction of new Desalter capacity as determined by Watermaster. Expansion of the Desalter capacity will occur as agricultural production in the southern water-quality impaired part of the basin declines.
- IEUA will construct recycled water facilities to meet the demand for recycled water and for replenishment.

PROGRAM ELEMENT 4 – DEVELOP AND IMPLEMENT COMPREHENSIVE GROUNDWATER MANAGEMENT PLAN FOR MANAGEMENT ZONE 1 (MZ1)

The occurrence of subsidence and fissuring in Management Zone 1 is not acceptable and should be reduced to tolerable levels or abated. The OBMP calls for a management plan to reduce or abate the subsidence and fissuring problems to the extent that it may be caused by production in MZ1. There is some uncertainty as to the causes of subsidence and fissuring and more information is necessary to distinguish among potential causes. Therefore an interim management plan will be developed to minimize subsidence and fissuring while new information is collected to assess the causes and to develop an effective long-term management plan.

Description.

The interim management plan consists of the following activities:

- Voluntary modifications to groundwater production patterns in Management Zone 1. During fiscal year 1999/2000 the cities of Chino and Chino Hills as well as the State of California have voluntarily reduced their production in the vicinity of recent ground fissures.
- Monitor long term balance of recharge and production in Management Zone 1.
- Determine gaps in existing knowledge.
- Implement a process to fill the gaps in existing knowledge. This include(s) hydrogeologic, geophysical, and remote sensing

investigations of Management Zone 1, as well as certain monitoring programs, including piezometric, production, water quality, ground level, and subsidence monitoring.

- Formulate a long-term management plan. The long-term management plan will include goals, activities to achieve those goals, and a means to evaluate the success of the plan.

The long-term management plan will be formulated while the interim management plan is in-place based on investigations, monitoring programs and data assessment. It may include modifications to groundwater pumping rates and the locations of pumping, recharge, and monitoring. The long-term management plan will be adaptive in nature – meaning monitoring and periodic data assessment will be used to evaluate the success of the management plan and to modify the plan, if necessary.

Implementation Status.

Watermaster will develop the interim management plan during fiscal year 2000/01. Watermaster's budget estimate for this effort in fiscal 2000/01 is $100,000. Monitoring and construction of extensometers for this effort is included in Program Element 1.

Approval of The Peace Agreement will also provide the adoption of Basin-wide measures that will benefit conditions within MZ 1. These measures include the following a portion of which are referenced on pages 16-19 and are repeated below in the interest of completeness and clarity:

Recharge and Replenishment.

After the Effective Date and until the termination of this Agreement, the Parties expressly consent to Watermaster's performance of the following actions, programs or procedures regarding Recharge and Replenishment:

(a) All Recharge of the Chino Basin with Supplemental Water shall be subject to Watermaster approval.

(b) Watermaster will ensure that any person may make application to Watermaster to Recharge the Chino Basin with Supplemental Water, including the exercise of the right to offer to sell in-lieu Recharge water to Watermaster as provided in the Judgment and the Agreement in a manner that is consistent with the

OBMP and the law. Watermaster shall not approve an application by any party to the Judgment if it is inconsistent with the terms of the Agreement, or will cause any Material Physical Injury to any party to the Judgment or the Basin. Any potential or threatened Material Physical Injury to any Party or the Basin caused by the Recharge of Supplemental Water shall be fully and reasonably mitigated as a condition of approval. In the event the Material Physical Injury cannot be fully and reasonably mitigated, the request for Recharge of Supplemental Water must be denied.

(c) Watermaster shall administer, direct and conduct the Recharge of all water n a manner that is consistent with this Agreement, the OBMP and causes no Material Physical Injury to any party to the Judgment or the Chino Basin. Nothing herein shall be construed as committing a Party to provide Supplemental Water upon terms and conditions that are not deemed acceptable to that Party.

(d) Notwithstanding Section 5.1(c), CBWCD shall reserve its complete discretion to Recharge the Basin with water other than Supplemental Water as may be authorized by general law so long as the Recharge is in accordance with the limitations in the Judgment, if any and is in accordance with the provisions of Section 5.1(d)(i)-(v).

(i) Upon request by Watermaster CBWCD shall exercise Best Efforts to consult, coordinate and cooperate with Watermaster when recharging water into the Basin;

(ii) CBWCD shall provide Watermaster with reasonable notice in advance of any material change in its historic Recharge operations;

(iii) CBWCD shall not be required to provide funding for Recharge projects merely by virtue of its execution of this Agreement;

(iv) CBWCD shall Recharge the Basin in a manner that does not cause Material Physical Injury to any party to the Judgment or the Basin. Upon Watermaster's receipt of a written allegation that an existing or proposed CBWCD Recharge activity has or will cause Material Physical Injury to any party to the Judgment or the Basin, Watermaster shall hold a Public Hearing within a reasonable time. Watermaster shall provide notice and opportunity to be heard to interested parties to the Judgment including CBWCD. After hearing, Watermaster may approve, deny or condition the CBWCD's Recharge. Watermaster's decision shall be based upon the record and it shall be subject to the court's review;

(v) CBWCD's Recharge of the Basin coupled with an intent to store and recover water shall require a storage and recovery agreement.

(e) Watermaster shall exercise its Best Efforts to:

(i) protect and enhance the Safe Yield of the Chino Basin through Replenishment and Recharge;

(ii) ensure there is sufficient Recharge capacity for Recharge Water to meet the goals of the OBMP and the future water supply needs within the Chino Basin;

(iii) direct Recharge relative to Production in each area and sub-area of the Basin to achieve long term balance and to promote the goal of equal access to groundwater within all areas and sub-areas of the Chino Basin;

(iv) evaluate the potential or threat for any Material Physical Injury to any party to the Judgment or the Chino Basin, including, but not limited to, any Material Physical Injury that may result from any Transfer of water in storage or water rights which is proposed in place of physical Recharge of water to Chino Basin in accord-ance with the provisions of Section 5.3;

(v) establish and periodically update criteria for the use of water from different sources for Replenishment purposes;

(vi) ensure a proper accounting of all sources of Recharge to the Chino Basin;

(vii) Recharge the Chino Basin with water in any area where groundwater levels have declined to such an extent that there is an imminent threat of Material Physical Injury to any party to the Judgment or the Basin;

(viii) maintain long-term hydrologic balance between total Recharge and discharge within all areas and sub-areas;

(ix) coordinate, facilitate and arrange for the construction of the works and facilities necessary to implement the quantities of Recharge identified in the OBMP Implementation Plan.

(f) Watermaster shall undertake Recharge, using water of the lowest cost and the highest quality, giving preference as far as possible to the augmentation and the Recharge of native storm water.

(g) In furtherance of its obligations under this Section, for a period of five years, commencing with Fiscal Year 2000-2001, and within each such Fiscal Year Watermaster shall arrange for the physical Recharge of Supplemental Water in the amount of an annual average of 6,500 acre-feet per year in one or more of the areas commonly known as the Montclair, Brooks and Upland spreading facilities.

(i) If for any reason at the end of the five year period, a cumulative total of 32,500 acre-feet of physical Recharge has not been accomplished under this subdivision, then Recharge shall continue at the above referenced locations at the average annual rate of 6,500 acre-feet until the full 32,500 acre-feet of physical Recharge has been accomplished;

(ii) The Recharged Supplemental Water shall increase the Operating Safe Yield under the Judgment. The cost and allocation of this Supplemental Water under this Section 5.1g shall be apportioned pro rata among the members of the Appropriative Pool under the Judgment according to the Producer's share of the initial Safe Yield;

(iii) The need to continue physical Recharge under this paragraph shall be evaluated by Watermaster after the conclusion of Fiscal Year 2004-2005. In evaluating further physical Recharge pursuant to this paragraph, Watermaster shall take into account the provisions of this Article, the Judgment and the OBMP among all other relevant factors. Except as to Watermaster's determination of Material Physical Injury, the rights of each party to the Judgment to purchase or lease water to meet its over-Production obligation shall be unaffected by this provision;

(h) Watermaster shall not own Recharge projects, including but not limited to spreading grounds, injection wells, or diversion works. It shall never own real property. However, Watermaster may own water rights in trust for the benefit of the parties to the Judgment. Moreover, Watermaster shall arrange, facilitate and provide for Recharge by entering into contracts with appropriate persons, which may provide facilities and operations for physical Recharge of water as required by the Judgment and this Agreement, or pursuant to the OBMP. Any such contracts shall include appropriate terms and conditions, including terms for the location and payment of costs necessary for the operation and maintenance of facilities, if any.

(i) CBWCD's rights and obligations to obtain Replenishment Water are unaffected by the execution of this Agreement. Its obligation, rights and duties regarding Recharge may be set by arms length negotiation through separate agreement or as they otherwise exist under general law and the Judgment.

(j) Watermaster shall provide an annual accounting of the amount of Recharge and the location of the specific types of Recharge.

Implementation Actions and Schedule

First Five Years (2000/01 to 2004/05).

The following actions will be completed in the first three years commencing fiscal year 2000/01:

For a period of five years, commencing with Fiscal Year 2000-2001, and within each such Fiscal Year, arrange for the physical recharge of Supplemental Water in the amount of an annual average of 6,500 acre feet per year in one or more of the areas commonly known as the Montclair, Brooks and Upland spreading facilities. The need to continue physical recharge at these locations shall be evaluated by Watermaster after the conclusion of Fiscal Year 2004-2005.

- 2000/01 – A Management Zone 1 committee will develop a recommended interim management plan consistent with the above description.
- 2001/02 to 2003/04 – Implement the approved interim management plan, including appropriate monitoring; and annual assessment of data from monitoring programs, and modification of monitoring programs if necessary.
- 2004/05 – Develop long-term management plan.
- Implement the long term management plan.

Years Six to Fifty (2005/06 to 2049/50).

The following actions will be completed in years six through fifty, commencing fiscal year 2002/03:

- 2007/08 and every three years thereafter – Assess data from monitoring programs every three years and modify of management plan if necessary.
- Implement the long term management plan.

PROGRAM ELEMENT 6 – DEVELOP AND IMPLEMENT COOPERATIVE PROGRAMS WITH THE REGIONAL BOARD AND OTHER AGENCIES TO IMPROVE BASIN MANAGEMENT, and PROGRAM ELEMENT 7 – SALT MANAGEMENT PROGRAM

These program elements are needed to address some of the water quality management problems that have occurred in the Basin. These water quality problems are described in Section 2 *Current Physical State of the Basin* and Table 3-8 in Section 3 *Goals of the OBMP* of the OBMP Phase 1 Report. The specific water quality issues addressed by these program elements are listed below:

- Watermaster needs to routinely demonstrate that implementation of the OBMP will lead to groundwater quality improvements. Watermaster will develop and use a method to determine water quality trends and to verify whether the OBMP is improving water quality.
- There is legacy contamination in the vadose zone from past agricultural activities (TDS and nitrogen) that will continue to degrade groundwater long into the future.

- Watermaster does not have sufficient information to determine whether point and non-point sources of groundwater contamination are being adequately addressed.
- There is ongoing salt and nitrogen loading from agriculture.

Demonstration of Water Quality Improvement

Description.

The Court has indicated that Watermaster needs to routinely demonstrate that implementation of the OBMP will lead to groundwater quality improvements. Groundwater quality monitoring will be done in Program Element 1 and can be used to assess the long-term water quality benefits of the OBMP. In the short term, groundwater quality monitoring will not be a true metric of the water quality benefits of the OBMP. Water quality changes will occur very slowly. Water quality may continue to degrade after implementation of the OBMP due to legacy contamination in the vadose zone. Watermaster committed to the development of a salt budget tool that enables Watermaster to evaluate the water quality benefits of OBMP. In fiscal year 1999/2000, Watermaster developed the preliminary version of the salt budget tool to evaluate the projected OBMP performance in the Program Draft Environmental Impact Report for the OBMP. The salt budget tool is a spreadsheet tool that estimates the flow-weighted concentration of TDS and nitrogen into the Chino Basin at the management zone and basin levels, and estimates the TDS and nitrogen impacts of the OBMP on the Santa Ana River. The preliminary version of the salt budget tool needs to be revised to more accurately account for storm water recharge and storm water quality. The cost to update the salt budget tool will range between $40,000 to $45,000. Subsequent uses, in either OBMP updates or *ad hoc* investigations, will involve using and analyzing new water quality input data based on new monitoring data and revised water and waste management scenarios and program refinements as more is learned.

Implementation Status. As part of the Phase 2 OBMP process, Watermaster conducted preliminary salt budget studies. The preliminary salt budget studies were completed in May of 2000. Watermaster will update and refine the salt budget tool during Watermaster fiscal year 2000/01.

Cooperative Efforts with the Regional Water Quality Control Board

Description.

Watermaster does not have sufficient information to determine whether point and non-point sources of groundwater contamination are being adequately addressed. Watermaster's past monitoring efforts have been largely confined to mineral constituents in the southern half of the Basin and to available monitoring data supplied by municipal and industrial Producers. The Regional Water Quality Control Board (Regional Board) has limited resources to detect, monitor and cause the clean up of point and non-point water quality problems in the Chino Basin. The Regional Board commits its resources to enforce remedial actions when it has identified a potential responsible party. Watermaster can improve water quality management in the Basin by committing resources to:

- identify water quality anomalies through monitoring;
- assist the Regional Board in determining sources of the water quality anomalies;
- establish priorities for clean-up jointly with RWQCB; and
- remove organic contaminants through regional groundwater treatment projects in the southern half of the Basin.

The last bulleted item requires some explanation. The well field for the Chino I Desalter will eventually intercept a solvent plume of unknown origin that is emanating from the Chino airport area. There is a second solvent plume northeast of the Chino airport area that could be intercepted by the current Desalter or another future Desalter. This will require additional treatment for the water Produced by the Desalter. The Desalter project can be used to clean up these plumes at some additional cost. The cost of cleaning up the solvent plumes at the Desalters will be less than the cost of a dedicated solvent removal system. The additional cost should be paid for by the entity responsible for the solvent discharge.

Implementation Status. Watermaster is in the process of identifying water quality anomalies through its groundwater monitoring programs in Program Element 1. A revised anomaly map similar to Figure 2-58 in the OBMP Phase 1 report will be prepared by Watermaster. These water quality anomaly maps will be revised at least annually by Watermaster. The maps and supporting data will be submitted to the RWQCB for their use.

Watermaster will form an ad hoc committee, hereafter *water quality committee*, to review water quality conditions in the Basin and to develop cooperative strategies and plans to improve water quality in the Basin. The committee will meet regularly with Regional Board staff to recommend cooperative efforts for monitoring groundwater quality and detecting water quality anomalies. The schedule and frequency of meetings will be developed with the Regional Board during fiscal 2000/01 of the OBMP implementation. Watermaster will budget sufficient funds for fiscal 2000/01 for the first year of ad hoc committee activities. Watermaster will refine its monitoring efforts to support the detection and quantification of water quality anomalies. This may require additional budgeting for analytical work and staff/support. If necessary, Watermaster will conduct investigations to assist the Regional Board in accomplishing mutually beneficial objectives. Watermaster will seek funding from outside sources to accelerate detection and clean up efforts.

TDS and Nitrogen (Salt) Management in the Chino Basin

Description. TDS and nitrogen management will require minimizing TDS and nitrogen additions by fertilizers and dairy wastes, desalting of groundwater in the southern part of the Basin, and maximizing the artificial recharge of storm water. The latter two management components are included in Program Elements 3 and 2, respectively

The agricultural area in the southern part of the Chino Basin will gradually convert to urban uses over the next 20 to 30 years and, thus, in the long term, the TDS and nitrogen challenges from irrigated agriculture and dairy waste management will go away. The Regional Board adopted new dairy waste discharge requirements in 1999. The requirements include the following:

- Each dairy will develop and implement an engineered waste management plan that will contain dairy process water and on-dairy precipitation runoff for up to a 25-year, 24-hour storm event
- Manure scraped from corrals must be exported from the dairy within 180 days
- All manure stockpiled in the Chino Basin as of December 1, 1999, will be exported from the Basin by December 1, 2001.
- No manure may be disposed of in the Chino Basin
- Some manure can be applied to land at agronomic rates if and only if in the opinion of the Executive Officer of the RWQCB there is

reasonable progress toward the construction of a new Desalter in the Chino Basin.

The urban land use that will replace agriculture will require low TDS municipal supplies that in turn will Produce lower TDS irrigation returns to groundwater than those generated by agriculture. The construction of Desalters in the southern part of the Basin (as described in Program Elements 3 and 5) will extract and export large quantities of salt from the Basin. If Desalters are installed or expanded as currently being evaluated, approximately 50% of the salt removal capacity contemplated by 2020 in the Phase I report will be occurring by 2005. By 2020, the salt removal capacity of the Desalters will reach over 77,000 tons per year. Watermaster expects a net reduction in salt loading of about 77,000 to 100,000 tons of salt per year in the next 20 to 30 years.

Implementation Status. Watermaster will continue to monitor the nitrogen and salt management activities within the basin and update its nitrogen and salt management strategy as necessary.

Implementation Actions and Schedule

First Three Years (2000/01 to 2002/03). The following actions will be completed in the first three years commencing fiscal year 2000/01:

- Watermaster will form an ad hoc committee, hereafter *water quality committee.* The schedule and frequency of meetings will be developed with the Regional Board during the first year of the OBMP implementation.
- Watermaster will refine its monitoring efforts to support the detection and quantification of water quality anomalies. This may require additional budgeting for analytical work and staff/support.
- If necessary, Watermaster will conduct investigations to assist the Regional Board in accomplishing mutually beneficial objectives.
- Watermaster will seek funding from outside sources to accelerate detection and clean up efforts.
- Develop salt budget goals, develop the salt budget tool described above and review all the OBMP actions.
- Watermaster will continue to monitor the nitrogen and salt management activities within the basin.

At the conclusion of the third year, the *water quality committee* will have met several times, developed and implemented a cooperative monitoring plan with the Regional Board, and developed a priority list and proposed schedule for cleaning up all known water quality anomalies.

Years Four through Fifty (2003/04 to 2049/50).

The following actions will be completed in years four through fifty, commencing fiscal year 2003/04:

- Continue monitoring and coordination efforts with the Regional Board.
- Annually update priority list and schedule for cleaning up all known water quality anomalies.
- Continue to seek funding from outside sources to accelerate clean up efforts.
- Implement projects of mutual interest.
- As part of periodic updates of the OBMP, re-compute the salt budget using the salt budget tool. The salt budget tool will be used to reassess future OBMP actions to ensure that salt management goals are attained.
- Watermaster will continue to monitor the nitrogen and salt management activities within the basin.

PROGRAM ELEMENT 8 – DEVELOP AND IMPLEMENT GROUNDWATER STORAGE MANAGEMENT PROGRAM, PROGRAM ELEMENT 9 – DEVELOP AND IMPLEMENT STORAGE AND RECOVERY PROGRAMS

Watermaster seeks to develop a storage and recovery program that will benefit all the parties in the Basin and ensure that Basin water and storage capacity are put to maximum beneficial use while causing no material physical injury to any Producer or the Basin.

The following definitions were developed by Watermaster:

Operational Storage Requirement - The operational storage requirement is the storage or volume in the Chino Basin that is necessary to maintain safe yield. In the context of this storage and recovery program, the operational storage is estimated to be about 5,300,000 acre feet. An engineering analysis will be done to assess the operational storage requirement of the Basin as part of the implementation of this program.

Safe Storage – Safe storage is an estimate of the maximum storage in the Basin that will not cause significant water quality and high groundwater related problems. In the context of this storage management program, the safe storage is estimated to be about 5,800,000 acre-ft. An engineering analysis will be done to assess the safe storage requirement of the Basin as part of the implementation this plan.

Safe Storage Capacity – The safe storage capacity is the difference between safe storage and operational storage requirement and is the storage that can be safely used by Producers and Watermaster for storage programs. Based on the above, the safe storage capacity is about 500,000 acre-ft including water in the existing storage accounts. The allocation and use of storage in excess of safe storage will preemptively require mitigation, that is, mitigation must be defined and resources committed to mitigation prior to allocation and use.

Key Elements of the Storage and Recovery Program will include Watermaster taking the following actions:

Storage and Recovery.
After the Peace Agreement is effective Watermaster shall act in accordance with the following actions regarding the storage and recovery of water:

(a) In General.

(i) All storage capacity shall be subject to regulation and control by Watermaster;

(ii) No person shall store water in and recover water from the Chino Basin without an agreement with Watermaster;

(iii) Watermaster will ensure that any person, including but not limited to the State of California and the Department of Water Resources may make application to Watermaster to store and recover water from the Chino Basin as provided herein in a manner that is consistent with the OBMP and the law. Watermaster shall not approve an application to store and recover water if it is inconsistent with the terms of this Agreement or will cause any Material Physical Injury to any party to the Judgment or the Basin. Any potential or threatened Material Physical Injury to any Party or the Basin caused by the storage and recovery of water shall be reasonably and fully mitigated as a condition of approval. In the event the Material Physical Injury cannot be mitigated, the request for storage and recovery must be denied.

(iv) This Agreement shall not be construed to limit the State or its department or agencies from using available storage capacity in the Basin in accordance with the provisions of this Section under a storage and recovery agreement with Watermaster.

(b) Local Storage.

(i) For a period of five years from the Effective Date, Watermaster shall ensure that: (a) the quantity of water actually held in Local Storage under a storage agreement with Watermaster is confirmed and protected and (b) each party to the Judgment shall have the right to store its un-Produced carry-over water. Thereafter, a party to the Judgment may continue to Produce the actual quantity of carry-over water and Supplemental Water held in its storage account, subject only to the loss provisions set forth in this Section 5.2. This means a party to the Judgment may increase the total volume of carry-over water it holds in Local Storage up to five years after the Effective Date and as Watermaster may approve pursuant to a Local Storage agreement for Supplemental Water.

(ii) For a period of five years from the Effective Date, any party to the Judgment may make application to Watermaster for a Local Storage agreement, whereby it may store Supplemental Water in the Chino Basin.

(iii) Watermaster shall provide reasonable advance written notice to all interested parties of the proposed Local Storage agreement, prior to approving the agreement. The notice shall include the persons engaged in the Local Storage, the location of the Recharge and Production facilities and the potential for any Material Physical Injury, if any.

(iv) Watermaster shall approve the Local Storage agreement so long as: (1) the total quantity of Supplemental Water authorized to be held in Local Storage under all then existing Local Storage agreements for all parties to the Judgment does not exceed the cumulative total of 50,000 acre-feet; (2) the party to the Judgment making the request provides their own Recharge facilities for the purpose of placing the Supplemental Water into Local Storage; (3) the agreement will not result in any Material Physical Injury to any party to the Judgment or the Basin. Watermaster may approve a proposed agreement with conditions that mitigate any threatened or potential Material Physical Injury.

(v) There shall be a rebuttable presumption that the Local Storage agreement for Supplemental Water does not result in Material Physical Injury to a party to the Judgment or the Basin.

(vi) In the event any party to the Judgment, or Watermaster, objects to a proposed Local Storage agreement for Supplemental Water and submits evidence that there may be a Material Physical Injury to any party to the Judgment or the Basin, Watermaster shall hold a Public Hearing and allow the objecting party to the Judgment a reasonable opportunity to be heard.

(vii) In the event more than one party to the Judgment submits a request for an agreement to store Supplemental Water pursuant to a Local Storage agreement, Watermaster shall give priority to the first party to file a bona fide written request which shall include the name of the party to the Judgment, the source, quantity and quality of the Supplemental Water, an identification of the party to the Judgment's access to or ownership of the Recharge facilities, the duration of the Local Storage and any other information Watermaster shall reasonably request. Watermaster shall not grant any person the right to store more than the then existing amount of available Local Storage. The amount of Local Storage available for the storage of Supplemental Water shall be determined by subtracting the previously approved and allocated quantity of storage capacity for Supplemental Water from the cumulative maximum of 50,000 acre-feet.

(viii) Watermaster shall base any decision to approve or disapprove any proposed agreement upon the record.

(ix) Any party to the Judgment may seek judicial review of Watermaster's decision.

(x) Five years after the Effective Date, Watermaster shall have discretion to place reasonable limits on the further accrual of carry-over and Supplemental Water in Local Storage. However, Watermaster shall not limit the accrual of carry-over Local Storage for Fontana Union Mutual Water Company and Cucamonga County Water District when accruing carry-over storage pursuant to *Lease of Corporate Shares Coupled with Irrevocable Proxy, dated July 1, 1993 between Cucamonga County Water District and Fontana Water Resources Inc. and the Settlement Agreement Among Fontana Union Water Company, Kaiser Steel Reserves Inc., San Gabriel Valley Water Company and Cucamonga County Water Districts dated February 7, 1992*, to a quantity less than 25,000 acre-feet for the term of this Agreement.

(xi) Watermaster shall evaluate the need for limits on water held in Local Storage to determine whether the accrual of additional Local Storage by the parties to the Judgment should be conditioned, curtailed or prohibited if it is necessary to provide priority for the use of storage capacity for those Storage and Recovery Programs that provide broad mutual benefits to the parties to the Judgment as provided in this paragraph and Section 5.2(c) below;

(xii) Watermaster shall set the annual rate of loss from Local Storage for parties to the Judgment at zero until 2005. Thereafter the rate of loss from Local Storage for parties to the Judgment will be 2% until recalculated based upon the best available scientific information. Losses shall be deducted annually from each party to the Judgment's storage account;

(xiii) Watermaster shall allow water held in storage to be transferred pursuant to the provisions of Section 5.3 below. Storage capacity is not transferable by any party to the Judgment or any Party hereto.

(c) Storage and Recovery Program.

(i) Watermaster will ensure that no person shall store water in and recover water from the Basin, other than pursuant to a Local Storage agreement, without a storage and recovery agreement with Watermaster;

(ii) Watermaster shall prepare a list of basic information that a proposed applicant for a Storage and Recovery Program must submit to Watermaster prior to the execution of a storage and recovery agreement;

(iii) As a precondition of any project, program or contract regarding the use of Basin storage capacity pursuant to a Storage and Recovery Program, Watermaster shall first request proposals from qualified persons.

(iv) Watermaster shall be guided by the following criteria in evaluating any request to store and recover water from the Basin by a party to the Judgment or any person under a Storage and Recovery Program.

(a) The initial target for the cumulative quantity of water held in storage is 500,000 acre-feet in addition to the existing storage accounts;

(b) Watermaster shall prioritize its efforts to regulate and condition the storage and recovery of water developed in a Storage and Recovery Program for the mutual benefit of the parties to the Judgment and give first priority to Storage and Recovery Programs that provide broad mutual benefits;

(v) For the term of this Agreement, members of the Appropriative Pool and the Non-Agricultural Pool shall be exclusively entitled to the compensation paid for a Storage and Recovery Program irrespective of whether it be in the form of money, revenues, credits, proceeds, programs, facilities, or other contributions (collectively "compensation") as directed by the Non-Agricultural and the Appropriative Pools;

(vi) The compensation received from the use of available storage capacity under a Storage and Recovery Program, may be used to off-set the

Watermaster's cost of operation, to reduce assessments on the parties to the Judgment within the Appropriative and Non-Agricultural Pools, and to defray the costs of capital projects as may be requested by the members of the Non-Agricultural Pools and the Appropriative Pool;

(vii) Any potential or threatened Material Physical Injury to any party to the Judgment or the Basin caused by storage and recovery of water, whether Local Storage and recovery or pursuant to a Storage and Recovery Program, shall be reasonably and fully mitigated as a condition of approval;

(viii) Watermaster reserves discretion to negotiate appropriate terms and conditions or to refuse to enter into a Storage and Recovery or to deny any request. However, with respect to persons not parties to the Judgment, Watermaster reserves complete discretion. Watermaster shall base any decision to approve or disapprove any proposed Storage and Recovery Program upon the record. However, it may not approve a proposed Storage and Recovery Program unless it has first imposed conditions to reasonably and fully mitigate any threatened or potential Material Physical Injury;

(ix) Any party to the Judgment may seek review of the Watermaster's decision regarding a Storage and Recovery Program.

(d) The specific terms and conditions for the use of the facilities of CBWCD in connection with Local Storage or Storage and Recovery Programs shall be covered under separate agreements reached by arms length bargaining between Watermaster and CBWCD. Watermaster and any other Party shall not be entitled to the income received by CBWCD for use of its facilities in connection with Local Storage or Storage and Recovery Programs without the consent of CBWCD. Nothing in this Agreement shall be construed as preventing CBWCD from entering into an agreement with others for use of its facilities in a manner consistent with Section 5.1(d) i-v of this Agreement.

(e) Nothing herein shall be construed as prohibiting the export of Supplemental Water stored under a Storage and Recovery Program and pursuant to a storage and recovery agreement.

(f) Watermaster shall exercise Best Efforts to undertake the following measures:

(i) Complete the Short-Term conjunctive use project, authorized by Watermaster and conducted by IEUA, TVMWD and MWD;

(ii) Evaluate and develop a seasonal peaking program for in-Basin use and dry year yield to reduce the Basin's demand on the Metropolitan Water District for imported water;

(iii) Evaluate and develop a dry year export program;

(iv) Evaluate and develop a seasonal peaking export program;

Re-determination of Safe Yield and Storage Loss Rates

Safe Yield is currently 140,000 acre-feet per year. The safe yield and storage loss rate will be assessed every ten years starting in the year 2010/14. The ten-year period of 2000/01 to 2009/10 will be used to compute the safe yield and to estimate the storage loss rate.

Safe yield and storage loss rate determinations require accurate groundwater level and production data. Watermaster does not have accurate production data from agricultural Producers. Program Element 1 of the OBMP includes a program to install meters and obtain more accurate production measurements from wells in the Basin. It will take three years to implement the initial part of this program.

The safe yield in the Judgment was developed over the period 1965 to 1974 using the procedure described in Section 2 of the OBMP Phase I Report. The safe yield will be re-determined in year 2010/11 using the ten-year period 2000/01 to 2009/10 because it will contain accurate production data and groundwater level data. A ten-year period is proposed to be consistent with the method used in the engineering work for the Judgment and is the minimum necessary to estimate a safe yield.

Re-determination of the storage loss rate will require the use of a numerical model. The model will be used as follows:

- Calibrate the numerical model for the safe yield period. In the calibration process, the hydrology for the period 2000/01 to 2009/10 will be developed including deep percolation of applied water and precipitation, unmeasured storm water recharge, subsurface inflow from adjacent basins, and uncontrolled discharges from the Basin (rising water).

- Once calibrated, the water supply plans of the Producers and other storage entities will be modified to assume that no water would be put into storage accounts. The model will be rerun with this assumption and the results will be compared to the calibration run to determine losses from storage and the storage loss rate.
- The storage loss rate will be set based on the relationship of water in storage and associated losses.

Watermaster's new groundwater level and production monitoring are

crucial to this effort.

Implementation Actions and Schedule

First Three Years (2000/01 to 2002/03).

The following actions will be completed in the first three years commencing fiscal year 2000/01:

- Evaluate need to modify Watermaster UGRR regarding storage management plans and procedures.
- Determine the operational storage requirement and safe storage.

Years Four through Fifty (2003/04 to 2049/50).

The following actions will be completed in years four through fifty, commencing fiscal year 2003/04:

- In year 2010/11 and every ten years thereafter, compute safe yield and storage loss rate for prior ten-year period, and reset safe yield and storage loss rates for the next the next ten-year period. Reassess storage management plan and modify Watermaster UGRR, if needed.
- Start assessing losses at 2% per year in year 2005. This amount will be subject to modification in future years.

SALT CREDITS DEVELOPED IN THE OBMP

Salt Credits from Desalters

The Regional Board has determined that there is no assimilative capacity for TDS in most of the basin with current TDS objectives and subbasin boundaries. The Regional Board will probably adopt new TDS objectives using the boundaries of Management Zones 1 through 5 by the end of 2000. When the new boundaries and objectives are adopted the Regional Board will also determine that there is no assimilative capacity for TDS. This has the effect of requiring TDS reductions in either recycled water prior to recharge (through desalting) or the removal of an equivalent mass of salt from groundwater in the same management zone that the recycled water recharge is occurring. Desalination of wastewater prior to recharge is generally more expensive than desalting groundwater. Desalination of groundwater must occur in the southern end of Management Zones 1 through 3 and in Management Zones 4 and 5 to put groundwater in these areas to beneficial use and to maintain the safe yield of the basin. The amount of salt that would need to be removed from the basin for a 20,000 to 30,000 acre-ft/yr recycled water recharge program would be about 6,800 to 10,000 tons per year, respectively. If equal parts of recycled, state project and storm water are recharged then the offset drops to about 1,000 to 1,400 tons per year, respectively

Table 3 shows that the amount of salt being removed from the basin by the Desalters described in the OBMP in year 2003 to be about 36,000 tons per year and will reach about 77,000 tons per year in about 20 or more years. In addition to the Desalter the new dairy waste management requirements promulgated by the Regional Water Control Board will reduce the salt added by the dairies from over 30,000 tons per year to about 12,000 tons per year (dairy liquid waste only) in the current year. The residual 12,000 tons per year will reduce gradually over the next 20 to 30 years to negligible levels. By the end of 2003 the combined salt extraction by Desalters and reduction of dairy waste discharged to the basin will be about 54,000 tons per year – in the next 20 to 30 years this total will reach over 100,000 tons per year. This salt reduction rate will eventually improve the quality of groundwater in the Chino Basin.

The salt reduction described above is intended to be used as an offset or credit to mitigate the increased salt loading from the recharge of recycled water. The appropriators that own recycled water and IEUA and WMWD agreed to own and operate the Desalters through SAWPA PC#14, the OBMP Desalters and have been allocated the salt credits that could be used to offset the TDS impacts of recycled water recharge.

Salt Credits from Recharge of New Storm Water

Urban storm water is generally of low TDS and is almost always less than the TDS objectives. Surface water quality sampling by Watermaster in the Montclair and Brooks basins routinely demonstrate that urban storm water has a TDS concentration less than 100 mg/L – about 150 mg/l less than the TDS objectives in management Zones 1 through 3. New storm water recharge occurs when urban storm water is diverted into recharge facilities instead of allowing the runoff to flow to the Santa Ana River. As per the Judgment, yield augmentation from new storm water recharge is allocated to members of the appropriative pool regardless of who causes new storm water recharge to occur. New urban storm water recharge can be blended with recycled water to dilute the TDS concentration of the recycled water and reduce or eliminate the need for TDS mitigation. From a TDS perspective, the effect of recharging urban storm water that has a TDS concentration less than the TDS objective is similar to salt removal from a Desalter, and the OBMP Peace Agreement allocates salt removal credits to the appropriators.

Table 1 -- Recharge Projects to Increase Storm Water Recharge and Recharge Capacity of Supplemental Water

Basin	MZ	Current Owner	Native Water Conservation		Estimated Supplemental Recharge Capacity[1]		Supplemental Water Sources	Improvements/Activities		Dı (1) Late.
			Current Estimate (acre-ft/yr)	Goal (acre-ft/yr)	Current Estimate (acre-ft/yr)	Maximum Potential (acre-ft/yr)		Description	Overall Priority (A-highest C-lowest)	
Management Zone 1 Goals										
Native Water				*3,960*						
Supplemental Water				*30,100*						
Upland Basin										
	1	City of Upland	890	1,100	0	5,000	Imported Water	Acquire property	C	0
							Recycled Water	Facility Improvements		
								Expand MWDSC turnout OC 59	C	0
								New inlet from San Antonio Creek	A	1
								Emergency outlet to San Antonio Creek	A	1
								Removal of inert fill	A	1
								Recycled water pipeline and inlet	C	0
								Optimize the basin bottom geometry	A	1
College Heights Basins										
	1	CBWCD	0	500	0	11,000	Imported Water	Facility Improvements		
							Recycled Water	Expand MWDSC turnout OC 59	C	0
								New inlet from San Antonio Creek	A	1
								Emergency outlet to San Antonio Creek	A	1
								Removal of inert fill	A	1
								Recycled water pipeline and inlet	C	0
Montclair Basins										
	1	CBWCD	1,960	3,400	13,300	13,300	Imported Water	Facility Improvements		
							Recycled Water	Optimize the basin bottom geometry	A	1
								Recycled water pipeline and inlet	C	0
Brooks Street Basin										
	1	CBWCD	810	1,200	0	4,000	Imported Water	Facility Improvements		
							Recycled Water	Expand MWDSC turnout OC 59	C	0
								New inlet from San Antonio Creek	A	1
								Emergency outlet to San Antonio Creek	A	1
								Recycled water pipeline and inlet	C	0
								Optimize the basin bottom geometry	A	1
Grove Basin										
	1	SBCFCD	300	300	0	0		Facility Improvements		
								Optimize the basin bottom geometry	A	1
Seventh and Eighth Street Basins										
	1	SBCFCD	0	600	0	2,500	Imported Water	Facility Improvements		
							Recycled Water	New MWDSC turnout	B	0
								Pipeline from new MWDSC turnout to west Cuc. Ch	B	0
								Recycled water pipeline and inlet	C	0
								Deepen basin	A	1
								Optimize the basin bottom geometry	A	1
								Modify outlet works to allow conservation storage	A	1
<u>Subtotals</u>			<u>3,960</u>	<u>7,100</u>	<u>13,300</u>	<u>35,800</u>				

Table 1 -- Recharge Projects to Increase Storm Water Recharge and Recharge Capacity of Supplemental Water

Basin	MZ	Current Owner	Native Water Conservation: Current Estimate (acre-ft/yr)	Native Water Conservation: Goal (acre-ft/yr)	Estimated Supplemental Recharge Capacity[1]: Current Estimate (acre-ft/yr)	Estimated Supplemental Recharge Capacity[1]: Maximum Potential (acre-ft/yr)	Supplemental Water Sources	Improvements/Activities: Description	Overall Priority (A-highest C-lowest)	Do Now (1) or Later (0)
Management Zone 2 and 3 Goals										
Native Water				*23,300*						
Supplemental Water						*36,700*				
Turner Basin No. 1										
	2	SBCFCD	0	500	0	1,500	Imported Water	Facility Improvements		
							Recycled Water	New MWDSC turnout on Cucamonga Creek	B	0
								New inlet from Cucamonga Creek	A	1
								Misc. site improvements (grading, internal hydraulics, etc.)	A	1
								Recycled water pipeline and inlet	C	0
								Deepen basin to create conservation pool	A	1
								Optimize the basin bottom geometry	A	1
Turner Basin No. 2										
	2	SBCFCD	0	500	0	1,500	Imported Water	Facility Improvements		
							Recycled Water	New MWDSC turnout on Deer Creek	B	0
								New inlet from Deer Creek	A	1
								Misc. site improvements (grading, internal hydraulics, etc.)	A	1
								Recycled water pipeline and inlet	C	0
								Deepen basin to create conservation pool	A	1
								Optimize the basin bottom geometry	A	1
Ely Basins										
	2	SBCFCD 1&2 CBWCD 3	2,750	2,800	500	4,000	Imported Water	Facility Improvements		
							Recycled Water	New MWDSC turnout	B	0
								New pipeline from new MWDSC turnout to west Cuc. Ch	B	0
								Recycled water pipeline and inlet	A	1
								Optimize the basin bottom geometry	A	1
								Modify outlet works to allow conservation storage	A	1
Expansion of Lower Day Basin										
	2	SBCFCD	0	500	0	8,000	Imported Water	Facility Improvements		
							Recycled Water	Expand MWDSC turnout CB 15T	B	0
								New inlet pipeline to connect to MWDSC turnout	B	0
								Deepening basin	C	0
								Recycled water pipeline and inlet	C	0
								Optimize the basin bottom geometry	A	1
								Modify outlet works to allow conservation storage	A	1
Wineville Basin										
	3	SBCFCD	1,780	2,600	0	9,300	Imported Water	Facility Improvements		
							Recycled Water	Expand MWDSC turnout CB 15T	A	1
								New inlet pipeline to connect turnout to Day Creek	A	1
								Recycled water pipeline and inlet	A	1
								Optimize the basin bottom geometry	A	1
								Modify outlet works to allow conservation storage	A	1
Riverside Basin										
	3	SBCFCD	1,400	2,600	0	7,700	Imported Water	Facility Improvements		
							Recycled Water	Expand MWDSC turnout CB 15T	A	1
								New inlet pipeline to connect turnout to Day Creek	A	1
								Recycled water pipeline and inlet	A	1
								Optimize the basin bottom geometry	A	1
								Modify outlet works to allow conservation storage	A	1

Table 1 -- Recharge Projects to Increase Storm Water Recharge and Recharge Capacity of Supplemental Water

Basin	MZ	Current Owner	Native Water Conservation: Current Estimate (acre-ft/yr)	Native Water Conservation: Goal (acre-ft/yr)	Estimated Supplemental Recharge Capacity[1]: Current Estimate (acre-ft/yr)	Estimated Supplemental Recharge Capacity[1]: Maximum Potential (acre-ft/yr)	Supplemental Water Sources	Improvements/Activities Description	Overall Priority (A-highest C-lowest)	Do Now (1) or Later (0)
Expansion of Etiwanda Conservation Area (joint use of Etiwanda Debris Basin)										
	2	SBCFCD Private Parties	1,050	3,300	6,300	22,000	Imported Water Recycled Water	Acquire Markot property		
								Facility Improvements		
								Expand MWDSC turnout CB 14T	B	0
								Deepening and expansion of SBCFCD debris basin	A	1
								Recycled water pipeline and inlet	C	0
								Optimize the basin bottom geometry	A	1
								Modify outlet works to allow conservation storage	A	1
Improvements to Victoria Basin										
	2	SBCFCD	0	500	0	4,000	Imported Water Recycled Water	Facility Improvements		
								Expand MWDSC turnout CB 14T	B	0
								Recycled water pipeline and inlet	C	0
								New inlet from Etiwanda Creek	A	1
								Optimize the basin bottom geometry	A	1
								Modify outlet works to allow conservation storage	A	1
Improvements to San Sevaine No.'s 1 through 3										
	2	SBCFCD	2,790	4,500	9,200	10,600	Imported Water Recycled Water	Facility Improvements		
								Recycled water pipeline and inlet	C	0
								Optimize the basin bottom geometry	B	0
Improvements to San Sevaine No.'s 4 and 5										
	2	SBCFCD	80	500	0	19,400	Imported Water Recycled Water	Potential improvements		
								Expand MWDSC turnout CB 13T	B	0
								New inlet pipeline to connect to MWDSC turnout	B	0
								Recycled water pipeline and inlet	C	0
								Deepen basin to create conservation pool	B	0
								Optimize the basin bottom geometry	B	0
Banana Basin										
	3	SBCFCD	0	400	0	500	Imported Water Recycled Water	Potential improvements		
								Expand MWDSC turnout CB 13T	A	0
								Construct inlet in San Sevaine Creek and pipeline to convey MWDSC water to Banana Basin	A	0
								Recycled water pipeline and inlet	C	
								Deepen basin to create conservation pool	A	1
								Optimize the basin bottom geometry	A	1
								Modify outlet works to allow conservation storage	A	1
Hickory Basin										
	2	SBCFCD	0	500	0	1,500	Imported Water Recycled Water	Facility Improvements		
								Expand MWDSC turnout CB 13T	B	0
								Construct inlet in San Sevaine Creek and pipeline to convey MWDSC water to Hickory Basin	B	0
								Recycled water pipeline and inlet	B	
								Deepen basin to create conservation pool	A	1
								Optimize the basin bottom geometry	A	1
								Modify outlet works to allow conservation storage	A	1

Table 1 – Recharge Projects to Increase Storm Water Recharge and Recharge Capacity of Supplemental Water

Basin	MZ	Current Owner	Native Water Conservation: Current Estimate (acre-ft/yr)	Native Water Conservation: Goal (acre-ft/yr)	Estimated Supplemental Recharge Capacity[1]: Current Estimate (acre-ft/yr)	Estimated Supplemental Recharge Capacity[1]: Maximum Potential (acre-ft/yr)	Supplemental Water Sources	Improvements/Activities Description	Overall Priority (A-highest C-lowest)	Do Now (1) or Later (0)
Improvements to the Etiwanda Percolation Ponds										
	3	SBCFCD	0	500	0	4,000	Imported Water	Facility Improvements		
							Recycled Water	Construct new MWDSC turnout and pipeline to Etiwanda percolation basins.	A	1
								Pipeline to rout MWDSC water around site	A	1
								New outlet to Old Etiwanda Creek (to Wineville Basin)	A	1
								Misc. site improvements (grading, internal hydraulics, etc.)	A	1
								Recycled water pipeline and inlet	A	1
								Optimize the basin bottom geometry	A	1
Jurupa Basin										
	3	SBCFCD	0	3,000	0	4,000	Imported Water	Facility Improvements		
							Recycled Water	Expand MWDSC turnout CB 13T and/or CB 14T	A	1
								Optimize the basin bottom geometry	A	1
IEUA RP3 Ponds										
	3	IEUA	0	0	0	4,000	Imported Water	Facility Improvements		
								Expand MWDSC turnout CB 13T and/or CB 14T	A	0
								Construct inlet in San Sevaine Creek and pipeline to convey MWDSC water to RP3	A	0
								Optimize the basin bottom geometry	A	0
Declez Basin										
	3	SBCFCD	0	600	0	1,000	Imported Water	Expand MWDSC turnout CB 13T and/or CB 14T	A	0
								Construct inlet in San Sevaine Creek and pipeline to convey MWDSC water to Declez Basin	B	0
								Modify outlet works to allow conservation storage	A	1
								Deepen basin to create conservation pool	A	1
								Optimize the basin bottom geometry	A	1
Total All Management Zones				30,400	29,300	138,800				
Subtotal MZ 2 and MZ3				23,300	16,000	103,000				

Projects completed with Prop 13 money will accomplish the following:

	Native Water Conservation	Supplemental Recharge Capacity
Management Zone 1		
Goals	7,100	33,000
Current	3,960	13,300
After Improvement	7,100	29,300
Management Zone 2		
Goals	13,100	4,000
Current	6,670	16,000
After Improvement	13,100	16,000
Management Zone 3		
Goals	9,700	29,000
Current	3,180	0
After Improvement	9,200	21,000
Total Increse In Recharge	15,590	37,000

Note 1 – annual average recharge capacity assumes recharge water available for the months of October through April. Basic data for estimates is from Table 4-5 of the P1 RMP (Wildermuth, 1998), some with modification.

Table 2
Regional Water Supply Plan for the OBMP[1]
(acre-ft/yr)

Purveyor / Source	2000	2005	2010	2015	2020
	Year				
City of Chino					
Chino Basin Wells	10,000	10,000	10,000	10,000	10,000
Nitrate Removal Plant (Chino Groundwater)	0	0	0	0	0
OBMP Desalter No. I	1,680	3,360	4,420	5,490	6,550
WFA Treatment Plant	4,020	2,640	2,830	3,010	3,200
Reclaimed Water	100	1,050	1,050	1,050	1,050
Total Supply	15,800	17,050	18,300	19,550	20,800
Total Demand	15,800	17,050	18,300	19,550	20,800
City of Chino Hills					
Chino Basin Wells	3,610	3,610	3,610	3,610	3,610
OBMP Desalter No. I	1,120	7,540	7,540	7,540	7,540
Reclaimed Water	400	1,020	1,020	1,815	2,610
WFA Treatment Plant	0	0	0	0	0
MVWD Supply Chino GW	12,510	6,930	8,500	9,385	9,480
Total Supply	17,640	19,100	20,670	22,350	23,240
Total Demand	17,640	19,100	20,670	22,350	23,240
City of Norco					
Chino Basin Wells	0	0	0	0	0
City of Corona	220	0	0	0	0
Temescal Basin Groundwater	5,880	5,870	5,560	5,070	4,650
Supply from JCSD	900	0	0	0	0
OBMP Desalter No. II	0	1,530	2,140	3,330	4,350
Total Supply	7,000	7,400	7,700	8,400	9,000
Total Demand	7,000	7,400	7,700	8,400	9,000
City of Ontario					
Chino Basin Wells	34,720	32,950	32,950	32,950	32,950
WFA Treatment Plant	6,590	7,660	10,020	17,950	20,630
Reclaimed Water	840	840	1,680	2,520	3,360
Supply from SAWC (Chino GW)	850	850	850	850	850
OBMP Desalter No. II	0	5,000	5,000	8,530	12,710
Total Supply	43,000	47,300	50,500	62,800	70,500
Total Demand	41,530	45,830	49,030	61,330	69,030
Supply to Sunkist (Chino GW)	1,470	1,470	1,470	1,470	1,470

Table 2
Regional Water Supply Plan for the OBMP[1]
(acre-ft/yr)

Purveyor Source	2000	2005	2010	2015	2020
City of Pomona					
Chino Basin Wells	5,220	5,220	5,220	5,220	5,220
Pomona Nitrate Treatment Plant (Chino GW)	13,880	13,880	13,880	13,880	13,880
Other Groundwater Basins	5,160	5,160	5,160	5,160	5,160
Reclaimed Water	7,000	7,000	7,000	7,000	7,000
Pedley Treatment Plant	3,800	3,800	3,800	3,800	3,800
TVMWD Weymouth Treatment Plant	2,140	3,380	4,520	5,840	7,044
Total Supply	37,200	38,440	39,580	40,900	42,104
Total Demand	37,200	38,440	39,580	40,900	42,104
City of Upland					
Chino Basin Wells	2,429	2,430	3,410	3,070	3,050
Supply from SAWC (non-Chino GW)	4,920	4,520	4,520	4,520	4,520
Supply from SAWC (San Antonio Canyon TP)	2,411	2,390	2,390	2,690	2,690
Supply from WECWC (Chino GW)	0	1,420	1,440	1,480	1,500
Supply from WECWC (other GW basins)	4,650	4,650	4,650	4,650	4,650
WFA Treatment Plant	7,590	7,590	7,590	7,590	7,590
Total Supply	22,000	23,000	24,000	24,000	24,000
Total Demand	22,000	23,000	24,000	24,000	24,000
Cucamonga County Water District					
Chino Basin Wells	8,000	10,160	10,160	10,160	10,160
Other Groundwater Basins	12,650	11,180	12,390	12,390	12,390
Reclaimed Water	0	0	0	2,402	4,804
CCWD Bridge Water Treatment Plant	1,000	1,000	1,000	1,000	1,000
CCWD Lloyd Michael Treatment Plant	21,710	25,550	28,860	30,978	33,096
CCWD Royer-Nesbit Treatment Plant	6,000	6,000	6,000	6,000	6,000
Deer Creek	550	550	550	550	550
Total Supply	49,910	54,440	58,960	63,480	68,000
Total Demand	49,910	54,440	58,960	63,480	68,000
Fontana Water Company					
Chino Basin Wells	16,700	22,825	16,050	20,375	24,800
Other Groundwater Basins	12,700	12,700	12,700	12,700	12,700
Reclaimed Water	0	0	0	1,685	3,370
Fontana Water Treatment Plant	0	0	18,600	16,915	15,230
Sandhill Treatment Plant	7,400	7,400	0	0	0
Total Supply	36,800	42,925	47,350	51,675	56,100
Total Demand	35,100	41,200	45,600	49,900	54,300
Supply to California Steel	1,700	1,725	1,750	1,775	1,800

Table 2
Regional Water Supply Plan for the OBMP[1]
(acre-ft/yr)

Purveyor Source	2000	2005	2010	2015	2020
***Jurupa Community Services District*[2]**					
Chino Basin Wells (Potable)	14,425	11,275	12,885	13,265	13,625
Chino Basin Wells (Non-potable)	50	250	450	650	850
Other Groundwater Basins	500	500	500	500	500
OBMP Desalter No. I	1,800	0	0	0	0
OBMP Desalter No. II	0	5,000	5,790	7,810	9,850
Total Supply	16,775	17,025	19,625	22,225	24,825
Total Demand	14,200	17,000	19,600	22,200	24,800
Supply to Mira Loma SC	25	25	25	25	25
Supply to Norco	900	0	0	0	0
Supply to Swan Lake	350	0	0	0	0
Supply to SARWC	1,300	0	0	0	0
Subtotal	2,575	25	25	25	25
Mira Loma SC					
Chino Basin Wells	0	0	0	0	0
Supply from JCSD	25	25	25	25	25
Total Supply	25	25	25	25	25
Total Demand	25	25	25	25	25
***Santa Ana River Water Company*[2]**					
Chino Basin Wells	0	0	0	0	0
Almost Chino Basin Wells (along SAR outside legal bndy)	700	790	660	490	320
Supply from JCSD	1,300	0	0	0	0
OBMP Desalter No. II (see note below)	0	1,300	1,460	1,650	1,850
Total Supply	2,000	2,090	2,120	2,140	2,170
Total Demand	2,000	2,090	2,120	2,140	2,170

Note -- The Santa Ana Water Company may receive Desalter II water through either a direct connection paid for by the Company or through an interconnection with Jurupa Community Services District.

Purveyor Source	2000	2005	2010	2015	2020
Swan Lake					
Chino Basin Wells	0	0	0	0	0
Supply from JCSD	350	0	0	0	0
OBMP Desalter No. II	0	350	350	350	350
Total Supply	350	350	350	350	350
Total Demand	350	350	350	350	350
Marygold Mutual Water Company					
Baseline Feeder	1,450	1,580	1,620	1,660	1,700
Total Supply	1,450	1,580	1,620	1,660	1,700
Total Demand	1,450	1,580	1,620	1,660	1,700

Table 2
Regional Water Supply Plan for the OBMP[1]
(acre-ft/yr)

Purveyor / Source	2000	2005	2010	2015	2020
Monte Vista Water District					
Chino Basin Wells	26,670	21,090	22,660	23,545	23,640
WFA Treatment Plant	0	0	0	0	0
Total Supply	26,670	21,090	22,660	23,545	23,640
Total Demand	14,160	14,160	14,160	14,160	14,160
Supply to Chino Hills (Chino GW)	12,510	6,930	8,500	9,385	9,480
San Antonio Water Company – Domestic					
Chino Basin Wells	70	1,050	1,070	1,090	1,110
Other Groundwater Basins	400	400	400	400	400
San Antonio Canyon	0	0	0	0	0
San Antonio Tunnel	1,020	1,020	1,020	1,020	1,020
Total Supply	1,490	2,470	2,490	2,510	2,530
Total Demand	640	1,620	1,640	1,660	1,680
Supply to Ontario (Chino GW)	850	850	850	850	850
Southern California Water Company					
Chino Basin Wells	2,160	2,160	2,160	2,160	2,160
Other Groundwater Basins	4,950	4,490	4,850	4,850	4,850
TVMWD – Miramar Water Treatment Plant	7,090	8,300	8,670	8,670	8,670
Total Supply	14,200	14,950	15,680	15,680	15,680
Total Demand	14,200	14,950	15,680	15,680	15,680
West End Consolidated Water Company					
Chino Basin Wells	0	1,420	1,440	1,480	1,500
Other Groundwater Basins	4,650	4,650	4,650	4,650	4,650
Total Supply	4,650	6,070	6,090	6,130	6,150
Total Demand	0	0	0	0	0
Supply to Upland	4,650	6,070	6,090	6,130	6,150
West San Bernardino County Water District					
Other Groundwater Basins	5,330	6,835	9,520	9,510	9,510
SBVMWD Baseline Feeder	800	1,000	1,380	1,390	1,390
Total Supply	6,130	7,835	10,900	10,900	10,900
Total Demand	6,130	7,835	10,900	10,900	10,900

Table 2
Regional Water Supply Plan for the OBMP[1]
(acre-ft/yr)

Purveyor / Source	2000	2005	2010	2015	2020
Ameron					
Chino Basin Wells	9	9	9	9	9
Total Supply	9	9	9	9	9
Total Demand	9	9	9	9	9
San Bernardino County Division of Airports					
Chino Basin Wells (Potable (Domestic))	300	300	300	300	300
Total Supply	300	300	300	300	300
Total Demand	300	300	300	300	300
Reliant Energy					
Chino Basin Wells	800	0	0	0	0
Reclaimed Water	0	3,300	3,300	3,300	3,300
IEUA – MWD Water from CRA	2,500	0	0	0	0
Total Supply	3,300	3,300	3,300	3,300	3,300
Total Demand	3,300	3,300	3,300	3,300	3,300
Sunkist					
Chino Basin Wells	0	0	0	0	0
Supply from Ontario (Chino GW)	1,470	1,470	1,470	1,470	1,470
Total Supply	1,470	1,470	1,470	1,470	1,470
Total Demand	1,470	1,470	1,470	1,470	1,470
Kaiser Ventures					
Chino Basin Wells	670	670	670	670	670
Total Supply	670	670	670	670	670
Total Demand	670	670	670	670	670
San Bernardino County Parks Department					
Chino Basin Wells	75	75	75	75	75
Total Supply	75	75	75	75	75
Total Demand	75	75	75	75	75
Monte Vista Irrigation Company					
Chino Basin Wells	0	0	0	0	0
Total Supply	0	0	0	0	0
Total Demand	0	0	0	0	0
California Steel					
Chino Basin Wells	0	0	0	0	0
Fontana Water Company	1,700	1,725	1,750	1,775	1,800
Total Supply	1,700	1,725	1,750	1,775	1,800
Total Demand	1,700	1,725	1,750	1,775	1,800

Table 2
Regional Water Supply Plan for the OBMP[1]
(acre-ft/yr)

Purveyor / Source	2000	2005	2010	2015	2020
Totals By Source Type and Pool					
Pool 1 Overlying Agricultural Pool (groundwater)	49,100	39,975	30,850	21,725	10,000
Pool 2 Overlying Non-Agricultural Pool					
Chino Basin Groundwater	3,624	2,474	2,474	2,474	2,474
OBMP Desalter No. II	0	350	350	350	350
Other Local Supplies	0	0	0	0	0
Imported Water	2,500	0	0	0	0
Recycled Water	0	3,300	3,300	3,300	3,300
Total Pool 2	6,124	6,124	6,124	6,124	6,124
Pool 3 Appropriative Pool					
Chino Basin Groundwater	137,634	138,370	135,995	141,505	146,605
OBMP Desalter No. II	0	12,830	14,390	21,320	28,760
OBMP Desalter No. I	4,600	10,900	11,960	13,030	14,090
Other Local Supplies	84,141	83,485	80,320	80,000	79,450
Imported Water					
WFA Treatment Plant	18,200	17,890	20,440	28,550	31,420
CCWD Lloyd Michael TP	21,710	25,550	28,860	30,978	33,096
CCWD Royer Nesbit	3,000	3,000	3,000	3,000	3,000
Other	11,730	11,680	31,790	31,425	30,944
Subtotal	49,940	56,120	82,470	92,343	96,850
Recycled Water	8,340	9,910	10,750	16,472	22,194
Total Pool 3	284,655	311,615	335,885	364,670	387,949
Total All Pools	339,879	357,714	372,859	392,519	404,073
Total Water Produced By Desalter Projects					
OBMP Projects					
OBMP Desalter No. II	0	13,180	14,740	21,670	29,110
OBMP Desalter No. II Raw Water Supply	0	15,506	17,341	25,494	34,247
OBMP Desalter No. I	4,600	10,900	11,960	13,030	14,090
OBMP Desalter No. I Raw Water Supply	5,292	12,540	13,759	14,990	16,210
Pomona Ion Exchange					
Production	13,880	13,880	13,880	13,880	13,880
Raw Water Supply	14,309	14,309	14,309	14,309	14,309
Total Chino Basin Groundwater Production Summary					
Pool 1	49,100	39,975	30,850	21,725	10,000
Pool 2	3,624	2,824	2,824	2,824	2,824
Pool 3	143,355	166,495	167,175	182,069	197,141
Total	196,079	209,294	200,849	206,618	209,965

Note 1 -- Some of the water supply plans for agencies taking OBMP desalter water are different than the plans shown in the "Revised Draft Water Supply Plan, Phase 1 Desalting Project Facilities Report, June 2000. These difference are minor and will be reconciled in July 2000.

Note 2 -- "Jurupa Community Services District" means Jurupa Community Services District and the Santa Ana River Water Company individually. Subject to provisions of the Peace Agreement, the design and delivery obligations for the Chino II Desalter set forth in Section 7.3 regarding Jurupa Community Services District include both Jurupa Community Services District and the Santa Ana River Water Company.

Table 3
Production and Salt Removal Capacity of Chino Basin Desalters

Year	Product Water Capacity (mgd) OBMP Desalters No I	No II	Total	Desalter roundwater Production (acre-ft/yr)	Salt Removal Capacity (tons) OBMP Desalters No I	No II	Total	Fraction of Ultimat Capacity
2000	4.7	0.0	4.7	5,292	5,436	0	5,436	7%
2001	8.0	0.0	8.0	8,960	9,205	0	9,205	12%
2002	8.0	0.0	8.0	8,960	9,205	0	9,205	12%
2003	10.0	10.0	20.0	25,372	12,881	22,697	35,578	46%
2004	10.0	12.0	22.0	27,905	12,881	27,176	40,057	52%
2005	10.0	12.0	22.0	27,905	12,881	27,176	40,057	52%
2006	12.0	12.0	24.0	29,124	14,134	27,176	41,309	53%
2007	12.0	12.0	24.0	29,124	14,134	27,176	41,309	53%
2008	12.0	14.0	26.0	31,100	14,134	30,755	44,889	58%
2009	12.0	14.0	26.0	31,100	14,134	30,755	44,889	58%
2010	12.0	14.0	26.0	31,100	14,134	30,755	44,889	58%
2011	12.0	14.0	26.0	31,100	14,134	30,755	44,889	58%
2012	12.0	14.0	26.0	31,100	14,134	30,755	44,889	58%
2013	12.0	20.0	32.0	40,484	14,134	45,215	59,348	77%
2014	12.0	20.0	32.0	40,484	14,134	45,215	59,348	77%
2015	12.0	20.0	32.0	40,484	14,134	45,215	59,348	77%
2016	14.0	20.0	34.0	41,704	16,651	45,215	61,865	80%
2017	14.0	26.0	40.0	50,457	16,651	60,573	77,224	100%
2018	14.0	26.0	40.0	50,457	16,651	60,573	77,224	100%
2019	14.0	26.0	40.0	50,457	16,651	60,573	77,224	100%
2020	14.0	26.0	40.0	50,457	16,651	60,573	77,224	100%
21-Year Totals								
ater Production (acre-ft/yr)				683,128				
Salt Removal (tons)					287,080	708,326	995,406	

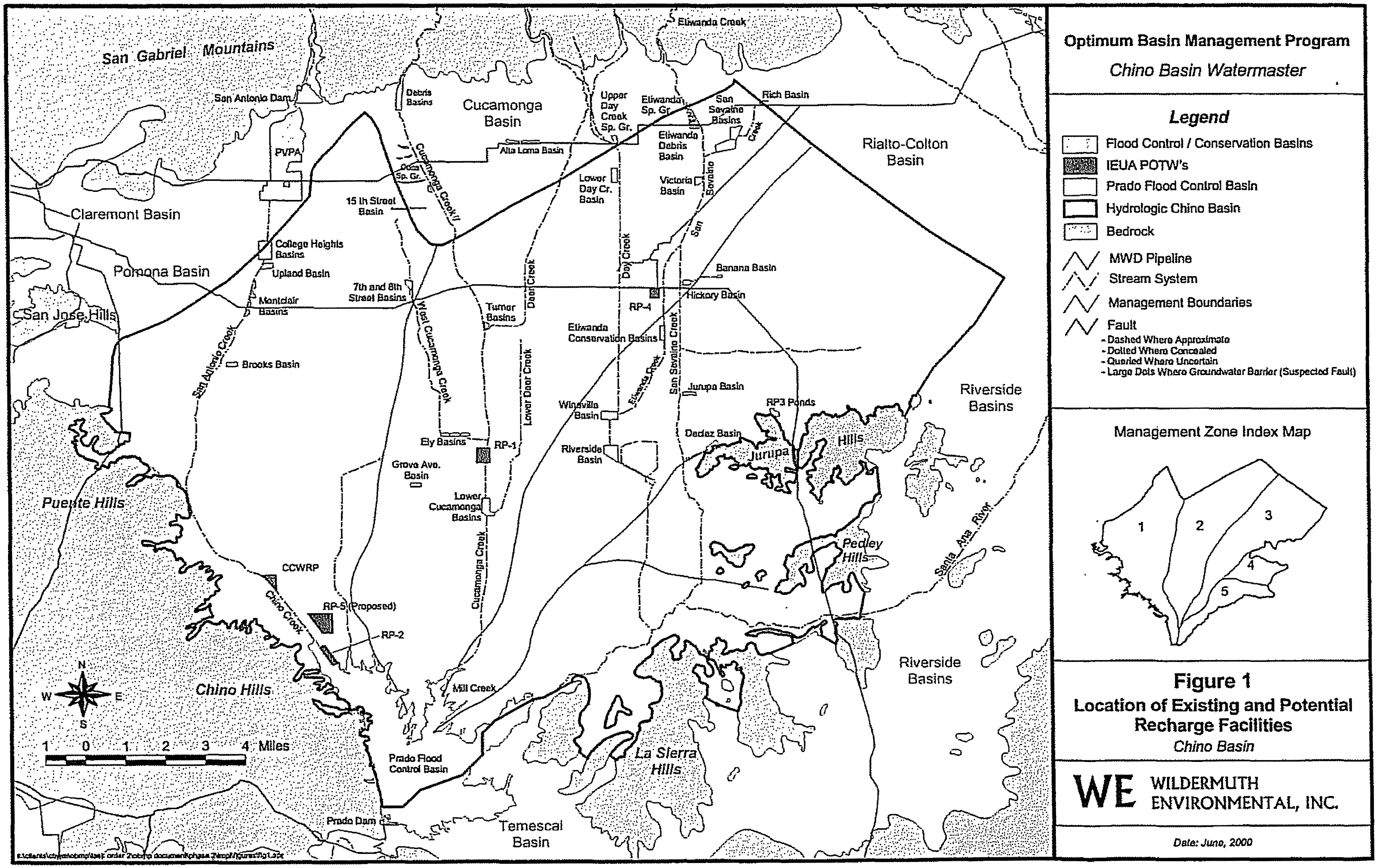

Figure 1
Location of Existing and Potential Recharge Facilities
Chino Basin

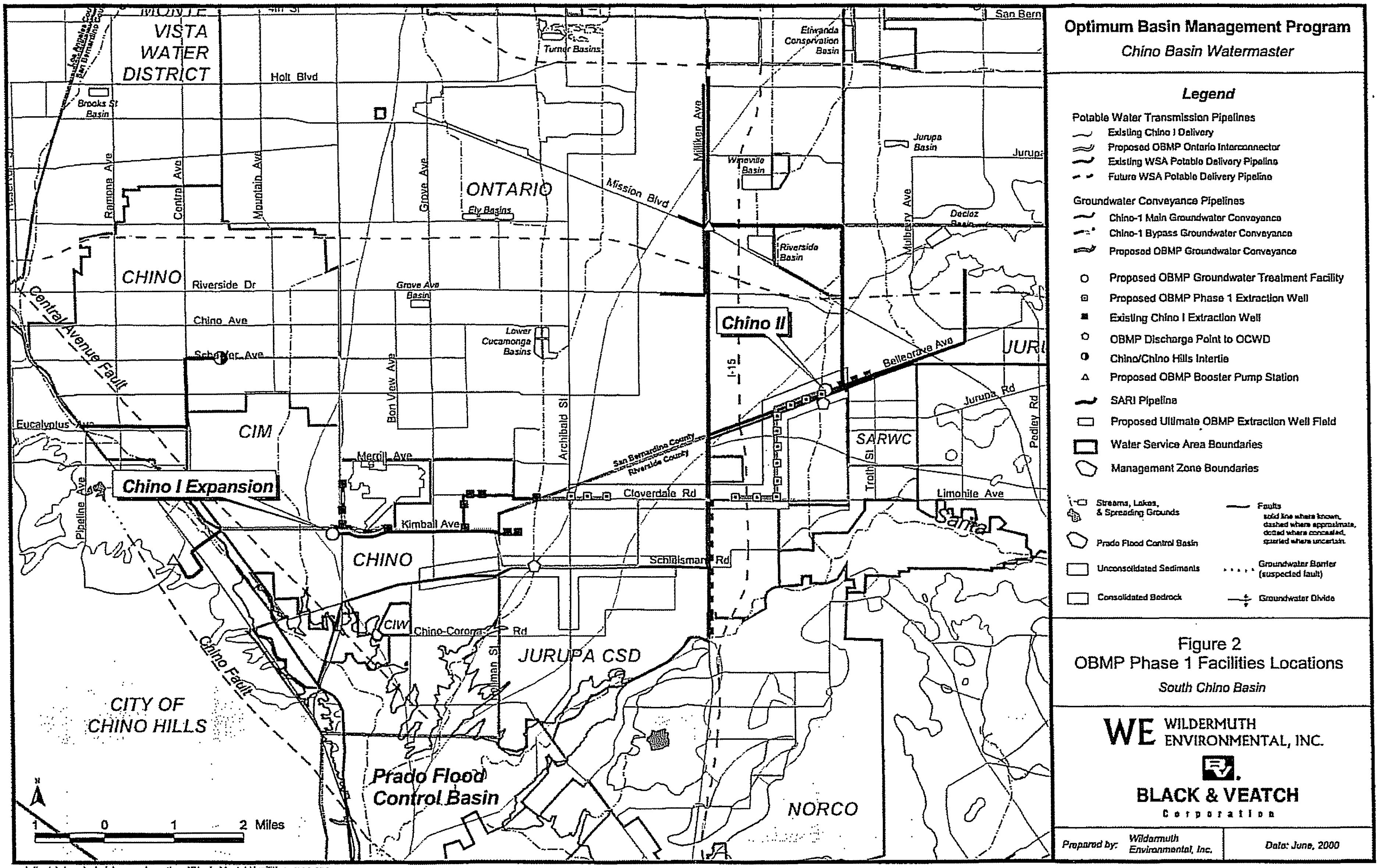

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EXHIBIT B

SUPERIOR COURT FOR THE STATE OF CALIFORNIA
FOR THE COUNTY OF SAN BERNARDINO

CHINO BASIN MUNICIPAL WATER DISTRICT, Plaintiff, vs. CITY OF CHINO, et al., Defendants	Case No. RCV 51010 ORDERS for Watermaster's Motion Regarding 2015 Safe Yield Reset Agreement, Amendment of Restated Judgement, Paragraph 6 Date: April 28, 2017 Time: 1:30 PM Department: S35

Watermaster's Motion Regarding 2015 Safe Yield Reset Agreement, Amendment of Restated Judgment, Paragraph 6, joined by The Chino Basin Overlying (Agricultural) Pool Committee and The Inland Empire Utilities Agency ("IEUA") and opposed by Jurupa Community Services District ("JCSD") and the City of Chino ("Chino") is granted in part and denied in part for the reasons set forth herein. The court grants the motion with respect to amending the restated judgment to reset the Safe Yield of the basin to 135,000 AFY.

However, the court denies all other parts of SYRA including the motions to amend the schedule for access to Re-Operation Water and. The court denies the motion to institute Safe Storage Management Measures. The court makes additional orders regarding priorities and with respect to access for Re-Operation Desalter water as set forth herein.

Additionally, the court orders that the Safe Yield reset to 135,000 AFY is an event that requires a "recalculation" with the definition of Judgment, Exhibit "H" ¶10.

REQUEST FOR JUDICIAL NOTICE

The court grants requests for judicial notice of JCSD as follows:

1. Restated Judgment ("Judgment") in case number RCV 51010.
2. Implementation Plan Optimum Basin Management Program for the Chino Basin ("OBMP Implementation Plan").
3. Chino Basin Watermaster Rules and Regulations ("Rules and Regulations").
4. 2015 Safe Yield Reset Agreement ("SYRA").
5. Order Concerning Motion for Approval of Peace II Documents ("2007 Order") in case number RCV 51010.
6. 2000 Peace Agreement Chino Basin ("Peace I Agreement" or "Peace I").
7. Watermaster Compliance with Condition Subsequent Number Eight: Proposed Order Submitted Concurrently.
8. Peace II Agreement: party support for Watermaster's OBMP Implementation Plan, Settlement and Release of Claims Regarding Future Desalters ("Peace II Agreement" or "Peace II").

JOINDERS AND FILINGS

A. Watermaster's motion regarding 2015 Safe Yield Reset Agreement, amendment of restated Judgement, Paragraph 6.

1. City of Chino's objections to declaration of Kavounas submitted with Watermaster's Motion regarding 2015 Safe Yield Reset Agreement, Amendment of Restated Judgment, Paragraph 6

Rulings in separate document.

2. City of Chino's objections to declaration of Wildermuth submitted with Watermaster's Motion regarding 2015 Safe Yield Reset Agreement, Amendment of Restated Judgment, Paragraph 6

Rulings in separate document.

B. The following parties joined in Watermaster's motion:

1. Overlying (Agricultural) Pool

2. Inland Empire Utilities Agency

C. Oppositions to Watermaster's motion

1. City of Chino with supporting documents

a) Declaration of Robert Shibatani, physical hydrologist

b) Declaration of David Crosley, civil engineer, water and environmental manager for City of Chino

2. Jurupa Community Services District (JCSD) with supporting documents

a) Request for judicial notice identified above

b) Declaration of Todd Corbin, general manager of JCSD

c) Declaration of Robert Donlan, attorney

D. Watermaster's reply to oppositions to motion regarding 2015 Safe Yield Reset Agreement, amendment of Restate Judgement, Paragraph 6

1. Supplemental declaration of Kavounas

a) City of Chino's objections Kavounas supplemental declaration in support of Watermaster's reply the Chino opposition

b) Watermaster's Response to City of Chino's objections to supplemental declaration of Peter Kavounas in support of Watermaster's reply to Chino's Opposition to Motion regarding 2015 Safe Yield Reset Agreement, Amendment of Restated Judgment, Paragraph 6

I) Motion to strike denied. The court finds that the declaration did not raise new issues.

II) All objections overruled.

2. Supplemental declaration of Wildermuth

a) City of Chino's objections to Wildermuth supplemental declaration in support of Watermaster's reply to Chino opposition.

b) Watermaster's Response to City of Chino's objections to supplemental declaration of Mark Wildermuth in support of Watermaster's reply to Chino's Opposition to Motion regarding 2015 Safe Yield Reset Agreement, Amendment of Restated Judgment, Paragraph 6.

I) Motion to strike denied. The court finds that the declaration did not raise new issues.

II) All objections overruled.

3. Declaration of Danielle Maurizio, assistant general manager of Chino Basin

a) City of Chino's objections to supplemental declaration of Danielle D. Maurizio in support of Watermaster's reply to chino opposition

b) Watermaster's Response to City of Chino's objections to supplemental declaration of Danielle E. Maurizio in support of Watermaster's reply to Chino's Opposition to Motion regarding 2015 Safe Yield Reset Agreement, Amendment of Restated Judgment, Paragraph 6

I) Motion to strike denied. The court finds that the declaration did not raise new issues.

II) All objections overruled.

4. Joinders in Watermaster's reply to oppositions

a) Overlying (Agricultural) Pool

b) City of Pomona and (in one pleading document)

I) City of Upland

II) Monte Vista Water District

III) Cucamonga Valley Water District

IV) Fontana Union Water Company

E. In an order Dated March 22, 2016, the court served the parties with questions and a request for further briefing in response to the questions. The responses were as follows:

1. Jurupa Community Services District response to Judge Reichert's request for clarification filed April 1, 2016.

2. City of Chino's responses to Judge Reichert's questions, filed April 1, 2016.

3. Watermaster's response to order for additional briefing filed April 1, 2016.

a) Chino's reply to Watermaster's response to order for additional briefing, filed April 11, 2016.

b) Jurupa Community Services District's additional response to Judge Reichert's request for clarification, filed April 11, 2016

4. Watermaster's further response to order for additional briefing, filed April 11, 2016

F. At the hearing on February 22, 2017, the court ordered that the parties may file questions regarding the court's tentative draft order, and the court set a briefing schedule. In response, the court received the following:

1. Filed March 10, 2017-Chino Basin Watermaster response to February 22, 2017 order

2. Filed March 10, 2017-City of Chino's response to issue in section II of Judge Reichert's revised proposed order re SYRA

3. Filed March 10, 2017-Responding AP members (Monte Vista Water District, Cucamonga Valley Water District, City of Pomona, and City of Upland) filed March 10, 2017

4. Filed March 24, 2017-Chino Basin Watermaster further response to February 22, 2017 order

5. Filed March 24, 2017-City of Chino's response to court authorized

further briefing re revised tentative order re Watermaster's motion re 2015 Safe Yield reset Agreement

6. Filed March 24, 2017-City of Chino's response to Chino Basin Watermaster's response to February 22, 2017 order

7. Filed March 24, 2017-City of Ontario's response regarding issue for further briefing

8. Filed March 24, 2017-Jurupa Community Services District opposition to Monte Vista Water District's response to court's February 22, 2017 order re SYRA and response to questions [joins in the opposition filed by the City of Ontario]

9. Filed March 24, 2017-Responding AP members response to both Watermaster and City of Chino's further briefing re revised tentative order re Watermaster's motion re 2015 Safe Yield Reset Agreement

10. Filed April 4, 2017-errata to City of Chino's response to Chino Basin Watermaster's response to February 22, 2017 order

11. Filed April 7, 2017-Chino Basin Watermaster further response to February 22, 2017 order

12. Filed April 7, 2017-City of Chino's reply to responses of Watermaster, 4AP Members, Ontario and Jurupa

13. Filed April 7, 2017-Jurupa Community Services District's limited reply to City of Chino's response to Chino Basin Watermaster's response to February 22, 2017 order, dated March 24, 2017

14. Filed April 7, 2017-Responding AP Members reply to opposition briefs re revised tentative order re Watermaster's motion re 2015 Safe Yield Reset Agreement

15. Filed April 27, 2017, request by Chino basin desalter authority member agencies regarding desalter pumping

SEPTEMBER 23, 2016, HEARING AND ADDITIONAL BRIEFING

After extensive briefing and consideration, on September 23, 2016, the court held a hearing on the 2015 SYRA and related motions. Before the hearing, the court had issued a lengthy (over 60 pages) proposed order. At the hearing on September 23, there was extensive oral argument, and the court concluded that some aspects of the court's proposed order were confusing or erroneous. Therefore, the ordered that there be even further briefing, and the court ordered additional briefing through questions by the parties about the proposed order. In its order entitled "Revised Proposed Order Re SYRA in Response to Questions: Issues for Further Briefing," and the current order, the court addressed the parties' questions.

I. INTRODUCTION, DEFINITIONS, BACKGROUND

A. The 1978 judgment in *Chino Basin Municipal Water District v. City of Chino* (San Bernardino Superior Court Case No. 51010) set the Safe Yield of the Chino Basin at 140,000 acre-feet per year (AFY), but reserved continuing jurisdiction to the court to amend the Judgment, inter alia, to redetermine the Safe Yield after the first 10 years of operation of the Physical Solution established under the Judgment. The Physical Solution identified three groups of parties (Pools) with water interests in the Chino Basin, and set forth their allocations as follows:

Pool	Allocation	Acre-feet Yearly Allocation
Overlying (Agricultural) Pool*	414,000 acre-feet in any five (5) consecutive years [note: 414,000 ÷ 5 = 82,800 per year]	82,800
Overlying (Non-agricultural)	7,366 acre-feet	7,366

Pool**		
Appropriative Pool***	49,834 acre-feet	49,834
	Yearly total allocation	140,000

*The members of this pool included dairy farms.

**The members of this pool include businesses which use water in their production processes.

***The members of this pool include cities and water companies. They "appropriate" the water by pumping and selling it.

Over the course of the Court-Approved Management Agreements (set forth in the next section), the court allowed up to 600,000 AF of water to be produced/pumped out of the Chino Basin without any replenishment obligation. "While the parties are not limited in the quantities of water they may produce, the Judgment requires that beyond the permitted Controlled Overdraft comprising an initial 200,000 AF and an additional 400,000 AF of Re-operation water (Restated Judgment, Exhibit "I", ¶¶ 2.(b), 3.(a)), there must be a bucket for bucket replenishment [and associated cost to the producer/pumper] to offset production in excess of the Basin's Safe Yield. (Restated Judgment, ¶¶ 13, 42)." (Watermaster's Response to Questions for Clarification in Final Orders for Watermaster's Motion Regarding 2015 Safe Yield Reset Agreement, Amendment of Restated Judgment, Paragraph 6, page 2, line 23 to page 3, line 4, filed October 28, 2016.)

The court notes that this total "controlled overdraft" i.e., pumping without replenishment cost, (aka "Re-Operation Water") of 600,000 AF has just about been exhausted.

This motion is the first time the court has redetermined the Safe Yield since the Judgment was entered in 1978.

B. Since the entry of the judgment, the court has previously approved agreements to implement the Physical Solution ("Court Approved Management Agreements" aka "CAMA"). There is no dispute that the court has the authority and duty to independently review the evidence de novo and determine whether proposals by Watermaster or any party comply with the Judgment and the Court Approved Management Agreements. (Restated Judgment ¶31(d).) The Court Approved Management Agreements are:

1. The Chino Basin Peace Agreement (Peace I Agreement), dated June 29, 2000, as subsequently amended in September 2004 and December 2007.

   a. In 2000 the parties executed Peace Agreement Chino Basin (Peace I Agreement) and agreed to Watermaster's adoption of the Optimum Basin Management Plan (OBMP) Implementation Plan. At about the same time, the court ordered Watermaster to proceed in a manner consistent with Peace I and the OBMP, including Program Element 8 (Develop and Implement Groundwater Storage Management Program) and Program Element 9 (Develop and Implement Storage and Recovery Programs). The implementation plan acknowledged the need to obtain better production data through the metering of non-exempt production within the Basin. Program Elements 8 and 9 provided for Watermaster to redetermine and reset the Basin's Safe Yield in the year 2010/11. The basis of the redetermination and reset would be production data derived from the collection of additional data regarding the parties' production (i.e., parties who pumped water out of the Basin) within the basin during the 10-year period 2000/01 through 2009/10. The study for redetermination and reset was not completed until 2015, and the motion regarding determination and reset was not filed until October 2015.

   b. The Peace I Agreement introduced the installation of Desalters in the southwest portion of the Basin. The Desalters pump ground water from the aquifer and supply that water to water companies and other users. By pumping water out of the aquifer, the Desalters also lowered the ground water table to help obtain Hydrologic Control, i.e., preventing Chino Basin ground water from reaching the Santa Ana River south of the Basin. The Santa Ana River is a major source of water for Orange County, and water impurities and contaminants, some of which came from the Chino Basin dairy farms ("salts") were in the groundwater flowing from the Basin into the Santa Ana River. The Desalter capacity has now expanded to 40 MGD (40 million gallons per day) as provided in the OBMP Implementation Plan to protect against a decline in Safe Yield and for water quality benefits, but the court reserved the question of how "Future Desalter" capacity would be addressed. The Chino Basin Desalter Authority (CDA), which includes the City of Chino, participated in the construction of the Desalters which represented a substantial engineering and financial undertaking. These Desalters were completed and fully operational in 2006.

2. The Peace II Measures (court approved on December 21, 2007).

a. In 2007, the parties entered into the Peace II Agreement. The objective was to increase the Desalter capacity to 40 MGD to achieve the OBMP Implementation Plan objectives. In order to do this, the parties designed and financed an additional 10 million gallons per day ~~(MGD)~~ of expanded Desalter capacity. The expansion of the Desalters to the full plant capacity will be completed in 2017. With the completion of this construction, Hydraulic Control will be achieved. Hydraulic Control now means only a de minimus amount of groundwater will flow from the Chino Basin south into the Santa Ana River. In fact, the Desalters now have lowered the water table in the south end of the Basin so that ground water is now flowing from the Santa Ana River north into the Chino Basin. ~~This is called Re-Operation water.~~

3. The Optimum Basin Management Plan (OBMP) Implementation Plan dated June 29, 2000, was supplemented in December 2007.

4. The Recharge Master Plan, dated 1998, was updated in 2010 and amended in 2013.

5. The Watermaster Rules and Regulations dated June 2000, as amended.

6. The October 8, 2010 Order Approving Watermaster's Compliance with Condition Subsequent Number Eight and Approving Procedures to be used to Allocate Surplus Agricultural Pool Water in the Event of a Decline in Safe Yield.

7. Watermaster Resolution 2010-04 ("Resolution of the Chino Basin Watermaster regarding Implementation of the Peace II Agreement and the Phase III Desalter Expansion in Accordance with the December 21, 2007 Order of the San Bernardino Superior Court").

C. Additional background for motion

1. At the September 24, 2015 Watermaster Board Meeting, the board adopted Resolution 2015-06: Resolution of the Chino Basin Watermaster regarding the 2015 Safe Yield Reset Agreement (SYRA).

2. Through a Facilitation and Non-Disclosure Agreement (FANDA), Watermaster attempted to obtain agreement as to all issues regarding Safe Yield redetermination and reset allocation. Those issues included not only a reset of the Safe Yield from 140,000 acre-feet per year to 135,000 acre-feet per year, but also Watermaster's accounting for reallocations related to Court Approved Management Agreements, and a method of allocations for water storage called the Safe Storage Management Agreements.

a) The FANDA process took place starting in November 2014, and through at least 30 meetings, by May 27, 2015, all but one of the then-active parties to the FANDA reached a non-binding agreement among their negotiating representatives on certain key principles (apparently also called the "term sheet") embodied in the Safe Yield Summary of Non-Binding Key Principles Derived from the Facilitated Process.

b) The parties continued to negotiate, with a goal of reducing the Key Principles into a binding instrument for execution by September 1, 2015. That agreement is identified as the 2015 Safe Yield Reset Agreement (SYRA). The Appropriative Pool, the Overlying (Agricultural) Pool, and the Three Valleys Municipal Water District approved the 22-page agreement, as did many other parties. The City of Chino refused to sign the agreement.

c) On September 24, 2015, the board at its regular meeting adopted resolution 2015-06, and previously – on September 17, 2015 – the advisory committee approved resolution 2015-06: "Resolution of Chino Basin Watermaster regarding 2015 Safe Yield Reset Agreement (SYRA)."

d) Watermaster's instant motion asks the court to address the issues covered in the SYRA as follows:

I) The reset of the Basin Safe Yield from 140,000 acre-fee per year (AFY) to 135,000 AFY pursuant to the Restated Judgment, the OBMP Implementation Plan, and Watermaster's Rules and Regulations;

II) The manner in which Watermaster should account for various components of the recharge to the Basin implementing the Court-Approved Management Agreements; and

III) Establishment of Safe Storage Management Measures (SSMM) intended to ensure that withdrawals of groundwater from authorized storage accounts within the Basin are safe, sustainable, and will not cause Material Physical Injury or undesirable results.

D. SUMMARY RULNGS:

In its motion, Watermaster requests an order acknowledging the 2015 Safe Yield Reset Agreement and ordering Watermaster to proceed in accordance with its terms with respect to amending the restated judgment to reset the Safe Yield of the Basin from 135,000 AFY to 135,000 AFY and amending the schedule for access to Re-Operation water. For the reasons set forth herein, the court grants the motion with respect to amending the restated judgment to reset the Safe Yield of the basin to 135,000 AFY. However, the court denies the rest of the motions including the motions to amend the schedule for access to Re-operation water and the motion to institute Safe Storage Management Measures. The court makes additional orders with respect to Desalter water as set forth herein.

II. Severability of SYRA

Watermaster has questioned whether the court can sever SYRA and enforce certain sections and not others. For the following reasons, except for the Safe Yield reset itself, the court has concluded that it cannot enforce some of sections and not others:

A. Watermaster itself has argued that SYRA is an integrated document which cannot be divided.

1. Watermaster's "Response to Questions for Clarification, etc." filed October 28, 2016, states: "the SYRA is the product of the Facilitation and Non-Disclosure Agreement (FANDA) process, during which the parties to that agreement comprehensively settled and compromised their disagreements, so as to enable Watermaster to implement the CAMA's through and following the reset of Safe Yield."

a) The court does not find a basis for this characterization. *Most* of the parties settled and compromised their disagreements, but not all, notably the city of Chino and Jurupa Community Services District.

2. Watermaster further argues that approving "some, but not all, of SYRA's provisions can materially advantage one party over another, in that the full benefit of the parties intended settlement and compromise is not achieved, as one or more parties may be denied the consideration for which it bargained."

a) For the reasons set forth below, the court refuses to adopt SYRA in whole. Following Watermaster's own all-or-nothing argument, the court must conclude that not only is there no legal basis to enforce part of SYRA, but also that it is fundamentally unfair to the parties to enforce portions of SYRA for which the parties did not bargain.

3. However, the court concludes there is a qualitative difference between the safe yield reset and the balance of SYRA.

a) The request to reduce the Safe Yield to 135,000 AFY is a legal determination for the court.

b) The request to reduce Safe Yield is based on the Reset Technical Memorandum report and model. That memorandum has nothing to do with interactions, bargaining, or allocations among the parties.

I) There ample technical and scientific support for the reset in the Technical Memorandum and the 2013 Chino Basin Groundwater Model Update and Recalculation of Safe Yield Pursant to the Peace Agreement prepared by Wildermuth Environmental, Inc. dated October 2015.

c) The request to reduce Safe Yield is in response to the court order itself to evaluate the yield every 10 years

I) Although the study should have been done in 2010, at least it was completed in 2015.

II) None of the other aspects of SYRA were pursuant to a court order.

III) The safe yield reset is a legal determination for the court. There is no "bargained-for exchange" for the court to consider.

d) Therefore for these reasons and those set forth in section III below ~~III~~ the court adopts the following provisions of Article 4-SAFE YIELD RESET TO 135,000 AFY of the SYRA AND ORDERS AS FOLLOWS:

4.1 Safe Yield Reset. Consistent with the prior orders of the Court pursuant to its continuing jurisdiction, effective July 1, 2010 and continuing until June 30, 2020, the Safe Yield for the Basin is reset at 135,000 AFY. For all purposes arising under the Judgment, the Peace Agreements and the OBMP Implementation Plan, the Safe Yield shall be 135,000 AFY, without exception, unless and until Safe Yield is reset in accordance with the procedures set forth in this order, and determined by the Court pursuant to its retained continuing jurisdiction.

4.2 Scheduled Reset. Watermaster will initiate a process to evaluate and reset the Safe Yield by July 1, 2020 as further provided in this order. Subject to the provisions of Paragraph 4.3 below, the Safe Yield, as it is reset effective July 1, 2020 will continue until June 30, 2030. Watermaster will initiate the reset process no later than January 1, 2019, in order to ensure that the Safe Yield, as reset, may be approved by the court no later than June 30, 2020. Consistent with the provisions of the OBMP Implementation Plan, thereafter Watermaster will conduct a Safe Yield evaluation and reset process no less frequently than every ten years. This Paragraph is deemed to satisfy Watermaster's obligation, under Paragraph 3.(b) of Exhibit "I" to the Restated Judgment, to provide notice of a potential change in Operating Safe Yield.

4.3 Interim Correction. In addition to the scheduled reset set forth in Paragraph 4.2 above, the Safe Yield may be reset in the event that, with the recommendation and advice of the Pools and Advisory Committee and in the exercise of prudent management discretion described in Paragraph 4.5(c), below, Watermaster recommends to the court that the Safe Yield must be changed by an amount greater (more or less) than 2.5% of the then-effective Safe Yield.

4.4 Safe Yield Reset Methodology. The Safe Yield has been reset effective July 1, 2010 and shall be subsequently evaluated pursuant to the methodology set forth in the Reset Technical Memorandum. The reset will rely upon long-term hydrology and will include data from 1921 to the date of the reset evaluation. The long-term hydrology will be continuously expanded to account for new data from each year, through July 2030, as it becomes available. This methodology will thereby account for short-term climatic variations, wet and dry. Based on the best information practicably available to Watermaster, the Reset Technical Memorandum sets forth a prudent and reasonable professional methodology to evaluate the then prevailing Safe Yield in a manner consistent with the Judgment, the Peace Agreements, and the OBMP Implementation Plan. In furtherance of the goal of maximizing the beneficial use of the waters of the Chino Basin, Watermaster, with the recommendation and advice of the Pools and Advisory Committee, may supplement the Reset Technical Memorandum's methodology to incorporate future advances in best management practices and hydrologic science as they evolve over the term of this order.

4.5 Annual Data Collection and Evaluation. In support of its obligations to undertake the reset in accordance with the Reset Technical Memorandum and this order, Watermaster shall annually undertake the following actions:

(a) Ensure that, unless a Party to the Judgment is excluded from reporting, all production by all Parties to the Judgment is metered, reported, and reflected in Watermaster's approved Assessment Packages;

(b) Collect data concerning cultural conditions annually with cultural conditions including, but not limited to, land use, water use practices, production, and facilities for the production, generation, storage, recharge, treatment, or transmission of water;

(c) Evaluate the potential need for prudent management discretion to avoid or mitigate undesirable results including, but not limited to, subsidence, water quality degradation, and unreasonable pump lifts. Where the evaluation of available data suggests that there has been or will be a material change from existing and projected conditions or threatened undesirable results, then a more significant evaluation, including modeling, as described in the Reset Technical Memorandum, will be undertaken; and,

(d) As part of its regular budgeting process, develop a budget for the annual data collection, data evaluation, and any scheduled modeling efforts, including the methodology for the allocation of expenses among the Parties to the Judgment. Such budget development shall be consistent with section 5.4(a) of the Peace Agreement.

4.6 Modeling. Watermaster shall cause the Basin Model to be updated and a model evaluation of Safe Yield, in a manner consistent with the Reset Technical Memorandum, to be initiated no later than January 1, 2024, in order to ensure that the same may be completed by June 30, 2025.

4.7 Peer Review. The Pools shall be provided with reasonable opportunity, no less frequently than annually, for peer review of the collection of data and the application of the data collected in regard to the activities described in Paragraphs 4.4, 4.5, and 4.6 above.

4.8 No Retroactive Accounting. Notwithstanding that the initial Safe Yield reset, described in Paragraph 4.1 above, shall be effective as of July 1, 2010, Watermaster will not, in any manner, including through the approval of its Assessment Packages, seek to change prior accounting of the prior allocation of Safe Yield and Operating

Safe Yield among the Parties to the Judgment for production years prior to July 1, 2014.

III. THE COURT FURTHER ORDERS AS FOLLOWS:

A. The court amends the restated judgment ¶6 and sets the safe yield to 135,000 AFY for the following reasons:

1. The court accepts the findings and conclusions of Wildermuth for the following reasons. Those conclusions are set forth in the reset Technical Memorandum.

a) Wildermuth has been the authoritative resource for the parties and the court during the pendency of the case for the last 15 years.

b) Wildermuth has performed a detailed analysis with substantiated facts and findings in the reset technical memorandum, the supplemental declaration of Mark Wildermuth in support of Watermaster's reply to oppositions to the motion regarding 2015 Safe Yield Reset Agreement, and the memo to restated judgment, paragraph 6 aka Wildermuth supplemental declaration.

c) The court accepts the net recharge approach and calculations set forth in the Wildermuth report.

d) The Wildermuth report gives the most comprehensive analysis and credible evaluation of the historic condition of the Basin.

e) The court does not accept the conclusions of Robert Shibatani for the following reasons:

I) Shibatani recognizes that the net recharge calculation is a legitimate approach to a determination of Safe Yield.

II) The Shibatani approach is unnecessarily quantitative. The Wildermuth analysis allows for the definitions required for the analysis of the Chino

Basin, including cultural conditions and undesirable results.

III) Wildermuth has considered the effects of climate change of Basin precipitation. The court accepts Wildermuth's conclusion that there are not any better predictive modeling scenarios generally available at this time accurately calibrated to the historical rainfall and are therefore not reliable as a predictive tool.

2. The Restated Judgment's definition of Safe Yield includes the consideration of the evolutionary land-use conditions the need to protect the Basin against undesirable results.

3. No party has objected to the reduction in Safe Yield, except the city of Chino. Chino's objections were discussed and rejected/overruled for the reasons set forth in Joinders and Filings, Section A.2 above.

4. The reduction safe yield is consistent with the Court-Approved Management Agreements.

5. The court finds that the provisions of SYRA set for in Section II above set forth an approach to a determination of future Safe Yield determinations in a manner consistent with the Court Approved Management Agreements.

a) The declaration of Peter Wildermuth and the supporting documentation, analysis supports the court's conclusion.

b) Wildermuth declaration, paragraph 14, states his opinion that the Basin protection measures to which the parties have agreed and the 2015 Safe Yield Reset Agreement will ensure that the Basin is not harmed by extraction of 135,000 AFY through fiscal 2020. However, again the court emphasizes that its ruling is not based on the agreement of the parties. The court's ruling is based upon the Restated Judgment, the Court Approved Management Agreements, and its legal conclusions supported by the technical analyses identified in the court's order.

I) Although the court concludes the Safe Storage Management Measures are useful and advisable, the court concludes there is no specific factual basis requiring the Safe Yield reset to include Safe Storage Management Measures. Therefore the court concludes that even without the Safe Storage Management Measures, reduction of Safe Yield to 135,000 AFY will not harm the Basin.

II) The 2013 Chino Basin Groundwater Model Update and Recalculation of Safe Yield Pursuant to the Peace Agreement is sufficiently documented and the court finds the data reliable.

c) Wildermuth declaration, paragraph 15, states that the Basin protection measures to which the parties have agreed and the 2015 Safe Yield Reset Agreement, including the Safe Storage Management Measures, will ensure that the Basin is not harmed by extractions of the 20,000 AF that was allocated in the past 4 years and would have been allocated if the Safe Yield have been reset to 135,000 AFY in 2011.

I) However, again Wildermuth does not specifically address the necessity of the Safe Storage Measures with respect to complying with the Court Approved Management Agreements. Therefore, the court again concludes that even without the Safe Storage Management Measures, reduction of Safe Yield to 135,000 AFY will not harm the Basin.

II) Again, the 2013 Chino Basin Groundwater Model Update and Recalculation of Safe Yield Pursuant to the Peace Agreement is sufficiently documented and the court finds the data reliable.

d) Therefore, the court concludes that the extraction of 135,000 AFY is consistent with the Court Approved Management Agreements and does not create any undesirable result or Material Physical Injury to the Basin.

B. The measures set forth in Article 4 are consistent with the Physical Solution under the judgment and Article X, section 2 of the California Constitution.

C. Paragraph 6 of the Restated Judgment is hereby amended to read as follows: "Safe Yield. The Safe Yield of the Basin is 135,000 acre feet per year."

1. The effective date of this amendment of Paragraph 6 of the Restated Judgement is July 1, 2010.

IV. SAFE YIELD RESET AGREEMENT (SYRA): WATERMASTER ALLOCATION HISTORY, EARLY TRANSFERS, AND THE DESALTERS

A. The 1978 Judgment as amended

1. The 1978 Judgment ¶44 made the following allocation of rights to Safe Yield in the Chino Basin ("the physical solution"):

Pool	Allocation
Overlying (Agricultural) Pool	414,000 acre-feet in any 5 consecutive years (82,800 acre-feet per year)* **
Overlying (Non-agricultural) Pool	7366 acre-feet per year**
Appropriative Pool	49,834 acre-feet per year
Total	140,000 acre-feet per year

*Note: 414,000 ÷ 5 = 82,800. 82,800 acre-feet per year has been the basis of calculations for the Appropriative Pool going forward from the judgment.

Note: the rights of the members of the Overlying (Agricultural) Pool and the Overlying (Non-Agricultural) Pool are fixed (Restated Judgment ¶8, ¶44, see also Exhibits "C" and "D" to the Restated Judgment). **Therefore the effect of a decline of the safe yield is borne entirely by the members of the Appropriative Pool (Restated Judgment ¶9).

2. The Judgment ¶1(x) defines Safe Yield as "the long-term average annual

quantity of groundwater (excluding replenishment or stored water but including return flow to the basin from use of replenishment or stored water) which can be produced [*i.e.,* pumped] from the basin under cultural conditions of the particular year without causing an undesirable result."

3. The judgment fixed the amount of water production (pumping) that could be allocated to the Overlying (Agricultural) Pool and the Overlying (Non-agricultural) Pool. However, the Appropriative Pool allocation could be changed.

a) The court concludes that the disputes in the oppositions concern relationship between unproduced (*i.e.*, unpumped) Overlying Agricultural Pool water (aka Ag Pool water) and the water available to the Appropriative Pool.

4. Exhibit "I" to the judgment is the Engineering Appendix. It discusses Hydraulic Control and Re-Operation, which are described in more detail below. Section 3 defines Operating Safe Yield as consisting in any "year of the Appropriative Pool's share of Safe Yield of the Basin, plus any controlled overdraft of the Basin which Watermaster may authorize."

a) Section 3(b) states that "in no event shall Operating Safe Yield in any year be less than the Appropriative Pool's share of Safe Yield, nor shall it exceed such share of Safe Yield by more than 10,000 acre feet. The initial Operating Safe Yield is hereby set at 54,834 acre feet per year."

I) The figure of 54,834 acre feet per year is the initial 1978 Judgment allocation of 49,834 acre-feet per year plus 5,000 acre feet per year. The additional 5,000 AFY comes from 200,000 acre-feet of overdraft (water pumped without a replenishment obligation) allocated by the Judgment to the Appropriative Pool. This overdraft total was later increased by 400,000 AF to a total of 600,000 AF. The overdraft will be exhausted in 2016/2017. (Watermaster Motion Regarding 2015 Safe Yield Reset Agreement, Amendment of Restated Judgement, Paragraph 6, page 3, line 27.)

b) Operating Safe Yield has also come to mean water that the Appropriative Pool could produce/pump without having to purchase replenishment water. (Exhibit "H" ¶5.)

5. Exhibit "H" to the judgment described the Appropriative Pool Pooling Plan, paragraph 10 described "Unallocated Safe Yield Water" as follows: "to the extent that, in any 5 years, any portion of the share of Safe Yield allocated to the Overlying (Agricultural) Pool is not produced, such water shall be available for reallocation to members of the Appropriative Pool as follows:

(a) Priorities. Such allocation shall be made in the following sequence:

(1) to supplement, in the particular year, water available from Operating Safe Yield to compensate for any reduction in the Safe Yield by reason of recalculation thereof after the tenth year of operation hereunder. [This Exhibit H ¶10(a)(1) priority is sometimes called 'unproduced Agricultural Pool water' or 'unproduced Ag Pool water.' The current credited production (pumping) for agricultural groundwater is about 33,600 AFY, but that includes agricultural land irrigated with reclaimed water. The actual groundwater production for agricultural purposes is about 22,000 AFY. (Jurupa Services District's response to Judge Reichert's Request for Clarification, March 22, 2016, page 2, lines 8–10.)]

(2) pursuant to conversion claims as defined in Subparagraph (b) hereof.

(3) as a supplement to Operating Safe Yield, without regard to reductions in Safe Yield."

6. In an order dated November 17, 1995, Conversion Claims were defined in Exhibit "H" ¶10(b) [this is the Subparagraph (b) to which the preceding paragraph--page 23, line 21--refers]. Peace I modified this definition in Exhibit "H" ¶10(b) to state as follows:

(b) Conversion Claims. The following procedures may be utilized by any appropriator:

1) Record of Unconverted Agricultural Acreage. Watermaster shall maintain on an ongoing basis a record with appropriate related maps of all agricultural acreage within the Chino Basin subject to being converted to appropriative water use pursuant to the provisions of this paragraph. An initial identification of such acreage as of June 30, 1995 is attached hereto as Appendix 1.

(2) Record of Water Service Conversion. Any appropriator who undertakes to permanently provide water service to lands subject to conversion may report such intent to change water service to Watermaster. Watermaster should thereupon verify such change in water service and shall maintain a record and account for each appropriator of the total acreage involved. Should, at any time, converted acreage return to water service form the Overlying (Agricultural) Pool, Watermaster shall return such acreage to unconverted status and correspondingly reduce or eliminate any allocation accorded to the appropriator involved.

(3) Allocation of Safe Yield Rights

(i) For the term of the Peace Agreement in any year in which sufficient unallocated Safe Yield from the Overlying (Agricultural) Pool is available for such conversion claims, Watermaster shall allocate to each appropriator with the conversion claim 2.0 acre-feet of unallocated Safe Yield water for each converted acre for which conversion has been approved and recorded by Watermaster.

(ii) In any year in which the unallocated Safe Yield water from the Overlying (Agricultural) Pool is not sufficient to satisfy all outstanding conversion claims pursuant to subparagraph (i) herein above, Watermaster shall establish allocation percentages for each appropriator with conversion claims. The percentages shall be based upon the ratio of the total of such converted acreage approved and recorded for each appropriators's [*sic*] account in comparison to the total of converted acreage approved and recorded for all appropriators. Watermaster shall apply such allocation percentage for each appropriator to the total unallocated Safe Yield water available for conversion claims to derive the amount allocable to each appropriator.

7. CONCLUSION: With the 1995 amendments, the Judgment set a prioritized list of claims upon unproduced Ag Pool water.

Ag Pool water--1995 Judgment amendment
82,800 AFY of the Ag Pool's water available to the Appropriative Pool with Appropriative Pool claims prioritized as follows: (1) to supplement, in the particular year, water available from Operating Safe Yield to compensate for any reduction in the Safe Yield by reason of recalculation thereof after the tenth year of operation as required by the Judgment; (2) pursuant to conversion claims as defined in Subparagraph (b of Exhibit "H" ¶10(b); (3) as a supplement to Operating Safe Yield, without regard to reductions in Safe Yield.

The court notes that there is currently more than 49,000 AFY of unproduced Agricultural Pool water available. (Jurupa Services District's response to Judge Reichert's Request for Clarification, March 22, 2016, page 2, lines 10–14.)

B. The 2000 Peace Agreement aka Peace I

1. With the agreements made in Peace I, the elements of Desalters and of water transfers entered the water allocations to the parties.

2. Peace I Section V-Watermaster Performance defined how Watermaster was to perform regarding procedures for Recharge and Replenishment. In paragraph ¶5.3(g), Watermaster was ordered to approve an "Early Transfer" from the Agricultural Pool to the Appropriative Pool of not less than 32,800 acre-feet per year

which was the expected approximate quantity of water not produced by the Agricultural Pool. ¶5.3(g)(i) further stated that "the quantity of water subject to Early Transfer under this paragraph shall be the greater of (i) 32,800 acre-feet or (ii) 32,800 acre-feet plus the actual quantity of water not produced by the Agricultural Pool for that Fiscal Year that is remaining after all the land use conversions are satisfied pursuant to" the following provision: "the Early Transfer water shall be annually allocated among members of the Appropriative Pool in accordance with their pro-rata share of the initial Safe Yield." The court notes that after this deduction, the Safe Yield water available to the Agricultural Pool became 50,000 acre-feet per year.

3. Peace I also introduced the construction and operation of Desalters in Section VII. ¶7.5 described replenishment for the Desalters provided from the following sources in the following order:

a) Watermaster Desalter replenishment account composed of 25,000 acre-feet of water abandoned by Kaiser and other water previously dedicated by the Appropriative Pool;

(b) New Yield of the Basin, unless the water Produced and treated by the Desalters is dedicated by purchaser of the Desalter water to offset the price of Desalter water to the extent of the dedication;

(c) Safe Yield of the Basin, unless the water Produced and treated by the Desalters is dedicated by a purchaser of the desalted water to offset the price of Desalter water to the extent of the dedication; [and then]

d) Additional Replenishment Water purchased by Watermaster, the cost of which shall be levied as an Assessment by Watermaster.

4. The court also concludes that the conversion claims have priority over the Early Transfers because the conversion claims pre-existed the Early Transfer allocations. The conversion claims came into existence with the 1995 Judgment amendment. The Early Transfers came into existence with Peace I in 2000. The Early Transfers must be interpreted in the context of the pre-existing 1995 Judgment

amendment.

5. CONCLUSION: With Peace I, there were major changes regarding the allocation of water among the parties as set forth in the following table.

Ag Pool water	Status and/or change result	Comments
1995 Judgment amendment	82,800 AFY of the Ag Pool's water available to the Appropriate Pool with Appropriative Pool claims prioritized as follows: (1) to supplement, in the particular year, water available from Operating Safe Yield to compensate for any reduction in the Safe Yield by reason of recalculation thereof after the tenth year of operation hereunder. (2) pursuant to conversion claims as defined in Subparagraph (b) hereof. (3) as a supplement to Operating Safe Yield, without regard to reductions in Safe Yield.	
2000 Peace I–Desalters start construction and	Early Transfers of 32,800 AFY of Ag Pool water	New Yield (with conditions) is source of

pumping water	going straight to the Appropriative Pool (leaving 50,000 AFY to Ag Pool). The remaining Ag Pool water is subject to Appropriative Pool's prioritized claims.	water to replenish water pumped by the Desalters. Under Peace I therefore Desalters do not affect Safe Yield or Operating Safe Yield. Water produced/pumped by the Desalters is not added to or subtracted from Safe Yield of the Basin.

The court concludes that Peace I interrelated Early Transfers and conversion claims in the following way. The Appropriative Pool received unproduced Ag Pool water in at least the amount of 32,800 AFY, but the Appropriative Pool could receive more unproduced Ag Pool water if 1) the Ag Pool did not produce/pump its leftover 50,000 AFY and 2) also after subtracting from the 50,000 AFY the Appropriative Pool's conversion claims at the rate of 2 acre-feet per year per converted acre.

However, the court also concludes that Peace I did not rearrange the priority of allocation claims on unproduced/unpumped water. The priorities of the judgment remain. Specifically, the priority set forth in Judgment, Exhibit "H," Paragraph 10.

EXAMPLE 1: So, for example in a particular year,

1. If one Appropriative Pool producer/pumper (*e.g.*, municipality, such as the City of Chino) had 1000 acres of converted land resulting in 2000 acre-feet of conversion claims (1000 acres x 2.0 acre feet of water/one acre converted), and assuming those were the only conversion claims; and

2. If the Ag Pool produced/pumped only 33,600 AFY leaving 49,200 AFY available

for further allocation (82,800 AFY– 33,600 AFY= 49,200 AFY; the court notes that 33,600 AFY is the approximate Ag Pool credited production [Jurupa response to court's clarification request, page 2, lines 9-10], but the court is using this figure only for illustration); then,

3. The Ag Pool water that would be available to the Appropriative Pool would be based on the following calculation

Example 1-A	Explanation	Comments
Initial Ag Pool allocation	82,800 AFY	
Ag Pool production/pumping	- 33,600 AFY	Assumption
Initial balance after production	49,200 AFY	(82,800 acre-feet – 33,600 acre-feet = 49,200 acre-feet per year)
Conversion claims	- 2000 acre-feet	1000 acres x 2.0 acre feet of water/one acre converted = 2000 acre-feet per year. The subtraction for satisfying conversion claims comes before any reallocation. The conversion claims are applied first because they are set forth in the 1995 Amendment to the Judgment
Ag Pool balance after reduction for conversion claims	47,200 AFY	(49,200 acre-feet - 2000 acre-feet = 47,200 acre-feet per year) Balance: Ag Pool water available to Appropriative Pool after conversion priority claims pursuant to Judgment Exhibit

		"H" Paragraph 10.
Reduction for Early Transfers	- 32,800 AFY	The Early Transfer is now applied because Early Transfers were instituted in Peace I in 2000. The Early Transfer from 82,800 AFY allocation leaving 50,000 AFY for the Ag Pool itself to produce/pump and for additional claims by the Appropriative Pool pursuant to Peace I and Peace II.*
Balance: Ag Pool water available to the Appropriative Pool after conversion priority claims and Early Transfers	14,400 AFY	(47,200 acre-feet -32,800 acre-feet = 14,400 acre-feet per year.) This is the total Ag Pool water available for reallocation to Appropriative Pool for production/pumping after subtraction of conversion priority claims of 2,000 acre-feet per year from and the 32,800 Early Transfer from the allotment of Ag Pool water.**

*It appears to the court that for convenience, many parties first simply take the reduction of the 32,800 acre-feet for Early Transfers and start these calculations with 50,000 acre-feet of Ag Pool water.

1. That calculation is simply to start with the 50,000 acre-feet of unproduced/unpumped Ag Pool water and then subtract the amount 33,600 acre-feet that was actually pumped in this example. The result is 16,400 acre-

feet available for conversion claims.

2. Then subtract the 2,000 acre-feet for conversion claims to get the 14,400 acre-feet of Ag Pool water available for allocation to the Appropriative Pool.
3. However, this procedure is inconsistent with the judgment and Peace Agreements as interpreted by the court for the reasons stated above.

**The also court notes that the particular producer who serviced the converted acres would actually be able to pump the additional conversion claim water as an allocation.

EXAMPLE 2: The following example demonstrates complications arising from a decrease in the amount of Ag Pool water available to the Appropriative Pool. If the Ag Pool produced/pumped more than 48,000 AFY there would be no available water for the Appropriative Pool.

Example 2		Comment
Initial Ag Pool allocation	82,800 AFY	
Ag Pool production/pumping	48,000 AFY	Assumption
Initial balance after production	34,800 AFY	82,800 acre-feet – 48,000 acre-feet = 34,800 acre-feet per year
Conversion claims	- 2000 acre-feet	The subtraction for satisfying conversion claims before any reallocation. (1000 acres x 2.0 acre feet of water/one acre converted = 2000 acre-feet).
Balance:	32,800 AFY	34,800 acre-feet – 2,000 acre-feet = 32,800 acre-feet per year. Ag Pool Water Available after conversion

		priority claims pursuant to Judgment Exhibit "H" Paragraph
Reduction for Early Transfers	- 32,800 AFY	Early Transfer of 32,800 AFY from 82,800 AFY allocation leaving 50,000 AFY for the Ag Pool itself to produce/pump. Any water which the Ag Pool did not produce/pump water up to the 50,000 AFY would be available for allocation to the Appropriative Pool pursuant to Peace I and Peace II.
Balance: Ag Pool water available after conversion priority claims and Early Transfers	0 AFY	32,800 acre-feet -32,800 acre-feet = 0 acre-feet per year. There would be no Ag Pool water available for reallocation to Appropriative Pool after subtraction of conversion priority claims of 2,000 acre-feet and the 32,800 Early Transfer of unproduced/unpumped from the allotment of Ag Pool water.
Conclusion: Under this scenario, the Appropriative Pool would not get any additional allocation from Ag Pool water		

6. Regarding replenishment for the Desalters, Peace I ¶7.5 sets forth the hierarchy of sources of replenishment water for the Desalters as follows:

> Replenishment Water. Replenishment for the Desalters shall be provided from the following sources in the following order of priority.
>
> (a) Watermaster Desalter Replenishment account composed of 25,000

acre-feet of water abandoned by Kaiser pursuant to the "Salt Offset Agreement" dated October 21, 1993, between Kaiser and the RWQB, and other water previously dedicated by the Appropriative Pool.

(b) New Yield of the Basin, unless the water Produced and treated by the Desalters is dedicated by a purchaser of the desalters water to offset the price of the salted water to the extent of the dedication;

(c) Safe Yield of the Basin, unless the water Produced and treated by the Desalters is dedicated by a purchaser of the the salted water to offset the price of the salted water to the extent of the dedication;

(d) Additional Replenishment Water purchased by Watermaster, the cost of which shall be levied as an Assessment by Watermaster.

C. The 2007 Peace II Agreement (Peace II)

1. Peace II Agreement Article VI-Groundwater Production by and Replenishment for Desalters and Article VII-Yield Accounting further defined the accounting for the Desalters and Desalter Production Offsets.

2. Peace II Paragraph 6.2(a)(iii) states as follows in pertinent part:

Peace II Desalter Production Offsets. To facilitate Hydraulic Control through Basin Re-Operation, [court note: that is, water pumped as part of the 600,000 AF controlled overdraft] in accordance with the 2007 Supplement to the OBMP Implementation Plan and the amended Exhibits G and I to the Judgment, additional sources of water will be made available for purposes of Desalter Production and thereby some or all of a Replenishment obligation. With these available sources, the Replenishment obligation attributable to Desalter production in any year will be determined by Watermaster as follows:

(a) Watermaster will calculate the total Desalter Production for the preceding year and then apply a credit against the total quantity from: . . .

(iii) New Yield (other than Stormwater (Peace Agreement Section

7.5(b)); . . .

v) Safe Yield that may be contributed by the parties (Peace Agreement Section 7.5(c));

(vi) any Production of groundwater attributable to the controlled overdraft authorized pursuant to amended Exhibit I to the Judgment. [The Judgment allowed for a temporary controlled overdraft, *i.e.*, initially 200,000 AF and then an additional 400,000 AF total production/pumping starting in 2007 and ending in 2026 without replenishment, in order to achieve Hydraulic Control. (Safe Yield Reset Implementation Desalter Replenishment Accounting Illustration (per Peace II Agreement, Section 6.2 (PIIA, 6.2) and June 11, 2015 Key Principles)–Exhibit C to Attachment 1, Watermaster's Motion regarding 2015 Safe Yield Reset Agreement, Amendment of Restated Judgment, Paragraph 6.]

Paragraph 7.1 provides as follows:

New Yield Attributable to the Desalters. Watermaster will make an annual finding as to the quantity of New Yield that is made available by Basin Re-Operation including that portion that is specifically attributable to the Existing and Future Desalters. Any subsequent recalculation of New Yield as Safe Yield by Watermaster will not change the priority set forth above for offsetting Desalter production as set forth in Article VII, Section 7.5 of the Peace Agreement. For the initial term of the Peace Agreement, neither Watermaster nor the Parties will request that Safe Yield be recalculated in a manner that incorporates New Yield *attributable to the Desalters* [emphasis in original] into a determination of Safe Yield so that this source of supply will be available for Desalter Production rather than for use by individual parties to the Judgment.

2. Additionally, in 2007 Peace II ¶1.1(d) defined Re-Operation as "the

controlled overdraft [pumping without replenishment] of the Basin by the managed withdrawal of groundwater Production for the Desalters and the potential increase in the cumulative un-replenished Production from 200,000 [acre-feet] authorized by paragraph 3 Engineering Appendix Exhibit I to the Judgment, to 600,000 acre-feet for the express purpose of securing and maintaining Hydraulic Control as a component of the Physical Solution." The Peace II agreement amended the Restated Judgment's Engineering Appendix to specify the additional 400,000 acre-feet that would be dedicated exclusively to the purpose of Desalter replenishment (Restated Judgement Exhibit "I" §2(b)[3]).

3. Peace II, Paragraph 6.2(a)(iii) gives Watermaster a basis to calculate the total Desalter production from the preceding year and then apply against that production/pumping a "credit" (*i.e.*, a reduction) which included a number of factors, including New Yield referencing Peace I, paragraph 7.5(b). This credit procedure is an important issue going forward for the administration of water allocations.

a) Peace I, paragraph 1.1(aa) defines New Yield as "proven increases in yield in quantities greater than historical amounts from sources of supply including, but not limited to, operation of the Desalters (including the Chino I Desalter), induced Recharge and other management activities implemented in operational after June 1, 2000."

I) The court concludes that New Yield in the above paragraph means water produced/pumped by the Desalters, because that is how yield is always used, e.g., Safe Yield, Operating Safe Yield, etc., and the source of supply is the Desalters as identified in the definition.

II) So, New Yield includes water produced/pumped by the Desalters.

b) Peace I, paragraph 1.1(nn) defines "Recharge and Recharge Water as "introduction of water to the Basin, directly or indirectly, ..." Recharge references the physical act of introducing water to the Basin."

c) The conclusion of the court is that after Peace II, the definition New Yield now includes both Desalter operation, *i.e.*, production/pumping from the Desalters, and induced Recharge (i.e., groundwater flowing back into the Basin from the Santa Ana River as the result of Desalter operation).

d) Peace II was consistent with Peace I. Peace II provided that the parties would avoid some or all or a replenishment obligation for Desalter production by getting credit/reduction against that production from sources such as New Yield which includes induced Recharge.

I) Peace I defined New Yield to include "operation of the Desalters" and "induced Recharge."

II) The court concludes that the Peace I and Peace II when read together recognized that some of the water which the Desalters produced/pumped came from induced recharge form the Santa Ana River.

III) Peace II was not explicit it stating that the Desalter production offset should follow the priorities of Peace I ¶7.5, but the court concludes that the replenishment water, *i.e.*, Desalter-induced recharge, must follow the priorities of Peace I.

(a) The agreements must be read together and interpreted together because they form a context for each other.

e) In its response to Judge Reichert's questions, Chino argued that SYRA's failure to give a specific definition to "Desalter-induced recharge" was purposeful because the failure allowed SYRA to use "Desalter-induced recharge" synonymously with New Yield. The court does not find "Desalter-induced recharge" to be synonymous with New Yield. The court finds that "Desalter-induced recharge" is only synonymous with "induced Recharge." Therefore Desalter-Inducted Recharge is included in the definition of New Yield, as set forth in Peace I ¶1(aa): "induced Recharge and other management activities implemented in operational after June 1, 2000" includes Desalter-induced recharge.

I) . The court further finds that "Desalter-induced recharge" and "induced Recharge" mean water flowing back into the Basin from the Santa Ana River due to production/pumping by the Desalters lowering the ground water table in the Basin. Finally, the court notes that New Yield includes Desalter production and Desalter-induced recharge.

(a) This result is exactly what the Desalters were designed to accomplish. They have achieved Hydraulic Control, meaning they have lowered the water table at the south end of the Basin, so that only a de minimus amount of Basin water is flows into the Santa Ana River.

(b) In fact the Desalters have accomplished their design objective so well that now some water flows from the Santa Ana River into the Chino Basin. The court finds that his water is New Yield as set forth above.

II) The court further finds that "Desalter-induced recharge" aka "induced Recharge" is measureable, part of which comes from the Santa Ana River, and is set forth in Watermaster's response to the court's questions. This water is also known as Santa Ana River Underflow or SARU.

4. Peace II specified Desalter production/pumping replenishment to include induced Recharge, controlled overdraft, and other sources set forth in Peace II ¶6.2(a). The Peace I and Peace II agreements did not specify any additional sources of Desalter replenishment, such as Ag Pool water or Safe Yield.

5. CONCLUSION:

Now, after Peace II, there were additional sources of water for the Basin, the

Desalter operation/Desalter-induced recharge, as well as the historical overdraft, as summarized below.

Ag Pool water		Comments
1995 Judgment amendment	82,800 AFY of the Ag Pool's water available to the Appropriate Pool with Appropriative Pool claims prioritized as follows: (1) to supplement, and the particular year, water available from Operating Safe Yield to compensate for any reduction in the Safe Yield by reason of recalculation thereof after the tenth year of operation hereunder. (2) pursuant to conversion claims as defined in Subparagraph (b) hereof. (3) as a supplement to Operating Safe Yield, without regard to reductions in Safe Yield.	
2000 Peace I–Desalters start construction and pumping water	Early Transfers of 32,800 AFY of Ag Pool water now go to the Appropriative Pool	New Yield (with conditions) is source of water to replenish water pumped by the

	(leaving 50,000 AFY to Ag Pool). The remaining Ag Pool water is subject to Appropriative Pool's prioritized claims. Peace I §1.1(aa) defines New Yield to include water produced/pumped from the Desalters.	Desalters. Water produced/pumped by the Desalters is New Yield and sourced by induced recharge and overdraft. As New Yield, water pumped by the Desalters is not Safe Yield or Safe Operating Yield. That water is "yield" attributable to specific sources of supply not included in Safe Yield. (Watermaster's Response to Order for Additional Briefing, page 5, line 22-23.) Therefore at the time of Peace I Desalter operations did not affect Safe Yield or Operating Safe Yield. Water produced/pumped by the Desalters was not added to or subtracted from yield of the Basin. Water

		produced/pumped by the Desalters had a separate allocation.
2007 Peace II-overdraft increased	Additional 400,000 AF above the 200,000 AF provided in the Judgment for a total of 600,000 AF.	This is a diminishing pumping allocation as the overdraft goes to 0 in 2017. Its purpose was to help establish Hydraulic Control.
Peace II Desalters	Peace II ¶7.1 requires Desalter production (defined as New Yield) excluded from the definition of Safe Yield. However, Peace II Article VI identifies offsets for Desalter production, which includes New Yield the meaning of which includes induced Recharge. (Peace I, ¶1.1(aa).)	Desalter production reaches above 20,000 AFY. Watermaster's Response to Order for Additional Briefing, Exhibit 1.

The court concludes that Peace II did not change any of the priorities for claims on actual water production. Peace II addressed Desalter replenishment and production/pumping but did not affect the priorities for allocations of unproduced Ag Pool water.

V. SYRA ARTICLE 5-STORMWWATER RECHARGE PLAN AND WATERMASTER ACCOUNTING ANALYSIS

In the instant motion, Watermaster asks the court to approve 1) a stormwater recharge plan, and 2) an accounting for allocation transfers as set forth in the Safe Yield and Reset Agreement (SYRA). The court will address these proposals separately.

A. Stormwater Recharge–SYRA ¶5.1

1. Although there have been no objections to this aspect of SYRA, the court denies its enforcement because the court finds that SYRA's provisions regarding anything other than they Safe Yield reset cannot be severed for the reasons set forth in Section II above.

B. Desalter-Induced Recharge Allocations, Early Transfers, Land Use Conversion–SYRA ¶5.2 and SYRA ¶5.3.

1. Because these provisions are major sources or contention among the parties, the court will set them forth in their entirety.

SYRA ¶5.2 sets forth the following provisions regarding Desalter Induced Recharge, and SYRA ¶5.3 sets forth the following provisions regarding Post 2030 Land Use Conversions and Early Transfers.

> 5.2 <u>Desalter-Induced Recharge</u>. After the Effective Date and until termination of this Agreement, the parties expressly consent to Watermaster's accounting for Basin recharge arising from or attributable the Desalters as follows:
>
> (a) <u>2001-2014 Desalter-Induced Recharge</u>. Induced recharge that arises from or is attributable to the Desalters for the period of production years 2001-2014 shall be accounted for as Safe Yield, in the manner it has been distributed through approved Watermaster Assessment Packages, shall not be considered New Yield, and shall not be considered to have been available for

production by the Desalters.

(b) 2015-2030 Desalter-Induced Recharge. For the production years of 2015- 2030, Watermaster shall account for induced recharge that arises from or is attributable to the Desalters as equal to fifty (50) percent of the total Desalter Production during each applicable production year up to a maximum of twenty-thousand (20,000) AFY of recharge. Consistent with Paragraph 6.2(a)(iii) of the Peace II Agreement, Watermaster shall deem the induced recharge as having been produced by the Desalters. During each applicable production year, Watermaster shall reduce Safe Yield by an amount equal to fifty (50) percent of the total Desalter Production, up to a maximum of twenty-thousand (20,000) AFY, and require a corresponding supplementation by the reallocation of available unproduced Agricultural Pool's share of the Basin's Safe Yield.

Claims for reallocation of the remaining unproduced quantity of the Agricultural Pool's share of Safe Yield shall be satisfied consistent with section 6.3(c) of Watermaster's Rules and Regulations, as amended as part of the Peace II Measures, and the October 8, 2010 Order Approving Watermaster's Compliance with Condition Subsequent Number Eight and Approving Procedures to be used to Allocated Surplus Agricultural Pool Water in the Event of a Decline in Safe Yield.

(c) 2031-2060 Desalter-Induced Recharge. Should the term of the Peace Agreement be extended pursuant to Paragraph 8.4 thereof, the treatment of Desalter-Induced Recharge shall be subject to the negotiation of a new and separate agreement among the Parties to the Judgment. The accounting provided for in Section 5.2(b), above, shall be without prejudice to the negotiation of such a new and separate agreement among the Parties to the Judgment. Unless otherwise agreed by the Parties or ordered by the court, during the extension term, Watermaster shall not consider such recharge to require supplementation by the reallocation of a portion of the unproduced Agricultural Pool's share of Safe Yield.

5.3 Post-2030 Priority among Land Use Conversion and Early Transfer Claims. At the expiration of the Peace II Agreement, the Peace II provisions relating to the distribution of surplus water by the Agricultural Pool requiring that claims for the Early Transfer of 32,800 AFY and for Land Use Conversion be treated equally are expressly repealed including (i) the amendment to Section 6.3(c) of Watermaster's Rules and Regulations, pursuant to the Peace II measures, and (ii) Section III.(6) of the October 8, 2010 Order Approving Watermaster's Compliance with Condition Subsequent Number Eight and Approving Procedures to be used to Allocate Surplus Agricultural Pool Water in the Event of a Decline in Safe Yield. In any Peace Agreement extension term, the previous changes to Restated Judgment, Exhibit "H", Paragraph 10(b)(3)(i) effectuated by Paragraph 4.4(c) of the Peace Agreement, which, to the extent sufficient unallocated Safe Yield from the Agricultural Pool is available for conversion claims, allocate 2.0 acre-feet of unallocated Safe Yield water for each converted acre, shall remain in effect.

C. The court summarizes the effect of these SYRA proposals ¶5.2 and ¶5.3 as follows:

Ag Pool water		Comments
1995 Judgment amendment	82,800 AFY of the Ag Pool's water available to the Appropriate Pool with Appropriative Pool claims prioritized as follows:	

	(1) to supplement, and the particular year, water available from Operating Safe Yield to compensate for any reduction in the Safe Yield by reason of recalculation thereof after the tenth year of operation hereunder. (2) pursuant to conversion claims as defined in Subparagraph (b) hereof. (3) as a supplement to Operating Safe Yield, without regard to reductions in Safe Yield.	
2000 Peace I– Desalters start construction and pumping water	Early Transfers of 32,800 AFY of Ag Pool water now goes to the Appropriative Pool (leaving 50,000 AFY to Ag Pool). The remaining Ag Pool water is subject to Appropriative Pool's prioritized claims.	New Yield (with conditions) is source of water to replenish water pumped by the Desalters. Therefore Desalters do not affect Safe Yield or Operating Safe Yield. Water produced/pumped by the Desalters is not added to or subtracted from Safe Yield or

		Operating Safe Yield of the Basin.
2007 Peace II-overdraft increased	Additional 400,000 AF above the 200,000 AF provided in the Judgment for a total of 600,000 AF.	This is a diminishing pumping allocation as the overdraft goes to 0 in 2017.
SYRA proposal: (see column to right for *Steps 1-3*): *Step 4*:SYRA ¶5.2(b) subtracts 50% of total Desalter production up to 20,000 AFY from Ag Pool Water and then adds that 50% of total Desalter production up to 20,000 AFY to Safe Yield (to make up for the subtraction in *Step 3*).*	SYRA proposal *Step 1*: The Desalter production/pumping up to 20,000 AFY is allocated to the Desalters, not as Safe Yield or Safe Operating Yield [or New Yield]. *Step 2*: Under SYRA ¶5.2(b) one-half of the source of Desalter production up to 20,000 AFY is attributed to "Desalter-induced recharge." Desalter-induced Recharge means water flowing back into the Basin from the Santa Ana River. *Step 3*: SYRA then subtracts the other half of Desalter production up to 20,000 AFY from Safe Yield.	
Additional SYRA Effects: ***Step 5*** (see above for *Steps 1-4*) The Ag Pool water allocation is reduced by up to 20,000 AFY for the Desalters.		

SYRA is unclear where the priority lies with respect to priority of allocation as required by Judgment Exhibit "H" Paragraph 10. The court orders that those priorities must be followed. Because the court has ordered that those priorities be followed, court concludes that it cannot order these provisions of SYRA in addition to SYRA's not being severable. At best SYRA is ambiguous with respect to following the priorities set by the Judgment and the Court Approved Management Agreements. At worst, SYRA contradicts them.

*So, the court concludes that previous to SYRA, the Desalter water production/pumping could be offset from a prioritized list of sources including New Yield (induced recharge). Now under SYRA:

1) All of the induced recharge gets allocated to water produced/pumped by the Desalters.

2) Watermaster reduces Safe Yield by 50% of the Desalter production up to 20,000 AFY.

3) Then, Watermaster adds to Safe Yield 50% of the Desalter production up to 20,000 AFY, from water allocated to the Ag Pool, to make up for (aka backfill) the reduction in Safe Yield allocated to Desalter production.

4) This means that the availability of Ag Pool water goes down and thereby the availability of unproduced Ag Pool water for the priorities set forth in the Judgment and the Court Approved Management Agreements. The priorities are also set forth in Watermaster Rules and Regulations ¶6.3(a).

5) Elaborating on Example 1-A from Section IV.B.5 of this order above, the court's analysis is as follows

Example 1-B	Explanation	Comment
Initial Ag Pool allocation	82,800 AFY	Judgment
Ag Pool production/pumping	- 33,600 AFY	Assumption based the current credited production (pumping)

		for agricultural groundwater is about 33,600 AFY, but that includes agricultural land irrigated with reclaimed water. [The actual groundwater production for agricultural purposes is about 22,000 AFY. Jurupa Services District's response to Judge Reichert's Request for Clarification, March 22, 2016 page 2, lines 8–10.]
Initial balance after production	49,200 AFY	82,800 acre-feet – 33,600 acre-feet = 49,200 acre-feet
Conversion claims	- 2000 acre-feet	Assumption: The subtraction for satisfying conversion claims before any reallocation. (1000 acres x 2.0 acre feet of water/one acre converted = 2000 acre-feet).
Balance:	47,200 AFY	49,200 acre-feet - 2000 acre-feet = 47,200 acre-feet. Ag Pool Water available after conversion priority claims pursuant to Judgment Exhibit "H" Paragraph 10
Reduction for Early Transfers	- 32,800 AFY	Basic Early Transfer from 82,800 AFY allocation leaving 50,000 AFY for the Ag Pool itself to produce/pump and for

		additional claims by the Appropriative Pool pursuant to Peace I and Peace II.*
Balance	14,400 AFY	(47,200 acre-feet -32,800 acre-feet = 14,400 acre-feet. This is the Ag Pool water available for reallocation to Appropriative Pool after subtraction of conversion priority claims of 2,000 acre-feet from and the 32,800 Early Transfer of unproduced/unpumped from the allotment of Ag Pool water.

Now, to examine the effect of SYRA on the Appropriative Pool:

Starting balance available Ag Pool water	14,400 AFY	Total Ag Pool water available for production/pumping from the example above
Desalter reallocation	- 20,000 AFY	SYRA Desalter reallocation: 20,000 AFY of Desalter production is allocated from Ag Pool water to Safe Yield.
Balance:	- 5,600 AFY	A negative amount. This plausible scenario assumes 2,000 AFY of conversion claims. The negative balance shows that this scenario under SYRA would not leave sufficient Ag Pool water for

		that amount of conversion claims. In order to meet conversion claims and Early Transfer allocations, the Ag Pool would only be able to produce/pump 26,000 AFY, well below their current credited pumping. Calculation follows: 82,800/initial allocation – 26,000/pumped = 56,800 56,800 – 2,000/conversion claims = 54,800 54,800 – 32,800/Early Transfer = 20,000 20,000 – 20,000/Desalter reduction from Ag Pool Allocation = 0

The court concludes that there is no basis in the Judgement or any of the Court Approved Management Agreements for the post SYRA result identified in the plausible scenario above.

D. Further Analysis and orders:

1. In addition to SYRA's not being severable, the court denies Watermaster's motion with respect to the implementation of ¶5.2 and ¶5.3 of SYRA for the following reason:

a) The court concludes that SYRA paragraphs 5.2 and 5.3 fundamentally change the allocations of Appropriative Pool and of Ag Pool water. Those fundamental changes are inconsistent with the Judgment and the

Court Approved Management Agreements

b) Peace I and Peace II both define Desalter production as within the definition of New Yield and therefore outside of the definition of Safe Yield. Through a several step re-allocation reassignment described above and summarized in this section of the court's order, SYRA now moves Desalter production into Safe Yield. The parties have not demonstrated any legal ~~or practical requirement~~ **basis** which allows this. Peace I and Peace II prohibit this.

c) The court concludes that Peace II Agreement Paragraphs 6.2(a)(iii) and 7.1 provide that through 2030 (the initial term of Peace I Agreement as set forth in ¶8.2) recharge attributable to the Desalters is allocated for Desalter Production and not allocated as Safe Yield producible (*i.e.*, water available to be pumped without a replenishment obligation by purchase or otherwise).

I) Peace II ¶7.1 excluded New Yield attributable to the Desalters from a determination of Safe Yield, at least for the 30 year term of Peace Agreement.

II) Peace I ¶1.1(aa) defines New Yield to include induced recharge.

(a) The court finds that induced recharge includes Desalter-induced recharge.

III) The court finds that Peace I ¶7.5 defines replenishment water for the Desalters includes New Yield, but not Safe Yield.

IV) The court finds that Peace II ¶7.1 states that no party can incorporate New Yield attributable to the Desalters into Safe Yield.

(a) In contradiction to Peace I and Peace II, SYRA ¶5.2(a) explicitly defines Desalter-induced recharge as Safe Yield, in contradiction to Peace I and Peace II.

V) In contradiction to the Peace I and Peace II, the court finds that

SYRA attempts to incorporate New Yield from the Desalters into Safe Yield through the accounting method of 1) taking Desalter induced yield water coming from Desalter-induced recharge, then 2) moving that water into Safe Yield, then 3) backfilling Safe Yield from unproduced Ag Pool water.

(a) This is an unacceptable circumvention of the court's orders based on Peace I and Peace II.

d) The analysis above shows that these SYRA provisions are contrary to the Judgment and the Court Approved Management Agreements, specifically Peace I and Peace II. These SRYA provisions can prevent the application of the Judgment provisions regarding conversion claims. They are invalid.

e) There is no basis in the Judgment or the Court Approved Management Agreements for the attribution of water production from Desalters into the definition of Safe Yield.

f) There is no basis in the Judgment or any of the Court Approved Management Agreements for the splitting and reallocation of Desalter production/pumping to one-half to Desalter-induced recharge and one-half to Safe Yield.

g) There is no basis in the Judgment or any of the Court Approved Management Agreements to reallocate Ag Pool water to Safe Yield to make up for the Safe Yield reallocated to the Desalters.

h) Due to the Desalters, there is now recharge coming from the Santa Ana River back into the Chino Basin. SYRA Paragraph 5.2(b) takes the Peace I and Peace II agreements one step—wrongfully—farther by identifying how this recharge quantity will be estimated, *i.e.*, 50% of Desalter Production, and then further specifies that amount of recharge will be allocated to Desalter production and not to the parties as part of their allocation of the Safe Yield. There is no legal basis in the Judgment or the Court Approved Management Agreements for this redefinition of Safe Yield to include of 50% of Desalter Production up to 20,000 AFY through a mechanism of passing the amounts through the Appropriative Pool allocation.

i) SYRA attempts now to remove the special exception for New Yield from Desalter induced recharge and production and incorporate it into Safe Yield. The mechanism by which SYRA attempts to do this is by 1) taking half of the Desalter production and sourcing that production/pumping from Desalter induced recharge from the Santa Ana River and 2) sourcing the other half from the Appropriative Pool through unproduced Ag Pool water. The court concludes and finds that this attempt is not justified because it can interfere with the priority of claims on unproduced Ag Pool water set forth in the judgment and the Court-Approved Management Agreements.

I) The court notes that Peace II, Article VII-Yield Accounting, ¶7.2(d) discusses a contingency if Western Municipal Water District (WMWD) and the Appropriative Pool "do not reach agreement on apportionment of controlled overdraft of Future Desalters, then no later than August 31, 2009, the members of the Appropriative Pool will submit a plan to Watermaster that achieves the identified goals of increasing the physical capacity of the Desalters and potable water use of approximately 40,000 acre-feet of groundwater production from the Desalters from the Basin no later than 2012."

II) The court concludes that the Desalter production of 40,000 acre-feet has been under discussion since Peace II in 2007.

III) However, the court cannot accept the resolution set forth in SYRA for the reasons stated in this order.

j) SYRA ¶5.2 and ¶5.3 contradict and conflict with Peace I and Peace II.

I) Peace II ¶7.1 requires neither Watermaster nor the parties to request that safe yield be recalculated in a manner that incorporates New Yield *attributable to the Desalters* into the determination of Safe Yield so that this source of supply will be available for Desalter Production rather than for use by individual parties to the judgment. (Emphasis in original.)

II) SYRA now includes New Yield in the determination of Safe Yield in two ways.

(a) First, SYRA takes up to 20,000 AFY away from Safe Yield through Desalter Production.

(b) Second, SYRA adds back up to 20,000 AFY to Safe Yield from unproduced Ag Pool water.

(c) The net change to Safe Yield is 0, but available Ag Pool water for allocation is reduced up to 20,000 AFY. This re-allocation and re-accounting, is not justified or supported in the Peace I, Peace II, Watermaster Rules and Regulations, or the court's orders of implementation, the Judgment, or the CAMAs.

(d) The following chain shows SYRA's violations of the previous orders:

(i) Desalter-induced recharge is New Yield. (Peace ¶1(aa).)

(ii) Peace II ¶7.1 prevents New Yield from being incorporated within Safe Yield.

(iii) SYRA moves 20,000 AFY of Desalter-induced recharge to the Ag Pool.

(iv) Then SYRA moves the 20,000 of Desalter-induced recharge (now characterized as Ag Pool Water) into

Safe Yield.

(v) Therefore, SRYA recalculates Safe Yield to incorporate New Yield in violation of Peace II ¶7.1

(vi) Moving the 20,000 AFY of Desalter-induced Recharge through the portal of the Ag Pool water does not change its definition of New Yield.

k) The court does not find a legal ~~or factual basis~~ for determining a post-2030 priority among land use conversion and early transfer claims. The priority is set forth in the judgment and as specified in this order

l) In addition to SYRA's not being severable, the court's 2010 order does not require the implementation of ¶5.2 or ¶5.3.

Section III.(6) of the October 8, 2010 order states:

> Watermaster is ordered to utilize the procedures regarding the re-allocation of surplus Agricultural Pool water the event of a decline in Safe Yield as described in the December 2008 staff report and the December 4, 2008 memorandum from legal counsel. Specifically, in the event that Operating Safe Yield is reduced because of a reduction in Safe Yield, Watermaster will follow the hierarchy provided for in the Judgment, exhibit "H," by first applying the unproduced Agricultural Pool water to compensate Appropriative Pool members for the reduction in Safe Yield. (Judgment, Exhibit "H," paragraph 10 (a).) If there is unallocated water left, Watermaster will then follow the remainder of the hierarchy and reallocate unallocated Agricultural Pool water next to conversion claims then to supplement the Operating Safe Yield without regard to reductions in Safe Yield according to the guidance provided by Peace Agreement I & II and Watermaster's rules and regulations as amended. If, after

applying the unallocated Agricultural Pool water to compensate the Appropriate Pool members for the reduction in Safe Yield, the actual combined production from the Safe Yield made available to the Agricultural Pool, which includes overlying Agricultural Pool uses combined with land use conversions and the Early Transfer, exceeds 82,800 in any year, the amount of water available to members of the Appropriative Pool shall be reduced pro rata in proportion to the benefits received according to the procedures outlined in Watermaster Rules and Regulations.

I) In considering the reference to Watermaster Rules and Regulations in the preceding paragraph, if the order is vague, the court now clarifies it. In the instant order, the court has clarified that Watermaster must follow the priorities set forth in the Judgment for allocations of unproduced Ag Pool water.

II) The court has the continuing jurisdiction to interpret and apply its previous orders in light of changing circumstances. In light of the instant motion, the court is doing so.

III) JCSD correctly points out that pursuant to the Judgment ¶15 the court is authorized "to make such further or supplemental orders or directions as may be necessary or appropriate for interpretation, enforcement or tearing out of this judgment . . . ."

IV) Because there has not been a reset in Safe Yield, the court does not find that there has been a detrimental reliance on the court's October 8, 2010 Order. This would not be the first time that the court's orders and interpretations thereof have the subject of further litigation.

V) Watermaster's further response to order for additional briefing, filed April 11, page 3, lines 15-19 states:

> Both responses provided by the City of Chino and JCSD omit the key fact: Section 6.3(c) Watermaster Rules and Regulations, as amended pursuant to Peace II measures provides that water unused by members of the Agricultural Pool shall be divided equally between Land Use Conversions and Early Transfers. The Court's October 8, 2010 Order provides that this shall be done even if the safe yield declines. For the first time, approximately five years following this Order, the City and JCSD would set it aside and thereby unwind accounting, court approvals, and agreements impliedly if not expressly made in reliance thereon.

m) No party has offered any specific detriment that would occur from the court's instant orders regarding the priorities.

n) Watermaster is relying on its own interpretation of its own rules and regulations which the court does not accept for the reasons set forth herein. The court has clarified its October 8, 2010 Order.

I) Watermaster cannot use its own interpretations of the court's orders to contradict the court's interpretation. The final decision is the court's, not Watermaster's.

II) If there is any ambiguity that Watermaster finds the current circumstances for the application of that Order III.(6) the court clarifies it now. SYRA's reference to that order's provision does not help in its clarification or application.

III) Watermaster argues that "in the event that Operating Safe Yield is reduced because of a reduction in Safe Yield, Watermaster will follow the reallocation hierarchy provided for in the Appropriative Pool Pooling Plan by first applying the unallocated Ag Pool water to compensate the Appropriate Pool members for the reduction in safe yield. (Restated Judgment, exhibit "H), paragraph 10 (a).) If, thereafter, there is unallocated water left, Watermaster then followed the remainder of the hierarchy and reallocate unallocated agricultural Pool water next to land use conversion claims and Early Transfer, and then to supplement the Operating Safe Yield without regard reductions in safe yield." (Watermaster's Reply to Oppositions to Motion regarding 2015 Safe Yield Recent Agreement, Amendment Restated Judgment, Paragraph 6, page 24, lines 7-14.)

IV) This argument equates land use conversion claims and Early transfer claims. This argument is incorrect for the reasons stated herein. Additionally:

(a) The court's order filed October 8, 2010, paragraph III.(6) is quoted in full in section "I" above:

(b) This paragraph III.(6) provides no basis to equate land use conversions and Early Transfers. The specific language of the order requires Watermaster to follow the hierarchy in Judgment, Exhibit "H" which does not include, or even mention, Early Transfers. Early transfers were an aspect of Peace I, and the court has interpreted and ordered the hierarchy to require conversion claims to have priority over Early Transfer claims.

o) Additionally, the court rejects and denies the implementation of SYRA ¶5.3 specifically because, as with SYRA ¶5.2, this provision has the same problems of interpretation of the court's 2010 Order Approving Watermaster's Compliance with Condition Subsequent Number Eight and Approving Procedures to be used to Allocate Surplus Agricultural Pool Water in the Event of a Decline in Safe Yield.

p) Watermaster's erroneous interpretation of the order of priorities is not a basis to continue that erroneous interpretation. If Watermaster has to make a reallocation, then it must do so in order to follow the court's order. A wrong practice can be long-standing, and still be wrong. A wrong practice cannot be a basis of prejudice.

q) The court rejects any argument that this issue is subject to issue preclusion. The specific issues raised by the oppositions to the motion have not been specifically addressed by the court. They are not barred by laches. The issues have been timely raised within the context of the instant motion, and the court always retains jurisdiction to modify its orders as those orders are drawn to the attention of the court, and the court determines they require modification for the reasons set forth in this order.

E. Dispute re priority of claims

A dispute has arisen concerning the priority of claims. The dispute concerns the priority of allocation claims to unproduced/unpumped Ag Pool water. The 1978 Judgment, Exhibit "H," Paragraph 10 was very specific as set forth in section A of this ruling above. For convenience, it is repeated here.

Paragraph 10 described "Unallocated Safe Yield Water" as follows:

> To the extent that, in any 5 years, any portion of the share of Safe Yield allocated to the Overlying (Agricultural) Pool is not produced, such water shall be available for reallocation to members of the Appropriative Pool as follows:
>
> (a) <u>Priorities</u>. Such allocation shall be made in the following sequence:
>
> (1) to supplement, and the particular year, water available from Operating Safe Yield to compensate for any reduction in the Safe Yield by reason of recalculation thereof after the tenth year of operation hereunder.
>
> (2) pursuant to conversion claims as defined in Subparagraph (b)

hereof.

(3) as a supplement to Operating Safe Yield, without regard to reductions in Safe Yield."

Confusion has arisen with respect to the relationship between the Judgment, Exhibit "H," Paragraph 10 on the one hand, and Watermaster Rules and Regulations ¶6.3(a) on the other. Watermaster Rules and Regulations ¶6.3(a) states as follows:

> Accounting of Unallocated Agricultural Portion of Safe Yield. In each year, the 82,800 acre-feet being that portion of the Safe Yield Made available to the Agricultural Pool under the Judgment, shall be made available:
>
> (i) To the Agricultural Pool to satisfy all demands for overlying Agricultural Pool lands;
>
> (ii) To land-use conversions were completed prior to October 1, 2000;
>
> (iii) To land use conversions that have been completed after October 1, 2000; and
>
> (iv) To the Early Transfer of 32,800 acre-feet from the Agricultural Pool to the Appropriative Pool in accordance with their pro-rather assigned share of Operating State Yield.

The confusion arises because Watermaster Rules and Regulation ¶6.3(a) does not explicitly confirm the priority of allegations set forth in the Judgment and as ordered by the court.

Chino has argued that

> [T]he members of the Appropriative Pool have received the right to participate in annual allocations of the Unproduced Agricultural Pool Water instead of every five years called "Early Transfers" (Paragraph 5.3(f-g), Peace Agreement) and the right to an equal priority of Early Transfers with Land Use Conversion Claims, which have a higher

priority under the Judgment, in order to maximize the amount of their Early Transfer water to the appropriators do not have Land Use Conversion Claims. (Paragraph 3.1(a)(i) and Attachment "F", Peace II Agreement). City of Chino's Opposition Watermaster Motion regarding 2015 Safe Yield Reset Agreement, Amendment of Restated Judgment, Paragraph 6, page 13, lines 19-25.

Attachment "F" refers to the Watermaster Rules and Regulations 6.3(c). As stated above, the court finds Watermaster Rules and Regulations 6.3(c) ambiguous.

The court finds that the Judgment must govern and take priority and precedent for the interpretation of any Watermaster rule or regulation, including Watermaster Rules and Regulations 6.3(c).

At this time, the court additionally orders as follows:

A. The order of priorities set forth in the Judgment, Exhibit "H," Paragraph 10 must be followed; and

B. Watermaster Rules and Regulations ¶ 6.3, and particularly ¶¶6.3(a) and (c), are to be interpreted to follow the priorities set forth in Judgment, Exhibit "H," Paragraph 10. In particular, the court orders conversion claims are to receive a higher priority than Early Transfer claims for the following reasons:

(1) The conversion claims are set forth in the judgment;

(2) Early Transfer claims were a creation of Peace I;

(3) Early Transfer claims did not affect the priority of claims set forth in the judgment;

(4) Early Transfer claims were ordered after the judgment and so must be considered subordinate to the original terms of the judgment.

(5) The parties to Peace I made their agreement in the context of the judgment and therefore used the Judgement priorities as a basis for additional allocations of Ag Pool water.

VI. SAFE STORAGE MANAGEMENT MEASURES

A. Through the facilitation and nondisclosure agreement (FANDA) Watermaster attempted to facilitate an agreement among all parties avoid an accelerated cumulative draw on Excess Carry Over stored water in order to avoid undue risks. SYRA had provisions to establish a mechanism for a safe storage reserve of 130,000 AF of water in the non-Supplemental Water storage accounts of the members of the Appropriative Pool as a reserve sufficient to protect the Basin. However, the concern for basin protection was balanced with temporary needs in the event of an emergency or to support Desalter Replenishment. Up to 100,000 AF could be accessed in the event of an emergency subject to conditions

a) The plan which Watermaster attempted to facilitate is identified in SYRA as "the safe storage reserve and safe storage management plan" or the safe storage management measures (SSMM).

b) The City of Chino (Chino) has the largest component of Excess Carry-Over water and was the most significantly affected party.

c) Chino refused to agree to SSMM.

B. The court rejects the adoption of the Safe Storage Management Measures set forth in the SYRA Article 6. The court is not going to set forth the provisions of SYRA Article 6 because the court is rejects the article as a whole.

C. The court rejects Article 6 of SYRA for the following reasons:

1. SYRA is not severable as set forth above.

2. Watermaster states that access to safe storage in the short term is extremely remote.

3. The volume in stored water accounts of Appropriative Pool members is

about 357,000 AF as of June 30, 2014.

4. The Judgment Parties presently lack the infrastructure capability (wells and pipelines) that would produce the quantity of water from storage that would trigger production from the safe storage reserve that is identified in SYRA.

5. Article 6 is essentially a statement of intent without specificity of implementation. The court refuses to consider or authorize an inchoate plan.

a) Although Watermaster argues that the Safe Storage Management Agreement provisions are still subject to "stakeholder process get to be initiated" (Watermaster's Reply to Oppositions to Motion regarding 2015 Safe Yield Reset Agreement, Amendment of Restated Judgment, Paragraph 6, page 1, line 18), the court does not approve policy statements and therefore rejects any implementation.

6. The Safe Storage Technical Memorandum (Exhibit E to the motion) does not set forth a factual basis for the court to order the parties to proceed with the provisions of Article 6. While the memorandum states that the SSMM will not cause Material Physical Injury or undesirable results, the memorandum does not include that the SSMM are essential to the OBMP.

7. The court notes that from 2000 to 2014, the short-term actual measured net recharge was less total rights allocated to the judgment Parties by as much as 130,000 AF.

a) From this the court concludes that during this period from 2000 to 2014, after offsets for production, there was recharge to the basin in excess of what water was actually produced by as much as 130,000 AF.

b) This recharge was accounted for in the storage of Excess Carry-Over water.

8. The court does not reach the arguments of Chino that the SSMM constitutes a "taking".

9. The safe storage measures are not required by the physical solution of

the Judgment, Peace I, Peace II, the court approved management agreements, the OBMP, the court orders of implementation, or Article X, section 2 of the California Constitution.

VII. The Safe Yield Reset and Ag Pool Water: Recalculation

A. The court finds that the Safe Yield reset to 135,000 AFY is a "recalculation" within the definition of Judgment, Exhibit "H" ¶10.

1. SYRA used the term "reset" to describe lowering the Safe Yield to 135,000 AFY.

a) Now that the court has rejected all of SYRA except the lowering of Safe Yield to 135,000 AFY, the court finds that "reset" is a legally unjustified and legally incorrect term for describing the lowering the Safe Yield to 135,000 AFY. For the reasons stated herein, the court finds that lowering the Safe Yield to 135,000 is a recalculation within the definition of Judgment, Exhibit "H" ¶10(a)(1). For the rest of this order, the court will correctly use the term recalculation for lowering the Safe Yield from 140,000 AFY to 135,000 AFY.

b) Wildermuth himself calls it a recalculation. Exhibit 1 to his declaration is entitled Declaration of Mark Wildermuth-2013 Chino Basin Groundwater Model Update and *Recalculation* of Safe Yield Pursuant to all the Peace Agreements. [Emphasis added.]

c) The recalculation to 135,000 is pursuant to the "tenth year" of operation evaluation required by the Judgment.

d) Watermaster and the City of Ontario argue to the contrary, but the "reset" lowering of Safe Yield fits any ordinary definition of the word "recalculation."

I) The whole point of the SYRA motion, related motions, and series of hearings has been for the court to determine how to integrate the reduction of the Safe Yield from 140,000 AFY to 135,000 AFY. The court finds this reduction to be a recalculation of the Safe Yield into the current reality of the Chino Basin.

(a) In the context of SYRA, the use of the term "reset" might have made some legal sense. However, now that the court has rejected everything but the reduction, the label "reset" has no basis in fact or law.

II) The court cannot find any other way to reconcile these provisions and their interpretations while keeping the ruling consistent with reality. The reduction in Safe Yield is a recalculation, no matter how subtle the attorneys' arguments are.

2. Therefore, the court finds and orders that the first 5,000 AFY of any unproduced Ag Pool water now has a top priority over any other claims, such as conversion claims and early transfers, and that 5,000 AFY of Ag Pool water be allocated to Operating Safe Yield pursuant to Judgment Exhibit H ¶10(a).

a) This 5,000 AFY has top priority because it is part of the Judgment.

b) To further illustrate the court's orders, based on the tables in sections IV.B.5 and V.C.5 above

Example 1-B	Explanation	Comment
Initial Ag Pool allocation	82,800 AFY	Judgment
Subtract 5,000 AFY	- 5,000	Safe Yield recalculation reduction pursuant to Judgment Exhibit H ¶10
Ag Pool production/pumping	- 33,600 AFY	Assumption based the current credited production (pumping) for agricultural groundwater is

		about 33,600 AFY, but that includes agricultural land irrigated with reclaimed water. The actual groundwater production for agricultural purposes is about 22,000 AFY. Jurupa Services District's response to Judge Reichert's Request for Clarification, March 22, 2016 page 2, lines 8–10.]
Initial balance after production and reset	44,200 AFY	82,800 acre-feet – 5,000 - 33,600 acre-feet = 44,200 acre-feet
Conversion claims	- 2000 acre-feet	Assumption: The subtraction for satisfying conversion claims before any reallocation. (1000 acres x 2.0 acre feet of water/one acre converted = 2000 acre-feet).
Balance:	42,200 AFY	44,200 acre-feet - 2000 acre-feet = 42,200 acre-feet. Ag Pool Water available after conversion priority claims pursuant to Judgment Exhibit "H" Paragraph 10
Reduction for Early Transfers	- 32,800 AFY	Basic Early Transfer from 82,800 AFY allocation leaving 50,000 AFY for the Ag Pool itself to produce/pump and for additional claims by the

		Appropriative Pool pursuant to Peace I and Peace II.
Balance	9,400 AFY	(42,200 acre-feet -32,800 acre-feet = 14,400 acre-feet. This is the Ag Pool water available for reallocation to Appropriative Pool after subtraction of the recalculation reallocation, the conversion priority claims of 2,000 acre-feet from and the 32,800 Early Transfer of unproduced/unpumped from the allotment of Ag Pool water.

VIII. Safe Yield Reset and Desalter-Induced Recharge

The court concludes and orders that Desalter-Induced Recharge is only to be applied to offset Desalter production. The court's analysis involves going back to the basics of the judgment and the Peace Agreements.

A. The Revised Judgment

1. The Judgment ¶I.4.(x) defines "Safe Yield" as "the long-term average annual quantity of groundwater . . . which can be produced from the Basin under cultural conditions of a particular year without causing an undesirable result."

2. The Judgment ¶I.4.(l) defines "Operating Safe Yield" as "the annual amount of water which Watermaster shall determine, pursuant to the criteria specified in Exhibit "I", can be produced from Chino Basin by the Appropriative Pool parties free of replenishment obligation under the Physical Solution herein.

a) Exhibit "I" is the Engineering Appendix which has come to include the definitions of Hydraulic Control, Re-Operation water, and Desalter production.

3. Judgment Exhibit "H" ¶10 Unallocated Safe Yield Water states: "to the extent that, in any five years, any portion of the share of Safe Yield allocated to the Overlying (Agricultural) pool is not produced, such water shall be available for reallocation to members of the appropriative pool, as follows:

(a) Priorities.-Such allocation shall be made in the following sequence:

(1) to supplement, in the particular year, water available from Operating Safe Yield to compensate for any reduction in the Safe Yield by reason of recalculation thereof after the tenth year of operation hereunder.

(2) pursuant to conversion claims as defined in Subparagraph (b) hereof.

(3) as a supplement to Operating Safe Yield, without regard to reductions in Safe Yield.

B. The 2000 Peace Agreement I

1. Peace I Section I(ee) defines "Operating Safe Yield" as the "annual amount of groundwater which Watermaster shall determine, pursuant to criteria specified in Exhibit "I" to the judgment, can be produced from Chino Basin by the Appropriative Pool free of Replenishment obligation under the Physical Solution. Watermaster shall include any New Yield in determining Operating Safe Yield."

a) This is a modification of the definition of "Operating Safe Yield" from the Judgment. In fact, the court notes "IV-Mutual Covenants, ¶ 4.5 Construction of "Operating Yield" Under the Judgment. Exhibit I to the Judgment shall be construed to authorize Watermaster to include New Yield as a component of Operating Safe Yield."

C. The 2007 Peace Agreement II

1. Article VII Yield Accounting, ¶7.1 <u>New Yield Attributable to the Desalters</u> states "for the initial term of the Peace Agreement, neither Watermaster nor the Parties will request that Safe Yield be recalculated in a manner that incorporates New Yield *attributable to the Desalters* into the determination of Safe Yield so that this source of supply will be available for Desalter Production rather than for use by individual parties to the Judgment." (Emphasis in original.)

D. The Safe Yield Recalculation and Desalter-Induced Recharge

1. Watermaster correctly states that that desalter induced recharge can only be used to offset desalter production. From this Watermaster concludes that Safe Yield of 135,000 acre-feet per year must include Desalter-induced recharge. This conclusion is wrong.

a) Through many avenues, Watermaster has attempted to include Desalter-Induced Recharge (with the new abbreviation of "DIR") within the definition of Safe Yield.

b) Watermaster has never explicitly offered an explanation of why Watermaster has attempted so diligently to convince the court to include Desalter-Induced Recharge within the definition of Safe Yield.

I) The court considers that Watermaster's explanation might include an argument that if Desalter-Induced Recharge is not included within the definition of Safe Yield, the parties could produce/pump water from Desalters without limit, with the result that water could be drained from the Santa Ana River without limit. That result would be not only detrimental to the hydrology of the entire region, but also legally unjustified.

c) In its latest argument, Watermaster has offered to "sequester" the portion of Safe Yield attributable to Desalter-Induced Recharge.

I) The court does not accept this characterization of Desalter production/pumping allocation because it is simply a characterization of an accounting.

II) The "sequestration" has no basis in the CAMA's and adds a new, vague, undefined term to an already complicated structure of accounting.

III) Watermaster argues "that Desalter-Induced Recharge is an inflow to the Basin and therefore a component of Safe Yield."

(a) The court rejects this argument because it contradicts the requirement of Peace II that for the initial term of the Peace Agreement, Safe Yield will not be recalculated to include New Yield attributable to the Desalters.

(b) Desalter-Induced Recharge is the source of (and offset to) New Yield attributable to the Desalters. That New Yield cannot be included in Safe Yield. So, so under Peace II, Safe Yield also does not include Desalter-Induced Recharge. (Peace I ¶ 1.1(aa)-definition of New Yield; Peace I ¶7.5-Replenishment Water; Peace II ¶6.2-Peace II Desalter Production Offsets.)

IV) The Responding AP Members argue that the court can only be consistent in its orders if the court resets the Safe Yield to 115,000 AFY. The court also rejects this argument for the following reasons.

(a) Using Watermaster's own proposal, the court recognizes that there is some logic to the position of the Responding AP Members because 1) if the 20,000 AFY is "sequestered" that it is not available for production/pumping without a replenishment obligation and 2) then the reality is the safe yield should be 135,000 AFY - 20,000 AFY for a net of 115,000 AFY.

(b) However, the court concludes that the structure set up by the

Judgment, Peace I, and Peace II require that there be separate analyses for Safe Yield and New Yield attributable to the Desalters.

(i) The analysis for Safe Yield is illustrated in this order Sec. VII.5.a above.

(ii) The analysis for Desalter-Induced Recharge and New Yield attributable to the Desalters is described in Peace I and Peace II and the further order as set forth herein.

(iii) Watermaster has been accounting for these analyses since 2007, so it should not be a problem for Watermaster to to continue to do so.

(c) The Responding AP Members also argues that the technical reports show that the basin can safely only sustain 135,000 AFY.

(d) However, in Exhibit 1 to the Declaration of Mark Wildermuth - 2013 Chino Basin Groundwater Model Update and Recalculation of Safe Yield Pursuant to Peace Agreements, section 1.2.3, "the updated Watermaster Model was used to estimate Santa Ana River Underflow New Yield (SARUNY) from the desalters and reoperation from both the calibration and planning periods. SARUNY means the same thing as that term *Desalter Induced Recharge* as used in the 2015 Safe Yield Reset Agreement." This definition is repeated in section 7.3.7.

(e) The Wildermuth declaration filed March 10, 2017, with the Chino Basin Watermaster Response to February 22, 2017 Order section 7.3.7 which states:

(i) "The net Santa Ana River recharge in the fiscal year spending July 1999 through June 2000 [one year] is the baseline from which to measure SARUNY, which was estimated to be -2,153 acre-ft/yr, indicating that the Chino Basin discharged to the Santa Ana River more water than was recharged by the River into the Basin. . . . Table 7-10 compares Chino Desalter production and SARUNY over the period of July 2000 through July 2030. . . . The effect of 's the Chino Desalters and reoperation becomes clear in 2005 when SARUNY reaches about 50 percent of CDA production. The New Yield results from the implementation of the Chino Desalters is consistent with the planning estimates that were assumed during the development of the Peace Agreements."

(f) Table 7-10 shows that starting in 2017, the ratio of new yield to CDA production is about an average of 45 percent, meaning that New Yield Desalter-Induced Recharge those years is about 45% of the Desalter production.

(g) From these facts the court concludes that the Wildermuth Safe Yield reset/recalculation has taken into account the Desalter-Induced Recharge and production, so there is no need to reduce the Safe Yield two 115,000 AFY as argued by the Responding AP Members.

(h) The Peace Agreement offsets for new yield production attributable to the Desalters are an accounting requirement process, not a feature of determination of Safe Yield.

(i) The court also concludes that the reset/recalculation has included the contractual features of the Peace Agreements, and one of those features is that Safe Yield not be recalculated to incorporate New Yield attributable to the Desalters. Wildermuth has considered this feature.

(j) Again, therefore the safe yield of 135,000 AFY does not include New Yield attributable to the Desalters.

2. The court still concludes for the term of Peace I (*i.e.*, until 2030), Safe

Yield not be recalculated in a manner that incorporates New Yield attributable to the Desalters into the determination of Safe Yield.

a) The 20,000 AFY of Desalter-Induced Recharge is not included with the definition of Safe Yield for the term of the Peace Agreements. To rule otherwise would contradict the Peace Agreements.

b) The court analogizes its ruling to the controlled overdraft allowed to achieve hydraulic control. That aspect of production/pumping was not allocated to Safe Yield. The court orders that Desalter-Induced Recharge New Yield remain unallocated to Safe Yield.

c) The court does not address the City of Chino's briefing regarding the Safe Yield Implementation Replenishment Accounting Illustration (Per Peace II agreement, Section 6.2 (PIIA, 6.2) and June 11, 2015 Key Principles) Watermaster motion filed October 23, 2015, Exhibit "F" Attachment 2 for the following reasons:

I) Chino asks if the Column G – Desalter-Induced Recharge replenishment water was coming from Desalter production.

II) Footnote 4 for this Column G states that "the desalter-induced recharge projection in the table is now shown at 50% of the annual total desalter production for years 2015 through 2030. Desalter -induced recharge from 2001 to 2014 (187,000 acre-feet) will be deemed Safe Yield and not available to offset Desalter production."

III) As part of its order that SYRA cannot be implemented, the court rejects the Safe Yield Reset Implementation Desalter Replenishment Accounting Illustration.

IV) The City of Ontario has argued that Desalter Induced Recharge to offset Desalter production should be "backfilled" from Safe Yield. The court rejects this argument for the following reasons:

(a) This is merely a characterization of what SYRA proposed to do, and, for the reasons already stated, the court has rejected SYRA except for the Safe Yield recalculation.

(b) The Judgment, the Peace Agreements, and the CAMA's do not support this accounting, again for the reasons already stated.

(c) Again, for the reasons stated herein, the court rejects that Ontario's argument that a Safe Yield recalculation to 135,000 AFY is not a "Safe Yield recalculation." The argument has no merit and is completely unpersuasive.

(d) The court finds that the definitions of Safe Yield and New Yield are sufficiently set forth in the Judgment, Peace I and Peace II.

(i) Watermaster does not point to any specific conflict between the court's current/instant order and the court's order implementing Watermaster Resolution 07-05, and the court finds none.

(ii) The court reaffirms the definitions of Peace II which have been in effect for 10 years, and of course the definitions of the Judgement and Peace I.

(iii)The court finds no basis for Watermaster's attempt to define Desalter-Induced Recharge into directly, indirectly, Safe Yield or by a "sequester."

(iv)In reaffirming the definitions of the Judgment, Peace I, and Peace II, the court of course also notes the definition of "Safe Yield" in the Judgment ¶I.1(x) inclusive of "undesirable result," and the "Material Physical Injury" of Peace I ¶I.1 (y).

V) The court finds and orders that Desalter production is not Safe Yield and Desalter production is to be offset only as provided in Peace II.

IX. Additional Bases for Rulings

A. The court has refused to implement the sections of SYRA identified above for the reasons set forth above. In the court's view, those reasons are sufficient under the law. Therefore, the court has not addressed other objections raised by the parties, such as those of the City of Chino, that Watermaster has failed to prove a change in circumstances, that Watermaster has improperly advocated for certain parties, that the parties are collaterally estopped from re-litigating the parties' rights, that the parties are equitably estopped from reducing their replenishment obligations, that SYRA fails to comply with CEQA, that SYRA provisions resulted in an unlawful taking of Chino's property.

B. Although the court understands the necessity of accounting for Desalter induced recharge from the Santa Ana River, the court does not find a basis in the law, the Judgment, or the Court Approved Management Agreements for simultaneously reducing Safe Yield and adding unproduced/unpumped Ag Pool water to account for Desalter induced recharge.

1. Watermaster argues that the court should approve SYRA because it is only a confirmation of "interpretation of the manner in which Watermaster should comply with the provisions of the Court Approved Management Agreements. (Watermaster's Reply to Oppositions to Motion regarding 2015 Safe Yield Reset Agreement, Amendment of Restated Judgment, Paragraph 6, page 10, line 26.)

a) The court does not accept this argument. The court interprets SYRA as an attempt for a major qualitative revision of the Court Approved Management Agreements, but the Court Approved Management Agreements do not support the SYRA revision for the reasons stated herein.

2. The court finds that the rulings herein will not cause material physical injury or an undesirable result.

a) Although many parties have approved SYRA, parties' approval or disapproval of SYRA is not a legal basis for the court to enforce SYRA. The court must look to the previous agreements of the parties, the previous court orders, the Court A6pproved Management Agreements, the Judgement, and the California Constitution.

Date: 4-28-17

S Reichert

Judge Stanford E. Reichert

San Bernardino County Superior Court

FILED
SUPERIOR COURT
COUNTY OF SAN BERNARDINO
SAN BERNARDINO DISTRICT

APR 28 2017

BY Tiffany Kretzmeier
TIFFANY KRETZMEIER, DEPUTY

SUPERIOR COURT FOR THE STATE OF CALIFORNIA
FOR THE COUNTY OF SAN BERNARDINO

CHINO BASIN MUNICIPAL WATER DISTRICT, Plaintiff, vs. CITY OF CHINO, et al., Defendants	CASE NOS. RCV 51010 CIVDS 1518945 Additional/Final Further Revised Proposed Order Re SYRA and Additional/Final Rulings and Order for Oral Argument Date: April 28, 2017 Time: 1:30 PM Department: S35
CITY OF CHINO, Plaintiff, vs. Cucamonga Water District, et al. Defendants	

PLEASE TAKE NOTICE that the additional/final further revised proposed order for the SYRA reset motion in case RCV 51010 is attached. A hearing is set for the additional/further revised proposed order for April 28, 2017, 1:30 PM, Dept. S35 of the above-entitled court.

NOTES RE FURTHER REVISED PROPOSED ORDER

A. Attached are two versions of the additional further revised proposed order.

1. One version, for the convenience of the parties, has parts of the order which the court has added in the following **font**. From the previous proposed order, filed April 18, 2017, the court has ~~stricken~~ anything that relates to limiting production /pumping of the Desalters. Court has not made any other substantive changes in the additional/further revised proposed orders from those orders filed April 18, 2017.

a) The court has received and considered the request by Chino Basin Desalter Authority Member Agencies regarding desalter pumping.

b) The court concludes that the court should not have made any orders whatsoever with respect to limiting production/pumping of the desalters in its previous orders for the following reasons:

I) Such orders were outside of the scope of any briefing regarding SYRA and the motions, requests, and disputes concerning SYRA.

II) Any limitation on Desalter production/pumping would require additional briefing and unreasonably postpone the resolution of SYRA motion, requests, and disputes.

III) In further review of the court's tentative rulings, the court further concludes that there were no legal or factual reasons set forth in the briefing for the court to make such an order.

(a) Therefore, from the previous proposed rulings, the parties are not to derive any conclusions on how the court might rule with respect to a request to limit Desalter production/pumping. This was only tentative ruling without sufficient briefing by the parties and sufficient analysis by the court. In the court's current view, it is erroneous.

(b) Specifically, to help the parties, the court has ordered stricken from the additional safe yield reset agreement motion and additional further revised proposed rulings and orders, the court has stricken:

(i) page 2 of 84: lines 5-6,

(ii) page 75 of 84: line 7-8, and

(iii)page 77 of 84: lines 8-10.

(a) The court has also deleted these lines from the additional safe yield reset agreement motion additional final rulings and order

2. The other version of the additional/further revised proposed order has all the changes incorporated into a final, "clean" proposed order as of 4/28/17.

B. Therefore the court's conclusion is the only remaining issue for oral argument is whether the Safe Yield reset to 135,000 AFY is an event that requires a recalculation within the definition of the Judgment, Exhibit "H" ¶10 for the reasons set forth in the additional/further revised proposed order.

Dated: 4-28-17

Stanford E. Reichert, Judge

EXHIBIT C

FILED
SUPERIOR COURT OF CALIFORNIA
COUNTY OF SAN BERNARDINO
SAN BERNARDINO CIVIL DIVISION

MAR 15 2019

BY ACHLEE LAWLESS, DEPUTY

SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF SAN BERNARDINO

CHINO BASIN MUNICIPAL WATER DISTRICT, Plaintiff, v. CITY OF CHINO et al., Defendant.	Case No. RCV RS51010 Assigned for All Purposes to the Honorable Stanford E. Reichert ~~PROPOSED~~ **FINDINGS AND ORDER REGARDING AMENDMENTS TO RESTATED JUDGMENT, PEACE AGREEMENT, PEACE II AGREEMENT, AND RE-OPERATION SCHEDULE**

The Court having read, reviewed, and considered all pleadings, declarations, and exhibits presented for the March 15, 2019 hearing, and the arguments of counsel, if any, the Court finds as follows:

(1) Watermaster is in substantial compliance with the approved Recharge Master Plan as required by Restated Judgment Exhibit "I", paragraph 2(b)(6), and the amended schedule set forth in Exhibit "B" to Watermaster's Resolution 2019-03 providing the quantities of Re-Operation Water that may be accessed by the Parties will not cause material physical injury to the Basin.

(2) The signatories to the Peace Agreement and the Peace II Agreement have been notified of Watermaster's Motion Regarding Amendments to Restated Judgment, Peace Agreement, Peace II agreement, and Re-Operation Schedule and have consented to the proposed

amendments to the Peace Agreement and Peace II Agreement set forth in Watermaster's Resolution 2019-03;

(3) The proposed amendments to the Court Approved Management Agreements are implementable by Watermaster provided that it can proceed to redetermine Safe Yield on a timely basis as provided on pages 15-18 of this Court's April 28, 2017 Order.

SUBJECT TO THE CONTINUING JURISDICTION OF THE COURT, the Court hereby makes the following Orders:

(1) Watermaster's adoption of its Resolution 2019-03 is approved and Watermaster shall proceed in accordance with the Resolution and the documents attached thereto;

(2) Watermaster shall proceed to redetermine Safe Yield as set forth on pages 15-18 of the Court's April 28, 2017 Order;

(3) The amendment to Paragraph 10 of Exhibit "H" to the Restated Judgment as shown in Attachment A hereto is approved;

(4) The amended schedule for access to Re-Operation water shown in Attachment B hereto is approved;

(5) The amendments to Paragraphs 6, 9, and 10 of Exhibit "G" to the Restated Judgment as shown in Attachment C hereto are approved; and

(6) Watermaster shall implement the Restated Judgment and continue to comply with all commitments made in the Court Approved Management Agreements, as amended by this Order.

IT IS SO ORDERED.

Dated: 3-15-19

SUPERIOR COURT OF CALIFORNIA COUNTY OF SAN BERNARDINO EUREKA

S. Reichert STANFORD E. REICHERT
JUDGE OF THE SUPERIOR COURT

18540473

ATTACHMENT A
[PROPOSED] ORDER

Exhibit A

Proposed Changes to Appropriative Pool Pooling Plan and CAMA

1. **Appropriative Pool Pooling Plan.** The introductory sentence to Exhibit H, ¶10 of the Judgment is amended to read as follows:

   10. Unallocated Safe Yield Water. To the extent that, in any ***year*** ~~five years~~, any portion of the share of Safe Yield allocated to the Overlying (Agricultural) Pool is not produced, such water shall be available for reallocation to members of the Appropriative Pool, as follows:

2. **Early Transfer**

   A. Section 1.1(o) of the Peace Agreement is amended to read as follows:

   (o) "Early Transfer" means the reallocation of Safe Yield not Produced by the Agricultural Pool to the Appropriative Pool on an annual basis ***after the allocations in subdivisions (a)(1) and (a)(2) of*** ~~rather than according to the five year increment described in~~ Paragraph 10 of Exhibit "H" of the Judgment;

   B. Section 5.3(g) of the Peace Agreement is amended to read as follows:

   (g) Watermaster shall approve an "Early Transfer" of water to the Appropriative Pool ~~in an amount not less than 32,800 acre-feet per year~~ that is the ~~expected approximate~~ quantity of water not Produced by the Agricultural Pool ***on an annual basis*** ~~The quantity of water subject to Early Transfer under this paragraph shall be the greater of (i) 32,800 acre-feet of (ii) 32,800 acre-feet plus the actual quantity of water not Produced by the Agricultural Pool for that Fiscal Year~~ that is remaining after all the land use conversions are satisfied pursuant to 5.3(***h***~~i~~) below.

   (i) The Early Transfer water shall be annually allocated among the members of the Appropriative Pool in accordance with their pro-rata share of the initial Safe Yield.

   (ii) The Transfer shall not limit the Production right of the Agricultural Pool under the Judgment to Produce up to 82,800 acre-feet of water in any year or 414,000 acre-feet in any five years as provided in the Judgment.

   (iii) The combined Production of all parties to the Judgment shall not cause a Replenishment assessment on the members of the Agricultural Pool. The Agricultural Pool shall be responsible for any Replenishment obligation created by the Agricultural Pool Producing more than 414,000 acre-feet in any five-year period.

   (iv) The parties to the Judgment and Watermaster shall Produce water in accordance with the Operating Safe Yield and shall procure sufficient quantities of Replenishment Water to satisfy over-Production requirements, whatever they may be, and avoid Material Physical Injury to any party to the Judgment or the Basin;

(v) Nothing herein shall be construed as modifying the procedures or voting rights within or by the members of the Agricultural Pool.

3. **Conversion Claims.** Subparagraph (b)(3)(i) of Exhibit H, ¶ 10 of the Judgment is amended to read as follows:

(i) For the term of the Peace Agreement ***and any extension thereof***, in any year in which sufficient unallocated Safe Yield from the Overlying (Agricultural) Pool is available for such conversion claims, Watermaster shall allocate to each appropriator with a conversion claim 2.0 acre-feet of unallocated Safe Yield water for each converted acre for which conversion has been approved and recorded by the Watermaster.

4. **Controlled Overdraft.** Pursuant to section 7.2(e)(ii) of the Peace II Agreement, 175,000 acre-feet of controlled overdraft (Re-Operation water) will be allocated to Desalter replenishment over a 17-year period, beginning in 2013-14 and ending in 2029-30, according to the schedule attached as Exhibit A.

5. **New Yield.** Section 7.1 of the Peace II Agreement, entitled "New Yield Attributable to Desalters," is deleted. It is replaced by new section 6.2(b)(ii) as set forth in section 6 below.

6. **Desalter Replenishment.** Section 6.2(b) of the Peace II Agreement is amended to read as follows:

(b) To the extent available credits are insufficient to fully offset the quantity of groundwater production attributable to the Desalters, Watermaster will use water or revenue obtained by levying the following assessments among the members of the Overlying (Non-Agricultural) Pool and the Appropriative Pool to meet any remaining replenishment obligation as follows.

(i) A Special OBMP Assessment against the Overlying (Non-Agricultural) Pool as more specifically authorized and described in amendment to Exhibit "G" paragraph ~~8(c)~~ **5(c)** to the Judgment will be dedicated by Watermaster to further off-set replenishment of the Desalters. However, to the extent there is no remaining replenishment obligation attributable to the Desalters in any year after applying the off-sets set forth in 6.2(a), the OBMP Special Assessment levied by Watermaster will be distributed as provided in section 9.2 below. The Special OBMP Assessment will be assessed pro-rata on each member's share of Safe Yield.~~, followed by~~

(ii) The members of the Appropriative Pool will contribute a total of 10,000 afy toward Desalter replenishment, allocated among Appropriative Pool members as follows:

(1) ***85% of the total (8,500 afy) will be allocated according to the Operating Safe Yield percentage of each Appropriative Pool member; and***

(2) ***15% of the total (1,500 afy) will be allocated according to each land use conversion agency's percentage of the total land use conversion claims, based on the actual land use conversion allocations of the year.***

The annual desalter replenishment obligation contribution of each Appropriative Pool member will be calculated using the following formula:

> *Desalter replenishment obligation contribution = (8,500 * % Appropriator's share of total initial 49,834 afy Operating Safe Yield) + (1,500 * % Appropriator's proportional share of that year's total conversion claims)*

A sample calculation of the desalter replenishment obligation contribution for each Appropriative Pool member is shown on Exhibit __ to this Peace II Agreement, as amended.

(iii) ~~(ii)~~ A Replenishment Assessment against the Appropriative Pool *for any remaining Desalter replenishment obligation after applying both 6(b)(i) and 6(b)(ii), allocated pro-rata to each Appropriative Pool member according to the combined total of the member's share of Operating Safe Yield and the member's Adjusted Physical Production, as defined below.* ~~pro-rata based on each Producer's combined total share of Operating Safe Yield and the previous year's actual production.~~ Desalter Production is excluded from this calculation. *A sample calculation of the allocation of the remaining desalter obligation is shown in Exhibit __ to this Peace II Agreement.* ~~However, if there is a material reduction in the net cost of Desalter product water to the purchasers of product water, Watermaster may re-evaluate whether to continue the exclusion of Desalter Production but only after giving due regard to the contractual commitment of the parties.~~

(iv) Adjusted Physical Production is the Appropriative Pool member's total combined physical production (i.e., all groundwater pumped or produced by the Appropriative Pool member's groundwater wells in the Chino Basin, including water transferred from the Non-Agricultural Pool under Exhibit G, ¶9 of the Judgment), with the following adjustments:

(1) In the case of assignments among Appropriative Pool members, or between Appropriative Pool members and Non-Agricultural Pool members under Exhibit G, ¶6 of the Judgment, resulting in pumping or production by one party to the Judgment for use by another party to the Judgment, the production for purposes of Adjusted Physical Production shall be assigned to the party making beneficial use of the water, not the actual producer.

(2) Production offset credits pursuant to voluntary agreements under section 5.3(i) of the Peace Agreement are calculated at 50% of the total voluntary agreement credit in the determination of Adjusted Physical Production for an Appropriative Pool member participating in a voluntary agreement for that year. In the determination of Adjusted Physical Production, the voluntary agreement credit is subtracted from physical production. Reduction of the voluntary agreement credit from 100% to 50% is applicable only to the calculation of the Adjusted Physical Production hereunder; but in all other applications, the voluntary agreement credit shall remain unchanged (i.e. remain at 100%).

(3) Production associated with approved storage and recovery programs (e.g., Dry Year Yield recovery program with MWD) is not counted in Adjusted Physical Production, except for in-lieu participation in such programs: in-lieu put quantities shall be added to physical production, and in-lieu take quantities shall be subtracted from physical production.

(4) Metered pump-to-waste Production that is determined by Watermaster to be subsequently recharged to the groundwater basin is deducted from physical production; unmetered pump-to-waste production that is determined by Watermaster not to be subsequently recharged to the groundwater basin is added to physical production.

(5) The Appropriative Pool may approve, by unanimous vote, the inclusion of other items in the determination of Adjusted Physical Production, with the exception of Non-Agricultural Pool water assigned or transferred under Exhibit G, ¶6 or ¶10 of the Judgment.

(v) Any member of the Non-Agricultural Pool that is also a member of the Appropriative Pool may elect to transfer (a) some or all of the annual share of Operating Safe Yield of the transferor in and for the year in which the transfer occurs (except that such transfer shall exclude any dedication to the Watermaster required by section 6.2(b)(1)), and (b) any quantity of water held in storage by the transferor (including without limitation carryover and excess carryover) to any member of the Appropriative Pool, in either case at any price that the transferor and transferee may deem appropriate and for the purpose of satisfying the transferee's desalter replenishment obligation. The transferee's desalter replenishment obligation shall be credited by the number of acre-feet so transferred.

(vi) ~~(iii)~~ The quantification of any Party's share of Operating Safe Yield does not include ***either*** land use conversions ***or Early Transfers.***

7. **Allocation of Non-Agricultural Pool OBMP Special Assessment.** The introductory sentence of section 9.2(a) of the Peace II Agreement is amended to read as follows:

a. For a period of ten years from the effective date of the Peace II Measures, any water (or financial equivalent) that may be contributed from the Overlying (Non-Agricultural) Pool in accordance with paragraph ~~8(e)~~ *5(c)* of Exhibit G to the Judgment (as amended) will be apportioned among the members of the Appropriative Pool in each year as follows:

Attachment: Peace Agreement, Section 7.2 (e)(ii)
Schedule for Use of Re-Operation Water**, and
Calculation of Remaining Desalter Replenishment Obligation (DRO)
Production from 2017-18 through 2029-30 is estimated

Production Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Peace I Desalter Production	29,227.997	29,541.300	27,008.810	26,275.588	30,000.000	30,000.000	30,000.000	30,000.000	30,000.000
Peace II Desalter Production	14.555	448.690	1,154.052	1,527.215	10,000.000	10,000.000	10,000.000	10,000.000	10,000.000
Appropriative Pool DRO Contribution	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)
Re-Operation Water**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**
Non-Agricultural Pool Assessment	0.000	0.000	0.000	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)
Remaining DRO	6,742.552	7,489.990	5,662.862	4,567.803	16,765.000	16,765.000	16,765.000	16,765.000	16,765.000

Production Year	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
Peace I Desalter Production	30,000.000	30,000.000	30,000.000	30,000.000	30,000.000	30,000.000	30,000.000	30,000.000
Peace II Desalter Production	10,000.000	10,000.000	10,000.000	10,000.000	10,000.000	10,000.000	10,000.000	10,000.000
Appropriative Pool "DRO Contribution	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)
Re-Operation Water**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(5,000.000)**	**(5,000.000)**	**(5,000.000)**	**(5,000.000)**	**(5,000.000)**
Non-Agricultural Pool Assessment	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)
Remaining DRO	16,765.000	16,765.000	16,765.000	24,265.000	24,265.000	24,265.000	24,265.000	24,265.000

Attachment: Peace II Agreement, Section 6.2(b)(ii)

Allocation of Appropriative Pool Desalter Replenishment Obligation (DRO) Contributions (by agency)

Production Year 2013-14 Desalter Replenishment Obligation (DRO) Contribution: 10,000.000 AF

Appropriative Pool Party	Production Year 2013/14 Common Data (Headings from Approved 2014/2015 Assessment Package)			Methodology for 85/15 split between shares of Operating Safe Yield and % of Land Use Conversions		
	a	b	c = %b	d = (DRO Contrib*.85)*a	e = (DRO Contrib*.15)*c	f = d + e
	Percent of Operating Safe Yield (Column 2A)	Land Use Conversions (Page 12A)*	Percent of Land Use Conversions	85% DRO Contribution Based on Percent of Operating Safe Yield	15% DRO Contribution Based on Percent of Land Use Conversions	Desalter Replenishment Obligation Contribution
Arrowhead Mtn Spring Water Co	0.000%	0.000	0.000%	0.000	0.000	0.000
Chino Hills, City of	3.851%	1,133.906	4.334%	327.335	65.013	392.348
Chino, City of	7.357%	7,623.064	29.138%	625.345	437.074	1,062.419
Cucamonga Valley Water District	6.601%	598.364	2.287%	561.085	34.308	595.393
Fontana Union Water Company	11.657%	0.000	0.000%	990.845	0.000	990.845
Fontana Water Company	0.002%	834.000	3.188%	0.170	47.818	47.988
Fontana, City of	0.000%	0.000	0.000%	0.000	0.000	0.000
Golden State Water Company	0.750%	0.000	0.000%	63.750	0.000	63.750
Jurupa Community Services District	3.759%	13,876.196	53.040%	319.515	795.602	1,115.117
Marygold Mutual Water Company	1.195%	0.000	0.000%	101.575	0.000	101.575
Monte Vista Irrigation Company	1.234%	0.000	0.000%	104.890	0.000	104.890
Monte Vista Water District	8.797%	55.075	0.211%	747.745	3.158	750.903
Niagara Bottling, LLC	0.000%	0.000	0.000%	0.000	0.000	0.000
Nicholson Trust	0.007%	0.000	0.000%	0.595	0.000	0.595
Norco, City of	0.368%	0.000	0.000%	31.280	0.000	31.280
Ontario, City of	20.742%	2,041.095	7.802%	1,763.070	117.028	1,880.098
Pomona, City of	20.454%	0.000	0.000%	1,738.590	0.000	1,738.590
San Antonio Water Company	2.748%	0.000	0.000%	233.580	0.000	233.580
San Bernardino, County of (Shooting Park)	0.000%	0.000	0.000%	0.000	0.000	0.000
Santa Ana River Water Company	2.373%	0.000	0.000%	201.705	0.000	201.705
Upland, City of	5.202%	0.000	0.000%	442.170	0.000	442.170
West End Consolidated Water Co	1.728%	0.000	0.000%	146.880	0.000	146.880
West Valley Water District	1.175%	0.000	0.000%	99.875	0.000	99.875
	100.000%	**26,161.700**	**100.000%**	**8,500.000**	**1,500.000**	**10,000.000**

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Attachment: Peace II Agreement, Section 6.2 (b)(iii)

Allocation of Appropriative Pool Remaining Desalter Replenishment Obligation (RDRO)

Production Year 2013-14:	acre-feet
CDA Production - Peace I Allocation	29,227.997
CDA Production - Peace II Allocation	14.555
Total Desalter Replenishment Obligation (Total DRO):	29,242.552
Desalter Replenishment Obligation Contribution (DROC)	(10,000.000)
Re-Operation Water	(12,500.000)
RDRO	6,742.552

Appropriative Pool Party	Operating Safe Yield	Production Year 2013/14 Common Data (From Approved 2014/2015 Assessment Package - Appendix A)					Methodology for Calculation of Adjusted Physical Production (APP)	Methodology for Calculation of "RDRO"
	a	b	c	d	e	f	APP = [b+(c*50%)+d+e+f]	Individual Party RDRO = ((a+APP)/(Total a +Total APP)) * RDRO
	Assessment Paackage Page 2A: Column 2D	Physical Production	Voluntary Agreements (w/Ag)	Assignments (w/Non-Ag)	Storage and Recovery Programs	Other Adjustments	*Note: APP for City of Chino does not include "Other Adjustments" for this period	
Arrowhead Mtn Spring Water Co	0.000	379.111	0.000	0.000	0.000	0.000	379.111	15.905
Chino Hills, City of	2,111.422	2,150.925	(286.221)	0.000	0.000	5,359.300	7,367.115	397.669
Chino, City of	4,033.857	6,725.430	(6,686.440)	(104.278)	0.000	65.288	3,277.932	306.764
Cucamonga Valley Water District	3,619.454	16,121.550	0.000	0.000	0.000	0.000	16,121.550	828.227
Fontana Union Water Company	6,391.736	0.000	0.000	0.000	0.000	0.000	0.000	268.163
Fontana Water Company	1.000	15,377.579	0.000	0.000	0.000	0.000	15,377.579	645.203
Fontana, City of	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Golden State Water Company	411.476	736.362	0.000	0.000	0.000	0.000	736.362	48.157
Jurupa Community Services District	2,061.118	18,406.630	0.000	(379.499)	0.000	(8.784)	18,018.347	842.427
Marygold Mutual Water Company	655.317	1,314.734	0.000	0.000	0.000	0.000	1,314.734	82.653
Monte Vista Irrigation Company	676.759	0.000	0.000	0.000	0.000	0.000	0.000	28.393
Monte Vista Water District	4,823.954	12,521.892	(151.480)	0.000	0.000	(5,371.667)	7,074.485	499.195
Niagara Bottling, LLC	0.000	1,342.588	0.000	0.000	0.000	0.000	1,342.588	56.328
Nicholson Trust	4.000	0.000	0.000	0.000	0.000	0.000	0.000	0.168
Norco, City of	201.545	0.000	0.000	0.000	0.000	0.000	0.000	8.456
Ontario, City of	11,373.816	21,980.342	(4,423.101)	(1,855.196)	0.000	0.000	17,911.096	1,228.639
Pomona, City of	11,215.852	12,909.293	0.000	0.000	0.000	0.000	12,909.293	1,012.163
San Antonio Water Company	1,506.888	1,159.242	0.000	0.000	0.000	0.000	1,159.242	111.857
San Bernardino, County of (Shooting Park)	0.000	16.390	0.000	0.000	0.000	0.000	16.390	0.688
Santa Ana River Water Company	1,301.374	0.000	0.000	0.000	0.000	48.515	48.515	56.634
Upland, City of	2,852.401	2,822.046	0.000	0.000	0.000	0.000	2,822.046	238.070
West End Consolidated Water Co	947.714	0.000	0.000	0.000	0.000	0.000	0.000	39.761
West Valley Water District	644.317	0.000	0.000	0.000	0.000	0.000	0.000	27.032
	54,834.000	113,964.114	(11,552.242)	(2,338.973)	0.000	92.652	105,876.384	6,742.552

ATTACHMENT B
[PROPOSED] ORDER

EXHIBIT B

Attachment: Peace Agreement, Section 7.2 (e)(ii)
Schedule for Use of Re-Operation Water**, and
Calculation of Remaining Desalter Replenishment Obligation (DRO)
Production from 2017-18 through 2029-30 is estimated

Production Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Peace I Desalter Production	29,227.997	29,541.300	27,008.810	26,275.588	30,000.000	30,000.000	30,000.000	30,000.000	30,000.000
Peace II Desalter Production	14.555	448.690	1,154.052	1,527.215	10,000.000	10,000.000	10,000.000	10,000.000	10,000.000
Appropriative Pool DRO Contribution	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)
Re-Operation Water**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**
Non-Agricultural Pool Assessment	0.000	0.000	0.000	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)
Remaining DRO	6,742.552	7,489.990	5,662.862	4,567.803	16,765.000	16,765.000	16,765.000	16,765.000	16,765.000

Production Year	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
Peace I Desalter Production	30,000.000	30,000.000	30,000.000	30,000.000	30,000.000	30,000.000	30,000.000	30,000.000
Peace II Desalter Production	10,000.000	10,000.000	10,000.000	10,000.000	10,000.000	10,000.000	10,000.000	10,000.000
Appropriative Pool "DRO Contribution	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)
Re-Operation Water**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(5,000.000)**	**(5,000.000)**	**(5,000.000)**	**(5,000.000)**	**(5,000.000)**
Non-Agricultural Pool Assessment	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)
Remaining DRO	16,765.000	16,765.000	16,765.000	24,265.000	24,265.000	24,265.000	24,265.000	24,265.000

ATTACHMENT C
[PROPOSED] ORDER

EXHIBIT A

PROPOSED AMENDMENT TO THE NON-AGRICULTURAL POOL POOLING PLAN

1. Section 6 of Exhibit G to the Judgment (the NAP Pooling Plan) is hereby amended and restated as follows:

6. Assignment. Rights herein decreed are appurtenant to that land and are only assignable with the land for overlying use thereon; provided, however (a) that any appropriator who may, directly or indirectly, undertake to provide water service to such overlying lands may, by an appropriate agency agreement on a form approved by Watermaster, exercise said overlying right to the extent, but only to the extent necessary to provide water service to said overlying lands, and (b) the members of the pool shall have the right to Transfer or lease their quantified production rights within the pool or to Watermaster in conformance with the procedures described in the Peace Agreement between the parties therein, dated June 29, 2000 for the term of the Peace Agreement. Any production pursuant to any such agency agreement (1) shall not constitute production in the Appropriative Pool for the purpose of calculating any assessments imposed on members of the Appropriative Pool, including without limitation replenishment assessments; and (2) shall constitute production in the Non-Agricultural Pool by the assignor for the purpose of calculating any assessments imposed on members of the Non-Agricultural Pool, with the continuing dedications by members of the Non-Agricultural Pool of 10% of their annual share of Operating Safe Yield to desalter replenishment pursuant to Section 5(c) being the sole and exclusive method by which such members shall be required to contribute at any time to desalter production or desalter replenishment.

2. Section 9 of Exhibit G to the Judgment (the NAP Pooling Plan) is hereby amended and restated as follows:

9. Physical Solution Transfers. All overlying rights are appurtenant to the land and cannot be assigned or conveyed separate or apart therefrom except that for the term of the Peace Agreement the members of the Overlying (Non-Agricultural) Pool shall have the discretionary right to Transfer or lease their quantified Production rights and carry-over water held in storage accounts in quantities that each member may from time to time individually determine as Transfers in furtherance of the Physical Solution: (i) within the Overlying (Non-Agricultural) Pool; (ii) to Watermaster in conformance with the procedures described in the Peace Agreement between the Parties therein, dated June 29, 2000; (iii) in conformance with the procedures described in Paragraph I of the Purchase and Sale Agreement for the Purchase of Water by Watermaster from Overlying (Non-Agricultural Pool dated June 30, 2007; or (iv) to Watermaster and thence to members of the Appropriative Pool in accordance with the following guidelines and those procedures Watermaster may further provide in Watermaster's Rules and Regulations:

(a) By December 31 of each year, the members of the Overlying (Non-Agricultural) Pool shall notify Watermaster of the amount of water each member shall make available in their individual discretion for purchase by the Appropriators. The Pool Committee of the Overlying (Non-Agricultural) Pool may, by affirmative action of its members from time to time, establish a price for such water or a method pursuant to which such price will be established. By January 31 of each year, Watermaster shall provide a Notice of Availability of each Appropriator's pro-rata share of such water;

(b) Except as they may be limited by paragraph 9(e) below, each member of the Appropriative Pool will have, in their discretion, a right to purchase its pro-rata share of the supply made available from the Overlying (Non-Agricultural) Pool at the price at which the water is being offered. Each Appropriative Pool member's pro-rata share of the available supply will be based on each Producer's combined total share of Operating Safe Yield and the previous year's actual Production by each party;

(c) If any member of the Appropriative Pool fails to irrevocably commit to their allocated share by March 1 of each year, its share of the Overlying (Non-Agricultural) Pool water will be made available to all other members of the Appropriative Pool according to the same proportions as described in 9(b) above and at the price at which the water is being offered. Each member of the Appropriative Pool shall complete its payment for its share of water made available by June 30 of each year.

(d) Commensurate with the cumulative commitments by members of the Appropriative Pool pursuant to (b) and (c) above, Watermaster will purchase the surplus water made available by the Overlying (Non-Agricultural) Pool water on behalf of the members of the Appropriative Pool on an annual basis at the price at which the water is being offered and each member of the Appropriative Pool shall complete its payment for its determined share of water made available by June 30 of each year.

(e) Any surplus water cumulatively made available by all members of the Overlying (Non-Agricultural) Pool that is not purchased by Watermaster after completion of the process set forth herein will be pro-rated among the members of the Pool in proportion to the total quantity offered for transfer in accordance with this provision and may be retained by the Overlying (Non-Agricultural) Pool member without prejudice to the rights of the members of the Pool to make further beneficial us or transfer of the available surplus.

(f) Each Appropriator shall only be eligible to purchase their pro-rata share under this procedure if the party is: (i) current on all their assessments; and (ii) in compliance with the OBMP.

(g) The right of any member of the Overlying (Non-Agricultural) Pool to transfer water in accordance with this Paragraph 9(a)-(c) in any year is dependent upon Watermaster making a finding that the member of the Overlying (Non-Agricultural) Pool is using recycled water where it is both physically available and appropriate for the designated end use in lieu of pumping groundwater.

(h) Nothing herein shall be construed to affect or limit the rights of any Party to offer or accept an assignment as authorized by the Judgment Exhibit "G" paragraph 6 above, or to affect the rights of any Party under a valid assignment.

3. A new Section 10 of Exhibit G to the Judgment (the NAP Pooling Plan) is inserted as follows:

10. Elective Transfers for Desalter Replenishment. Any member of the Non-Agricultural Pool (including without limitation any member of the Non-Agricultural Pool that is also a member of the Appropriative Pool) may elect to transfer (a) some or all of the annual share of Operating Safe Yield of the transferor in and for the year in which the transfer occurs (except that such transfer shall exclude any dedication to Watermaster required by Section 5(c) hereof), and (b) any quantity of water held in storage by the transferor (including without limitation carryover and excess carryover) to any member of the Appropriative Pool, in either case at any price that the transferor and transferee may deem appropriate and for the purpose of satisfying the transferee's desalter replenishment obligation. Any such transfer shall be effective upon delivery by the transferor or transferee to Watermaster staff of written notice of such transfer in the form attached hereto as Form A. The transferee's desalter replenishment obligation shall be credited by the number of acre feet so transferred.

4. Existing Section 10 of Exhibit G to the Judgment (the NAP Pooling Plan) is renumbered as Section 11 as follows:

11. Rules. The Pool Committee shall adopt rules for administering its program and in amplification of the provisions, but not inconsistent with, this pooling plan.

FORM A

NOTICE OF ELECTIVE TRANSFER FOR DESALTER REPLENISHMENT

QUANTITY:

______________ Acre-Feet of Annual Share of Operating Safe Yield for Current Year

______________ Acre-Feet of Carryover

______________ Acre-Feet of Excess Carryover

Transferor and Transferee hereby provide written notice to Watermaster staff of a transfer by the Transferor, in its capacity as a member of the Non-Agricultural Pool, to Transferee, in its capacity as a member of the Appropriative Pool, of water in the quantity and of the type set forth above pursuant to Section 10 of Exhibit G to the Judgment.

TRANSFEROR NAME:	TRANSFEREE NAME:
______________________	______________________
By: ______________	By: ______________
Name: ______________	Name: ______________
Its: ______________	Its: ______________
Dated: ______________	Dated: ______________

3.15.19

IT IS SO ORDERED

Judge

STANFORD E. REICHERT

EXHIBIT D

Appendix F

Response to Questions and Comments

from: Colleague/Peer Review Workshops, Public Workshop, and Stakeholder Review of Draft Final Report and Stakeholder Workshop. And, the Report of the Technical Expert

Appendix F Table of Contents

TECHNICAL MEMORANDUM

January 16, 2020

TO: File 007-019-012.10

FROM: Wenbin Wang, Eric Chiang, Jeff Hwang and Michael Blazevic

RE: Comments and responses for first colleague peer review of the 2020 Safe Yield Recalculation Model

Comment/Question 1: What version of MODFLOW was used for the Salinity management project?

Response: *MODFLOW NWT was used for the simulation of groundwater flow. The main reasons for selecting MODFLOW NWT was its improved numerical stability for drying and rewetting cells, that it supports the Streamflow Routing (SFR2) Package and provides output data that are required by the Streamflow Transport (SFT) Package of MT3D-USGS. MT3D-USGS will be used to simulate transport of TDS and TIN in groundwater and in the streams for future studies.*

Comment/Question 2: What was logic to introduce new confining layers (i.e. layers 2 and 4) in the updated MODFLOW model? What was the reason you want to do that?

Response: *The Chino Basin consists of a shallow unconfined aquifer and deep confined aquifers. Historical flowing artesian conditions were mapped in the early 1900s in the southwest portion of the Chino Basin (Mendenhall, 1905, 1908; Fife et al., 1976), which indicates the existence of confining layers in these areas. Likewise, review of water level time-series, water quality data, and aquifer testing data support confined groundwater conditions in the western portion of Chino Basin.[1] It has also been demonstrated in the Annual Report of the Ground-Level Monitoring Committee that the observed aquifer-system deformation in the Managed Area is a result of groundwater pumping from the deep and confined aquifer-system.[1] Similarly in Northwest MZ-1, available evidence indicates that the most likely mechanism behind the observed subsidence in the Northwest MZ-1 Area is the compaction of fine-grained sediment layers (aquitards) within the aquifer-system.[1]*

New confining layers (Layers 2 and 4) were added to hydrostratigraphic conceptual model to support our improved understanding of the Chino Basin's hydrostratigraphy, to simulate land subsidence across the Chino Basin, and to support the MODFLOW SUB package. The new Chino

[1] http://www.cbwm.org/rep_engineering.htm

Basin model that incorporates the MODFLOW SUB package will be used to support the future development of a subsidence management plan.

Comment/Question 3: Next to San Sevaine Creek, we have drilled some monitoring wells for IEUA to about 750 feet deep. Are they included in the cross-section (J-J')? Clay interbeds in the shallow aquifer system (note see well 1223033 in the cross-section J-J' near I-15) do not seem to be captured in the model.

Response: *The cross-sections depict the hydrostratigraphy used for the model based on borehole, geophysical logs, well screen position, water level, water quality, spinner logs, and specific capacity data. The delineation of the layering was based on a holistic analysis of the entire data set. For this reason, the layer boundaries do not always match specific observations at every well on every cross-section but do honor our general understanding of the Chino Basin's depositional environment and hydrostratigraphy.*

Comment/Question 4: Was there specific characteristics of the clay that you are looking for? ... moving into Fontana area, you still have the clay. Are you going to keep the clay in the same depth? What do you want to do with it?

Response: *See response to comment/question 3 above.*

Comment/Question 5: How are the pumping tests used to determine the value of hydraulic conductivity in the model? ...I would start with pumping test and I would like to see how the hydraulic parameters based on pumping test data match [with texture data]...We have flow meter survey data, that help us understand how much flow are occurring by the depth... as oppose to [use] driller's log...I don't want to build the model based on the lithology data [alone]. I want other data to be considered.

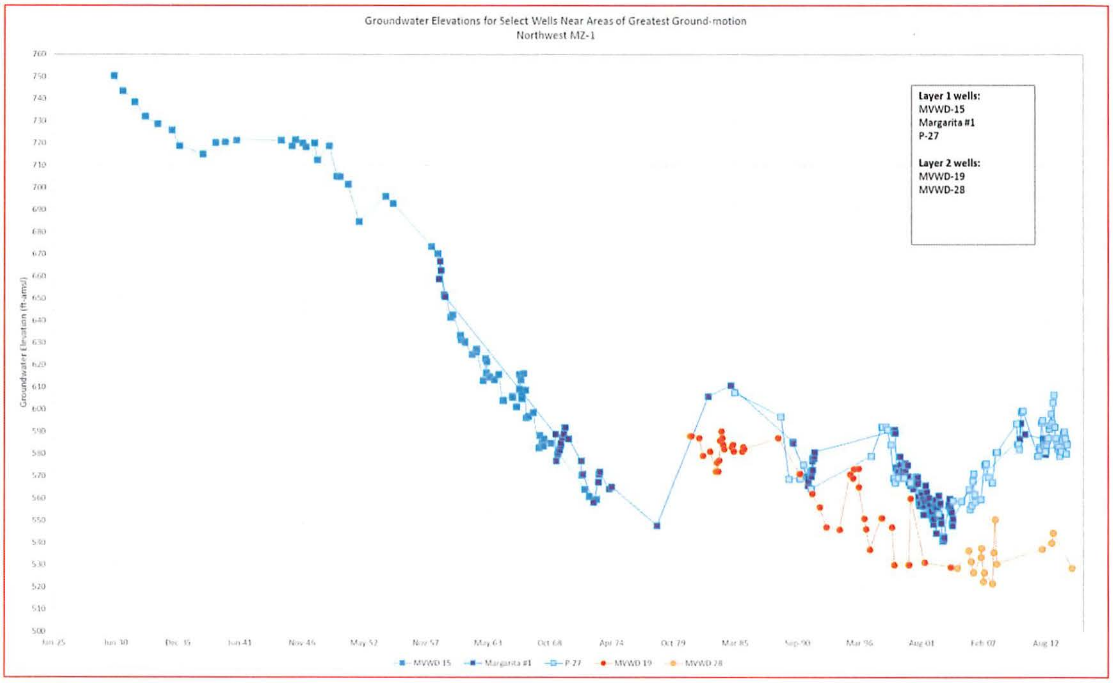
Response: *All available pumping, spinner, and specific capacity test data were collected and reviewed. These test results were used to derive transmissivity values and the pumping allocation across the different model layers and inform the calibration process.*

Comment/Question 6: The hydraulic data are based on lithology and then are used for Kriging. I recommend taking into consideration of the variability of these hydraulic data and use the max/min of those data to constrain calibration.

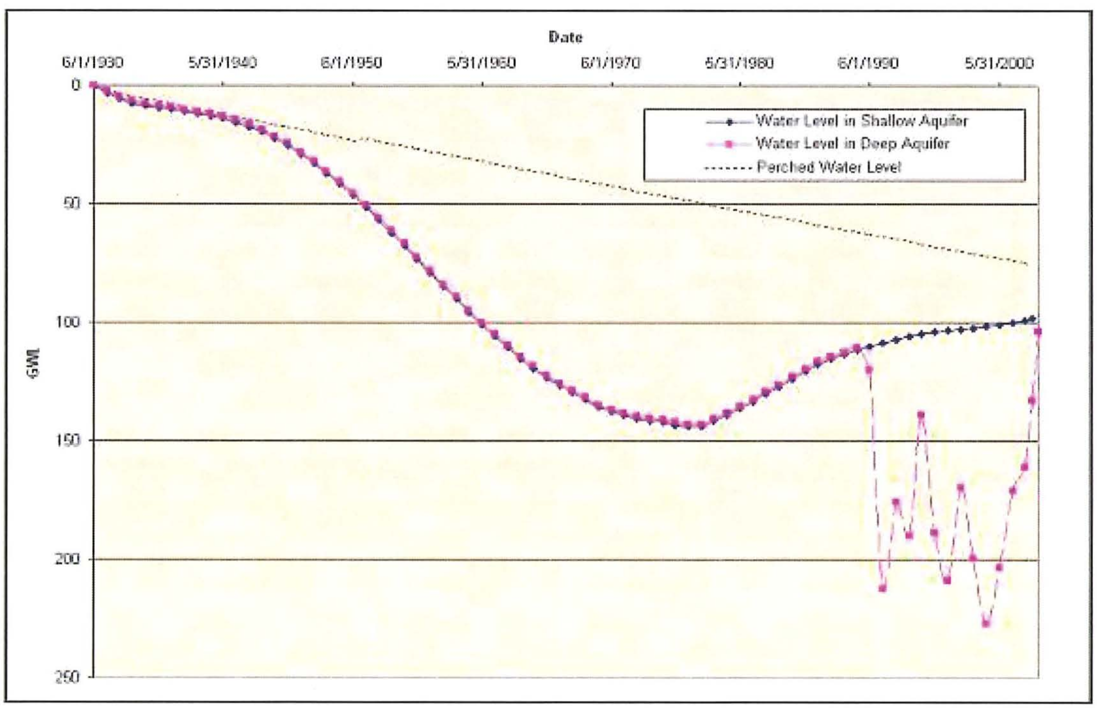
Response: *During the kriging process and model calibration, reasonable upper and lower bounds for the hydraulic data were used to constrain the calibration results.*

Comment/Question 7: How do you plan to distribute that critical head in the model for the Subsidence package?

Response: *Pre-consolidation pressure is the maximum effective vertical overburden stress that a particular soil sample has sustained in the past. In other words, the pre-consolidation stress is the lowest head in the aquifers and aquitards in the past. As shown in the figures below, the 1978 groundwater levels represent the lowest water levels in the period between 1930 and 1978. The initial pre-consolidation head across Chino Basin will be set to the 1978 water levels. With the groundwater flow simulation, the pre-consolidation heads in aquifers and aquitards are replaced by the new lowest water levels. Calibration of the land subsidence will occur after the Safe Yield process concludes.*

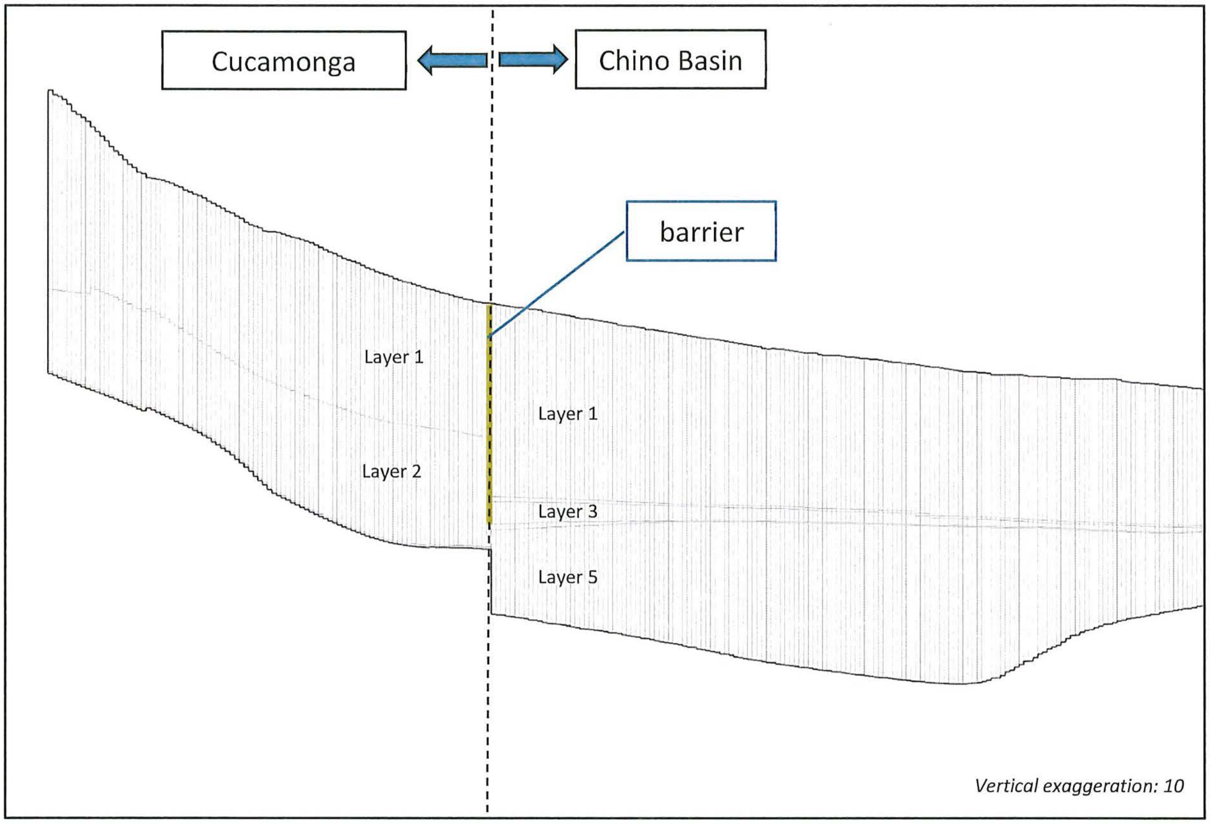


Historical Water Level in Ayala Park



Comment/Question 8: On this [Cucamonga] part of the model did you maintain the layering that you had in the main Chino Basin or do you have different layering? [How] did you meld it up to the current larger [Chino Basin] model?

Response: *Cucamonga and Six Basins are considered to be hydrogeologically separated from the Chino Basin and the hydrostratigraphy (layering) is different than the Chino Basin. The connections to Chino Basin from the Cucamonga and Six Basins are simulated as barriers. The deep aquifers in Cucamonga and Six Basins will be modeled as weakly connected to Chino Basin's deep aquifer-system by using the barrier's hydraulic conductivity parameter. See figure depicting a cross-section of the model below.*



Comment/Question 9: Expressed concerns that on the east [of the Cucamonga basin] there is only one boring.

Response: Comment noted. All available borehole records were reviewed from CVWD's database, WEI's database, and borehole logs requested directly from the DWR.

Comment/Question 10: What is the philosophy in terms of combining those [hydraulic parameters] together that you don't really have data?

Response: *Combining hydraulic parameter zones in areas where borehole data is sparse is based on our understanding of the geology and hydrogeology of the area, using other nearby borehole data, and our best professional judgement.*

Comment/Question 11: Expressed concerns about the sharp boundary of parameter values between zones after calibration.

Response: *Comment noted.*

Comment/Question 12: I want to know what was changed [between the new and the old R4 model].

Response: *The changes include: increasing the number of hydrologic subareas over the Chino Basin; improved resolution in the land use data for historical and projection periods; updates to the spreading basin infiltration rates; revision of the 2013 RMPU projects incorporated into future projections; and extending the precipitation, ET, evaporation record and gaged inflow to model domain through June 2019. More specifically:*

- *The number of land use types changed from 14 to 20. Land use types 15 to 18 were added to simulate the impact of Model Water Efficient Landscape Ordinance (MWELO), required by California Department of Water Resources. Land use types 19 and 20 were added to simulate the impact of recycled water irrigation and dairy wash water application.*
- *Surface water modeling area was expanded to include Chino Basin, Cucamonga Basin, Six Basins, Spadra Basin and Temescal Basin.*
- *Hydrologic subarea (HSA) boundaries were refined to reflect the groundwater basin boundaries. Total number of hydrologic subareas are increased from 180 to 344.*
- *WEI developed the HSPF model for San Gabriel Mountain, and its calculated daily runoff from mountain watersheds were used as boundary inflow to the R4 modeling area.*
- *Calibration period was extended through fiscal year 2018.*

Comment/Question 13: When you refine the land use, do you refine the waste allocation as well?

Response: *Water use, return flows and stormwater runoff are specific to each land use. If the land use is refined or updated then the associated water use return flows and stormwater runoff will be changed.*

Comment/Question 14: What is the source of [Crop Coefficient] data?

Response: *See references below:*

CA DWR, 1974. *Vegetative Water Use in California, 1974,* California Department of Water Resources, Bulletin No. 113-3, April 1975.

Merkel & Associates, Inc, 2007. *Evapotranspiration Analysis of the Prado Basin, Santa Ana River, California*, prepared for Wildermuth Environmental, Inc., November, 2007.

Snyder, R.L., M. Orang, S. Matyac, L. Bali, and S. Eching, *Basin Irrigation Scheduling (BIS),* Regents of the University of California, April, 2007.

Snyder, R.L., M. Orang, S. Matyac, and S. Eching, Crop Coefficients, Regents of University of California, Last Update March 2, 2007

Allen, R.G., L.S. Pereira, E. Raes, and M Smith, *FAO Irrigation and Drainage Paper No. 56, Crop Evapotranspiration (guidelines for computing crop water requirements),* Food and Agriculture Organization of the United Nations, 1998.

UCCE and CADWR, 2000, *A guide to Estimating Irrigation Water Needs of Landscape Plantings in California,* University of California Cooperative Extensions and California Department of Water Resources, August 2000

Comment/Question 15: What is the source of [Irrigation efficiency] data?

Response: *See references below:*

Sandoval-Solis, S, M. Orang, R.L. Snyder, S. Orloff, K.E. Williams, and J.M. Rodriguez, 2013. *Spatial Analysis of Application Efficiencies for the State of California,* prepared for United States Geological Survey and California Institute for Water Resources, University of California Davis.

Salas, W., P. Green, S, Frolking, C. Li, and S. Boles, *Estimating Irrigation Water Use for California Agriculture, 1950s to Present,* PIER Project Report, Prepared for California Energy Commission.

WILDERMUTH ENVIRONMENTAL, INC.

TECHNICAL MEMORANDUM

March 1, 2020

TO: File 007-019-012.10

FROM: Wenbin Wang, Eric Chiang and Mark Wildermuth

RE: Comments and responses for the second colleague peer review of the 2020 Safe Yield Recalculation that occurred on January 27, 2020

There are three Sections to this TM that include comments and questions captured from the attendees of the January 27 colleague/peer review meeting and subsequent correspondence from the Overlying Ag Pool and the City of Chino.

Comments and Questions from the January 27, 2020 Meeting

Many questions were asked at the January 27 Colleague/Peer review meetings and most were answered. Those questions that were not answered fully or where the answer would be revised subsequent to the meeting are included below.

Comment/Question 1: Tom Harder – What calibration points did you use for the HSPF model?

Response: *The HSPF model was calibrated to observed daily discharges on Live Oak Creek, San Antonio Creek, Cucamonga Creek and Day Creek*

Comment/Question 2: Amanda Coker: – Do you know the percentage of the agricultural pool pumping that is estimated vs what is metered?

Response: *We refer you to Watermaster to answer that question*

Comment/Question 3: Tom Harder – Why is the Santa Ana riverbed classified as "D" which is the most impervious soil type?

Response: *We don't know. This map was prepared by the NRCS decades ago. We use the hydrologic soil group classification for precipitation-based runoff calculation and not for streambed recharge.*

Comment/Question 4: Amanda Coker – Is the MS4 compliance data incorporated in the model?

Response: *No. There is no information available on the performance and maintenance of MS4 facilities that could be used to quantitatively assess the historical contribution to recharge or to project future recharge.*

Comment/Question 5: Attribution unknown – Have you retroactively changed the irrigation efficiency for any land use types that have been retrofitted, for example adding artificial turf, etc.?

Response: *No.*

Comment/Question 6: Tom Harder – How well is the HSPF model calibrated?

Response: *Please see Section 6 in the 2020 Safe Yield Recalculation Report (hereafter Report).*

Comment/Question 7: Eric Fordham – Did you use flux as well as head to calibrate the model? If both, what order did you use?

Response: *This is discussed in some detail in the Report in Sections 5 and 6. In summary, all flux terms, with the exception of three fluxes, are based on precipitation, estimated applied water and measured fluxes (e.g. Santa Ana River and Temescal Wash inflow to the active CVM domain, imported water recharge, recycled water recharge). The exceptions are subsurface inflow from the Rialto Basin (assumed a constant); subsurface inflow from the Riverside Basin through the Bloomington Divide (variable, based on head in the Riverside Basin); and subsurface outflow from the Spadra Basin to the Puente Basin (variable, based on head in the Puente Basin). When used for planning, the subsurface inflow from the Riverside Basin and subsurface* *outflow form the Spadra Basin were assumed to be a constant value and equal to the average flow from the last five years of the calibration period.*

Comment/Question 8: Tom Harder – Did you calibrate land subsidence?

Response: *No. 2020 CVM was updated to be able to calibrate it for land subsidence. Calibration for land subsidence will be done in the next fiscal year as part of the land subsidence management work being done by Watermaster*

Comment/Question 9: Attribution unknown – Is climate change applied to the availability of imported water?

Response: *No.*

Comment/Question 10: Tom Harder – Commented that wet years are not increasing the DIPAW, it is only leveling it out. Would the same thing happen if we had a couple really wet years in the near future?

Response: *Because of the decrease in pervious area and historical drainage practices, the contribution of precipitation to DIPAW has diminished over time. The occurrence of a couple of "really wet years" in the future will increase DIPAW but not as much as it would have in 1970s.*

Comment/Question 11: Tom Harder – How did you deal with the drought hangover in SFI?

Response: *To support Watermaster planning efforts from 2015 forward through the 2018 SFI work, we would annually update the previous model one year at a time without calibrating he model. Planning investigations, such as the 2018 SFI, used the model results from the end of the historical modeling for initial conditions. During these efforts there was no specific acknowledgement of a drought hangover.*

Comment/Question 12: Tracy Egoscue – Did you say that you were not confident in the MS4 recharge facility data..

Response: *There is no information available on the performance and maintenance of MS4 facilities that could be used to quantitatively assess the historical contribution to recharge or to project future recharge.*

Comment/Question 13: Tracy Egoscue – Will new recharge facilities counteract the effects of the drought?

Response: *New recharge facilities will increase future recharge and contribute to mitigating the effects of changes in cultural conditions and future drought.*

Comment/Question 14: Eric Fordham – Why doesn't the long term average DIPAW go down due to climate change?

Response: *In our work, we did not include any future outdoor water conservation measures as to do so would be speculative. This means that in the future if ET were to increase and precipitation decrease, that the more water would be used for irrigation and this would increase irrigation returns.*

Comment/Question 15: Katie Gienger – Did you include future standards for outdoor water use set by the state?

Response: *No. The recent legislation (AB 1668 & SB 606), collectively known as "Making Conservation a California Way of Life," to establish new water efficiency standards for purveyors, will result in new water conservation requirements for irrigation water use. Regulations on irrigation will come into effect in 2023 and it is expected that they will significantly reduce irrigation and subsequently irrigation return flows to groundwater.*

Comment/Question 16: Tom Harder – Can we incorporate possible alternative pumping scenarios?

Response: *No, it is not within our scope of work*

Comment/Question 17: Tom Harder – Really wants to optimize pumping to maximize SY. What happens if they change the way they pump and safe yield increases?

Response: *To be determined.*

Comments and Questions from February 3, 2020 Email fby Tracy Egoscue for the Overlying Ag Pool

Comment/Question 1: The Ag Pool is very interested in the "vadose zone drought hangover on DIPAW and the potential implications this may have on Safe Yield. Please explain any potential adjustments or revisions that have been, or may be made to the modeling approach or Safe Yield Reset Methodology to address this issue.

Response: There were no changes in approach or Safe Yield Reset Methodology. The same approach and methodology were used in the 2020 Safe Yield recalculation.

Comment/Question 2: The information presented in the workshop and on workshop presentation slide no. 236 in the PDF (Comparison of DIPAW Discharging Into and Out of the Vadose Zone) does not indicate how much of the decline in DIPAW discharge to the phreatic zone is due to drought and how much is due to gradual change in other persistent factors, such as land use and/or cultural conditions. Please explain this breakdown. The Ag Pool will have more specific comments or questions on this and/or related issues when the additional information becomes available.

Response: It is clear from our analysis that the change in cultural conditions are very significant when comparing the historical time series DIPAW from wet years, that the precipitation part of the DIPAW has significantly decreased. We did not do an investigation to quantitively assess the historical individual contributions of changes in cultural conditions and drought to historical DIPAW.

Comment/Question 3: Finally, please provide a summary of developed yield estimates through the current model calibration as these were not provided during the Safe Yield workshop.

Response: Please refer to Section 6 of the Report.

February 21, 2020 Comments and Questions from City of Chino and Eric Fordham

Comment/Question 1: The greatest amount of subsurface inflow is attributed to the Bloomington Divide (page 66 of PowerPoint presentation). (a) Why does this recharge inflow show increases since 2005 while inflow from the other boundaries appear to decrease or remain relatively constant? (b) How is the variable head boundary that is assigned to this recharge boundary calibrated? (c) Model parameters in this area of the model appear to be very sensitive and there are fewer calibration targets. How are the model parameters in the Bloomington Divide area constrained?

Response: (a) In the calibration period, the time series of groundwater elevations in the Riverside Basin at or near the Bloomington Divide are used to simulate the groundwater elevation on the model boundary. Groundwater elevations in the Fontana area have historically been declining relative to the groundwater elevations at the Bloomington divide. The groundwater elevation gradient into the Chino Basin has increased causing the increase in subsurface inflow from the Riverside Basin. With the exception of the Rialto Basin subsurface inflow, the subsurface inflows on the active CVM domain are based on precipitation. (b) and (c) The model parameters were calibrated using manual and optimization techniques that included constraints on the model parameters.

Comment/Question 2: Review of the model parameter sensitivity in Table 6-1 indicates some values that do not appear reasonable. For example, the parameters labeled "sylz**" for layer 1, which presumably represents specific yield, range from 0.47 to 1.01. Generally, specific yield is expected to be 0.3 or less. Considering the specific yield in layer I is a very sensitive parameter, more zonation and parameter control may be required. Please explain. Also, "vklzl" is presumably the vertical hydraulic conductivity for zone I of layer 1, which has a value of 32.7 ft/d (units are presumed) compared to "hklzl," which is presumably the horizontal hydraulic conductivity for zone I of layer I with a value of 2.5 ft/d. Generally, the vertical hydraulic conductivity of a zone is less than the horizontal hydraulic conductivity by half to an order of magnitude. The reported values are not consistent with generally accepted alluvial hydrostratigraphy. As these were initial estimates to assess sensitivity, presumably more constraints that are consistent with generally accepted hydrogeologic concepts were imposed during further modeling calibration. Please confirm and provide examples of final model parameter values used in the 2020 model.

Response: The table does not contain actual aquifer parameter values – it contains parameter zone scalers. Please see Section 5 of the Report for a description of the parameter zone scalers.

Comment/Question 3: Deep Infiltration of Precipitation and Applied Water (DIPAW). The chart on page 67 of the PowerPoint Presentation shows DIPAW to Saturated Zone with a difference from 1995 to 2018 of about 50,000 afy total over the time period. This decrease trends at a rate of about 2,200 afy, which is plotted on the attached chart. The 2013 DIPAW model decreases at a trend that is less than the current model, suggesting a decrease from 1996 to 2012 of about 1,500 afy. (a) Considering the surface area in the 2020 R4 model is larger than that of the 2013 model, what are the significant changes in the 2020 model that results in a greater decrease in DIPAW compared to the 2013 model? (b) Is the 700 afy difference within the error of the modeling estimates? (c) What are the sensitivities to those parameters that are most significant to DIPAW?

Response: (a) The primary difference in the DIPAW estimates is caused by improvements in the data used in compute DIPAW and surface runoff. Improvements in the data that include improved precipitation estimates and land use resolution. (b) We have not prepared a quantitative assessment of modeling error. (c) The sensitivity is self-evident from the differences in DIPAW estimates from the 2013 and 2020 models.

Comment/Question 4: Over the past 5 to 6 years, recharge has been constant or has increased while discharge (presumably mostly pumping) has decreased, although increase in storage has not been observed until the last 3 years (page 73 of PowerPoint presentation). (a) Why is there a lag of 2 years shown (2015 to 2016) considering the recharge is to the phreatic zone? (b) A table that provides the water budget, such as was provided in Table 3-1 of the 2013 CBWM Model Update would be helpful in better understanding the nuances of the 2020 model.

Response: (a) Our reading of the chart that shows recharge, discharge and change in storage to directly show the storage increasing with increased imported water recharge and slightly declining pumping as would be expected. (b) See Section 6 in the report for the historical water budget table.

Comment/Question 5: How were the lag times with respect to DIPAW determined (Figure 3-1; pages 78 and 79 of the PowerPoint presentation). As indicated during the workshops, soil texture and depth to water are considered. However, are these lag times calibrated to measured data, such as rainfall events and subsequent measured increases in groundwater level. This may have been explained but was not clear.

Response. See Section 5 of the Report for the derivation of the lag times.

Comment/Question 6: While we agree in total the model calibration is impressive, we suggest providing map views of calibration targets for key layers that represent the total error in order to better understand if there are any bias's in the model that either underpredicts or overpredicts recharge/discharge in various portions of the basin's management zones.

Response: See Section 6 of the Report for well location maps, scatter plots and residual analyses.

Comment/Question 7: The Safe Yield Recalculation Tech Memo (December 18, 2019) refers to Table C-2 in the 2020 Storage Management Plan as an example of the replenishment calculation methodology. (a) Review of Table C-2 suggests that Safe Yield (column 3) is inversely related to groundwater pumping (column 2) where reduced pumping through 2020 results in an increased Safe Yield from 2021 through 2030 followed by a decrease in Safe Yield through 2040 as a result of increasing pumping from 2021 through 2030, which then results in an increase in Safe Yield for 2041 through 2050. (b) Based on this relationship, the Safe Yield calculation should include scenarios that consider increased future groundwater pumping in order to better test the maximum Safe Yield potential.

Response: (a) In Table C-2 from the 2020 SMP, the Projected Safe Yield increases in the period 2021 through 2030 because the 2013 RMPU come online in 2021 and the increase in stormwater recharge boost the yield. Because pumping is less than pumping rights, storage builds up and suppresses the yield in the subsequent decade. (b) We disagree. The Safe Yield calculation should be based on the best estimate of how the basin will be which includes the best projection of future pumping provided by the Parties. An optimization investigation could be done with the new 2020 CVM to inform the Parties on how to maximize the Safe Yield through managing pumping, recharge and storage.

TECHNICAL MEMORANDUM

April 15, 2020

TO: Peter Kavounas

FROM: Mark Wildermuth, Eric Chiang, Wenbin Wang, Lauren Sather

RE: Review of and responses to questions posed by Thomas Harder in his February 3, 2020 Task Memorandum to you: *2020 Safe Yield Reset – Follow-Up to Technical Review Meeting on January 27, 2020*

Model Calibration – Surface Water Model

Mr. Harder wrote: *Please provide the calibration plots (measured vs. model-generated scatter plots) for the stream gages located north of Cucamonga Basin (one appears to be in Cucamonga Creek and one appears to be in Day Creek).*

WEI response: The scatter plots are attached to this TM as Figures 1 and 2.

Mr. Harder wrote: *Simulated recharge in managed recharge basins in the surface water model is not matching the measured data provided by IEUA. The fit of model-generated to measured data at Ely Basins and RP-3 Basins show a linear regression fit of less than 0.6. As indicated in the technical meeting, the recharge in the basins is estimated based on interpretation of staff gage readings and not direct measurement of inflow to and outflow from the basins, adjusted for evapotranspiration (ET) losses. Thus, WEI is calibrating the basin recharge in the surface water model to estimated data which results in considerable uncertainty. Given the importance of storm water capture/recharge to the estimate of Safe Yield in the Chino Basin, it is recommended to equip these basins with more accurate surface water balance monitoring equipment (e.g. calibrated gages at the inflow/outflow structures and weather stations to measure precipitation and ET) for recharge measurements.*

WEI response: We concur with your recommendation. Watermaster staff is currently in the process of assessing how the IEUA estimates stormwater capture, and it will be making recommendations for improvements in monitoring equipment and computational procedures to improve the accuracy of stormwater recharge estimates.

Model Calibration – Groundwater Model

Mr. Harder wrote: *For the groundwater flow model, please provide maps showing the final calibrated model distribution of:*

- *Specific Yield of Layer 1*
- *Specific storage of Layers 2, 3, 4 and 5*
- *Hydraulic conductivity of Layers 1 through 5*

WEI response: Please see Figures 3 through 12.

Mr. Harder wrote: *On the hydraulic conductivity maps, please plot the hydraulic conductivities derived from pumping tests, as provided by Thomas Harder & Co. following the July 23, 2020 technical meeting.*

WEI response: Per our coordination call on April 13, we prepared Table 1, which compares horizontal hydraulic conductivity (Kh)—developed from stress tests and estimated by WEI and others—to the final calibrated Kh's in the 2020 Chino Valley Model (CVM). Note that for the stress-test based Kh's provided by you:

- For confined aquifers, the stress-test based Kh's and the model-calibrated values are comparable.
- For unconfined aquifers, the stress-test based Kh's are consistently greater than the model-calibrated values.

The stress-test based Kh's, provided by you, for unconfined aquifers are based on the Jacob's solution for confined aquifers. By its formulation, the Jacobs solution for confined aquifers will always estimate greater values of Kh for an unconfined aquifer than solutions developed specifically for unconfined aquifers. The stress-test based Kh for CDA well I-16 was estimated by WEI using Neuman's solution for an unconfined aquifer. The stress-test based Kh for Chino Hills 19 was estimated with the Neuman-Witherspoon solution for a confined aquifer and corroborated using Theis, Hantush-Jacob, modified Hantush, and Moench solutions. Note that the model calibrated Kh's are close to the WEI estimated Kh's for CDA I-16 and Chino Hills 19.

Mr. Harder wrote: *For the hydrographs showing model-generated vs. measured groundwater levels, it is not clear which model layer the model-generated groundwater levels represent. For example, Chino Well 13 is perforated across Layers 1, 2 and 3 of the updated model (Section B-B' from July 23, 2019 technical meeting). MODFLOW will provide a layer-specific hydraulic head value but not a composite layer head value. Please provide the calibration hydrographs with a description of which model layer the model-generated groundwater level represents. If the* *model-generated groundwater level is not specific to a layer, provide a detailed explanation of how you arrived at the model-generated groundwater level shown on the hydrographs.*

WEI response: Calibration targets are available generally as measured groundwater levels, and they are not always available as groundwater levels in individual layers. We used a transmissivity-weighting function to calculate the groundwater level value at a calibration well h_{well} as follows:

$$h_{well} = \sum_{i=1}^{n} (h_i \times f_i)\,; \;\; f_i = \frac{T_i}{T_{sum}}\,; \;\; T_{sum} = \sum_{i=1}^{n} T_i$$

Where n is the number of screened layers, h_i is the model-calculated groundwater level in layer i, f_i is the weighting factor of layer i, and T_i is the transmissivity of the screened thickness in layer i.

Mr. Harder wrote: *Please provide a calibration hydrograph for Chino II-2.*

WEI response: Please see Appendix C, Exhibit C-9, in the final 2020 Safe Yield Recalculation Report (page 296 of the report pdf).

Mr. Harder wrote: *For Wells AP-PA7, the model doesn't replicate the groundwater level variation measured in the well. As this is a monitoring well, the variations are not associated with pumping groundwater levels and are therefore most likely indicative of pumping interference from nearby wells. The relatively large residuals were also observed in the later data for CH HIL 07C hydrograph. It is recommended to review the model pumping input and aquifer parameters in this area to make sure they are representative of measured data.*

WEI response: As you recommended, we reviewed the model pumping input and aquifer parameters. Chino Hills pumping is intermittent and large drawdown occurs at these wells. It is very difficult to find representative groundwater levels at these wells to calibrate to when the wells are operated this way. As to the aquifer parameters, next fiscal year, Watermaster will revise the CVM to include land subsidence and that process will include fine-tuning the aquifer parameters in this area and may lead to improved matching of observed and computed groundwater levels. It is our opinion that the occurrence of these residuals at these two wells does not impact the estimate of net recharge and Safe Yield.

Model Planning Scenario

Mr. Harder wrote: *The comparison of deep infiltration of precipitation and applied water (DIPAW) from the meeting raises several questions:*

1. *What assumptions/data changed in the surface water model that resulted in as much as approximately 15,000 acre-ft/yr more groundwater recharge from DIPAW in the current version of the model versus the 2013 version for the time period from approximately 1985 to 2005?*
2. *What assumptions/data changed that resulted in the greater downward trend in DIPAW in the current version of the model relative to the 2013 version?*
3. *In each of questions 1 and 2 above, what is the basis for the changed assumptions in the model?*
4. *How has the overall groundwater budget changed as a result of the changes in DIPAW?*

WEI response: (1) WEI is involved in a parallel effort to assist Watermaster and the IEUA in assessing alternative TDS compliance metrics for recycled water use. In that effort, the watershed was refined to comport more accurately with the groundwater basin boundaries, and land use delineations were updated to more accurately reflect water use and salt loading. Since the prior Safe Yield recalculation, the number hydrologic subareas have substantially increased to more accurately estimate stormwater recharge. These improvements were carried forward into the 2020 CVM. In the 2020 CVM, the method for estimating reference ET (ET_0) across the watershed was improved from past reliance on a relationship between the Pomona CIMIS station ET_0 and Puddingstone reservoir evaporation to a new ET_0 model that is based on empirical relationships of temperature and ET_0 measurements at the Pomona and Riverside CIMIS stations and using these relationships to estimate ET_0 temporally and spatially based on PRISM estimates of monthly temperature across the watershed. In the 2020 CVM, the method for estimating daily precipitation for each hydrologic subarea was improved from past reliance of interpolating daily precipitation at precipitation stations across the watershed using Thiessen polygons to the use of monthly precipitation estimates for each hydrologic subarea based on monthly PRISM estimates and converting the monthly estimates to daily precipitation estimates based on daily precipitation patterns from nearby precipitation stations. As to precipitation, these improvements were made prior to 2002. After 2002, daily precipitation estimates for the hydrologic subareas were based on NEXRAD estimates, as was done in the prior Safe Yield recalculation. The changes in the historical DIPAW estimates are primarily the result of these improvements in the data used in the R4 model.

(2) The primary drivers of the greater downward trend in DIPAW in the current version of the model relative to the 2013 version are the data improvements described in (1) above and the 20 -year drought period that started in 1999—the latter of which is the greatest dry-period in the instrumental record for the region.

(3) The hydrologic delineation of subareas and improvements in land use delineations as well as ET_0 and precipitation estimates were implemented to improve the accuracy of the recharge components in the Safe Yield recalculation; these improvements are consistent with the Court-ordered Safe Yield recalculation methodology.

(4) The changes in DIPAW and some other recharge components computed for the 2020 Safe Yield recalculation for the historical period are larger than those reported in the prior Safe Yield recalculation. Compare Table 6-3 and Figure 6-16 in the 2020 Safe Yield Recalculation report to Table 3-1 in the 2015 Safe Yield Recalculation report.

Mr. Harder wrote: *Please provide the groundwater budget for the updated model for the 1977 to 2018 calibration period (i.e. an updated version of Table 3-1 from the 2013 Safe Yield model report).*

WEI response: See Table 6-3 in the final 2020 Safe Yield Recalculation Report.

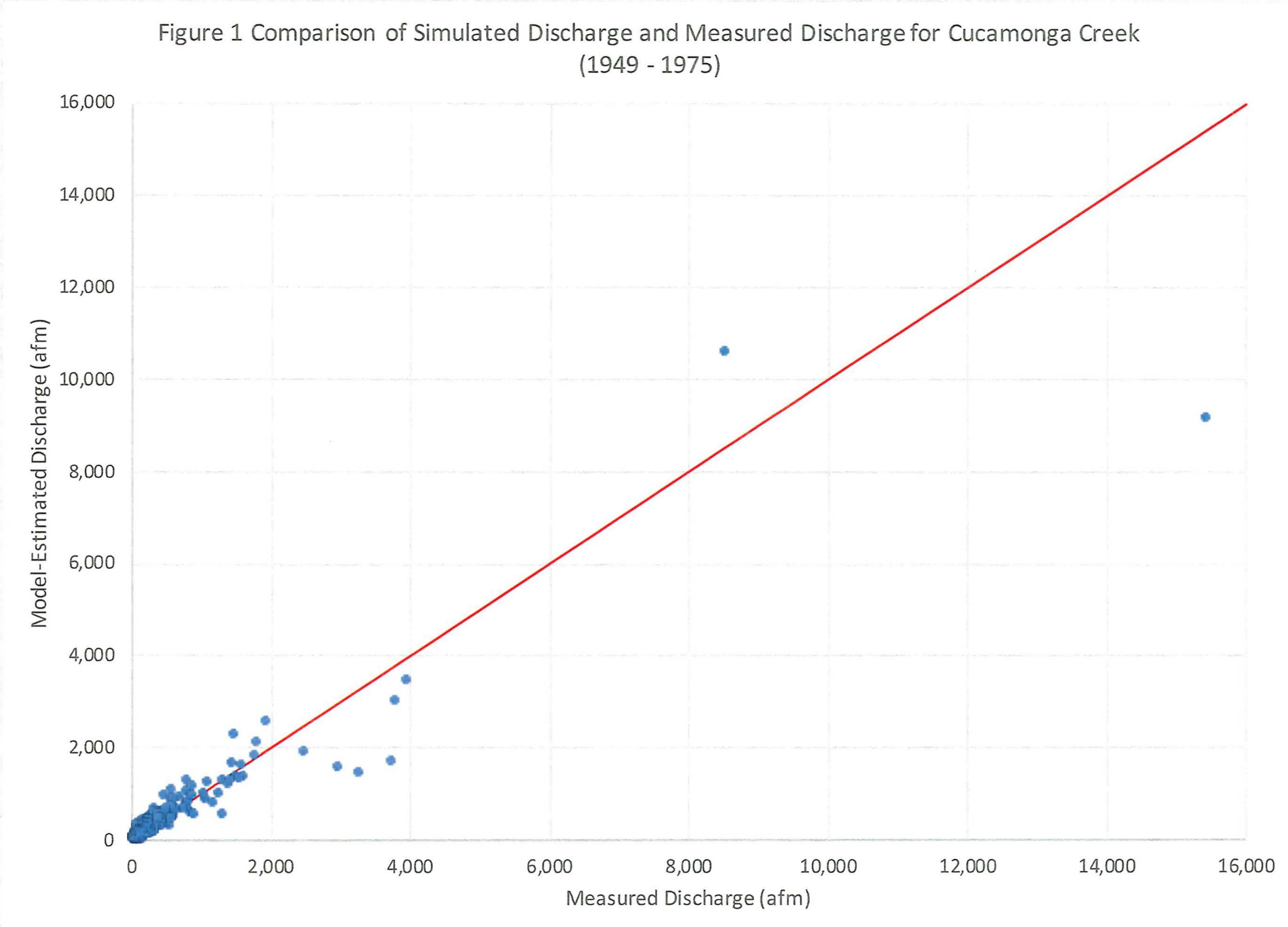


Figure 1 Comparison of Simulated Discharge and Measured Discharge for Cucamonga Creek
(1949 - 1975)
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
Model-Estimated Discharge (afm)
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
Measured Discharge (afm)

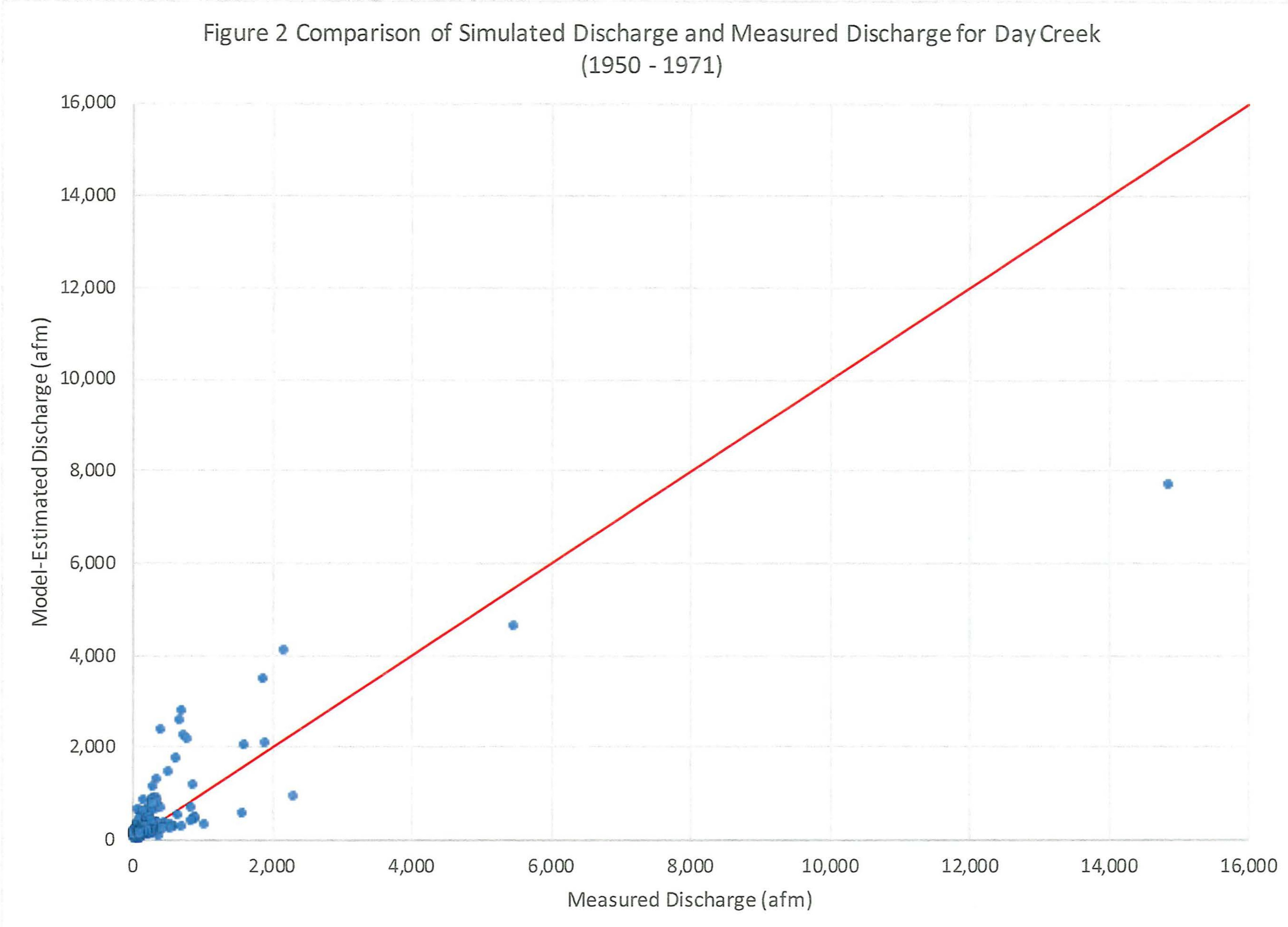
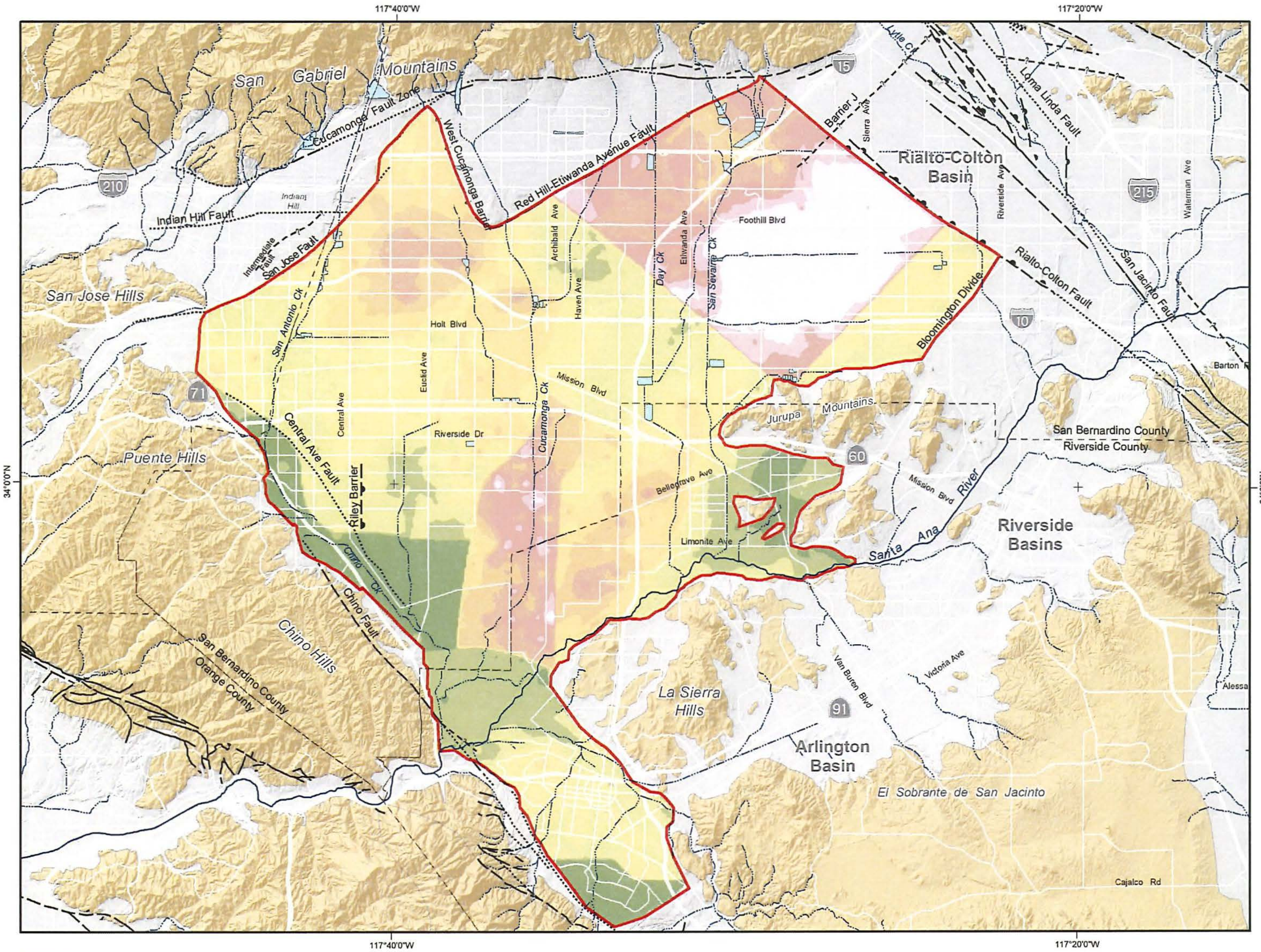


Figure 2 Comparison of Simulated Discharge and Measured Discharge for Day Creek
(1950 - 1971)
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
Model-Estimated Discharge (afm)
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
Measured Discharge (afm)



Calibrated Horizontal Hydraulic Conductivity
Layer 1 (ft/day)

- 3 - 21
- 22 - 40
- 41 - 58
- 59 - 76
- 77 - 95
- 96 - 113
- 114 - 132
- 133 - 150
- 151 - 168
- 169 - 187

- Model Domain
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

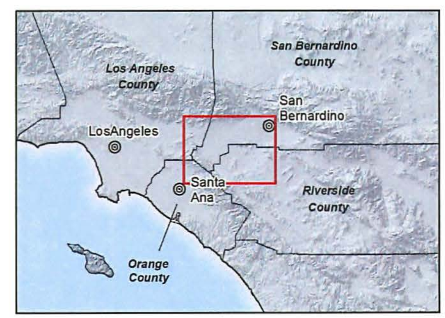
Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

- Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks
- Fault (solid where accurately located; dashed where approximately located or inferred; dotted where concealed)



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Document Name: L1Kh

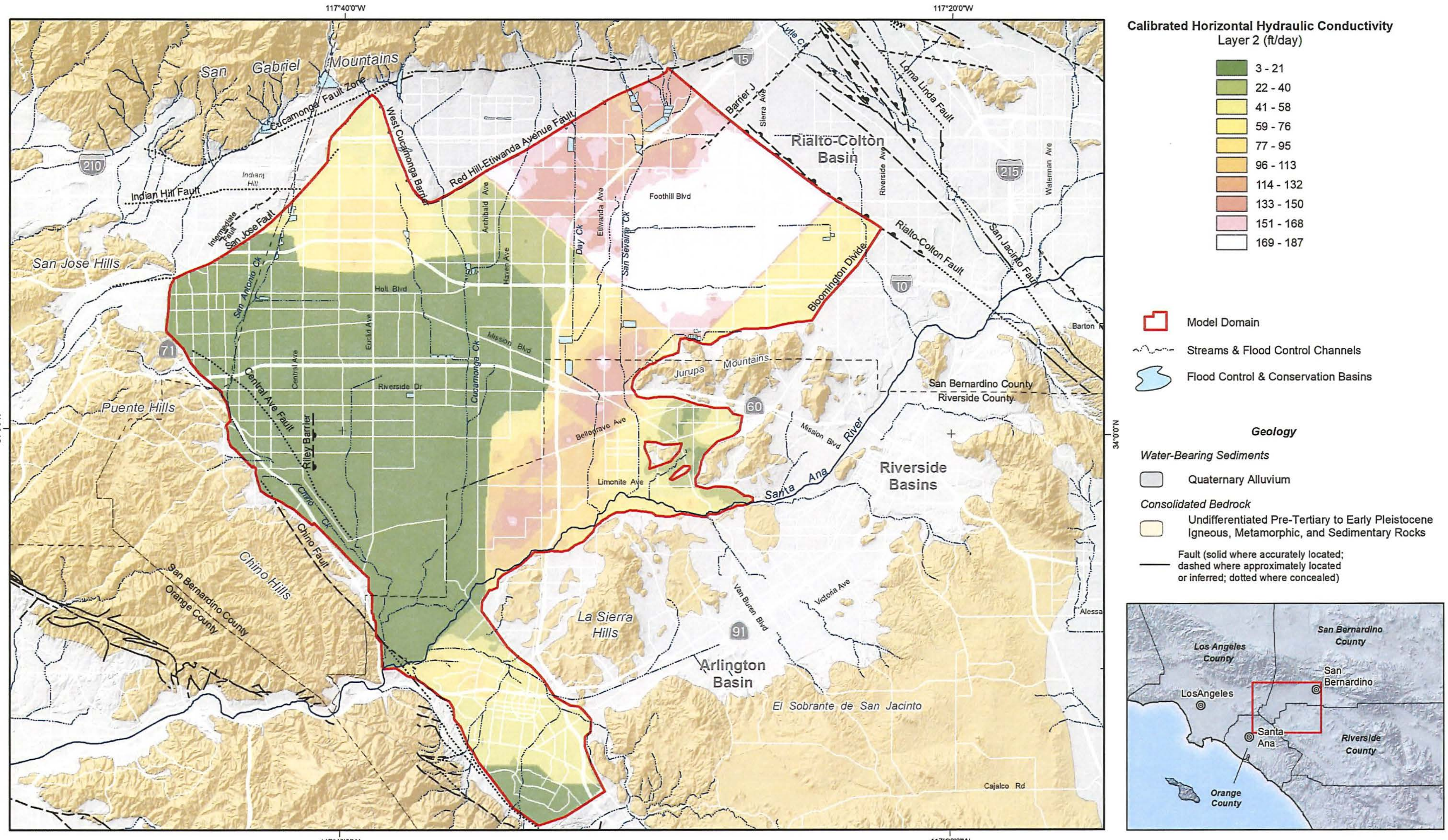
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

Prepared for:

2020 Safe Yield Recalculation

Calibrated Horizontal Hydraulic Conductivity
Layer 1

Figure 3



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Date: 4/13/2020
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0 1 2 3 4 5 Miles
0 2 4 6 8 KM

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2020 Safe Yield Recalculation

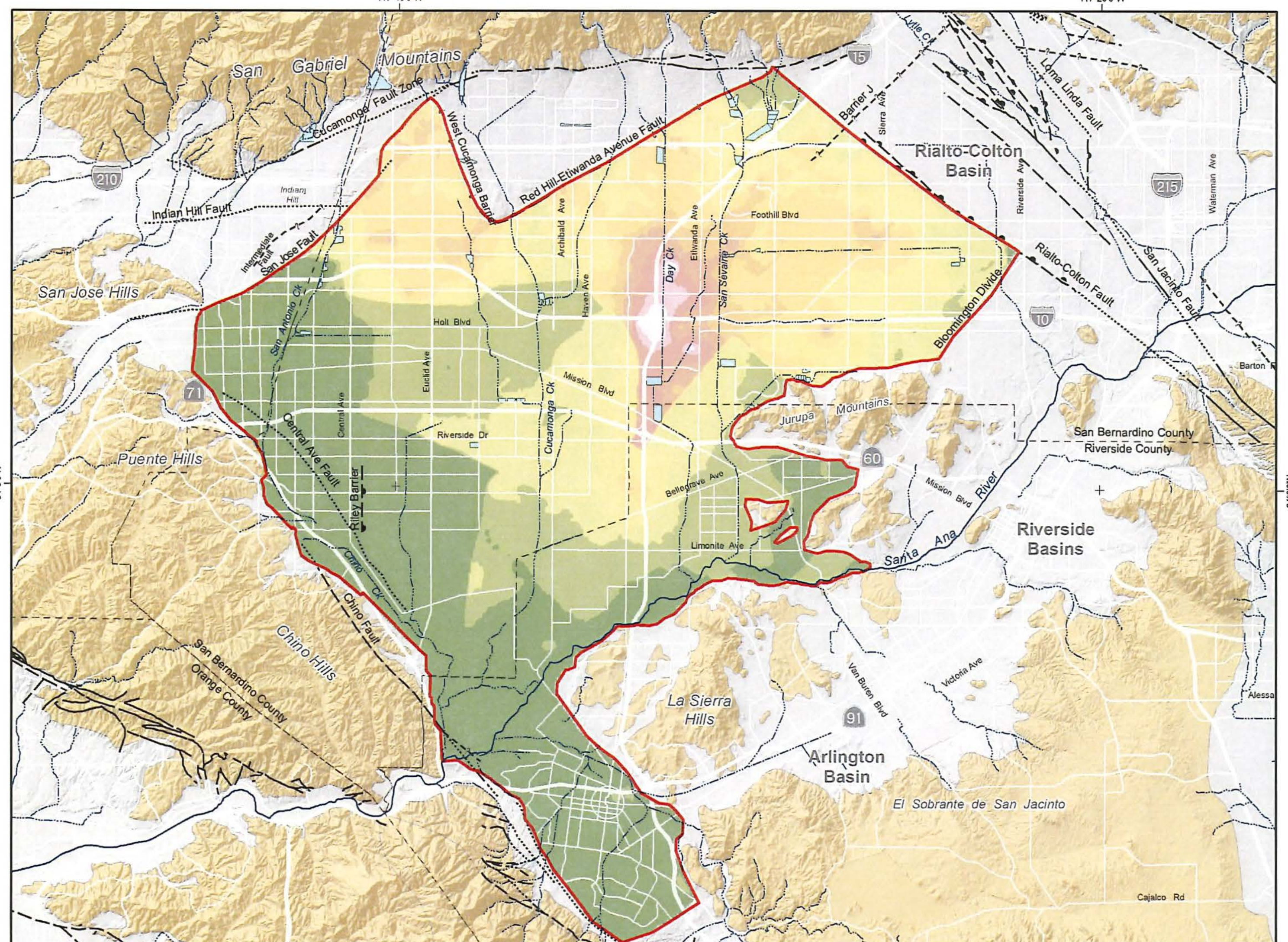
CHINO BASIN WATERMASTER — Partners in Basin Management

Calibrated Horizontal Hydraulic Conductivity
Layer 2

Figure 4

117°40'0"W

117°20'0"W



117°40'0"W

117°20'0"W

Calibrated Horizontal Hydraulic Conductivity
Layer 3 (ft/day)

- 3 - 21
- 22 - 40
- 41 - 58
- 59 - 76
- 77 - 95
- 96 - 113
- 114 - 132
- 133 - 150
- 151 - 168
- 169 - 187

Model Domain

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

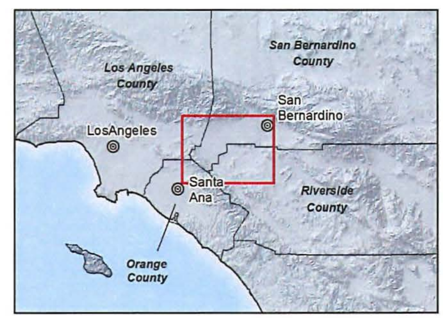
Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Fault (solid where accurately located; dashed where approximately located or inferred; dotted where concealed)



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Document Name: L3Kh

0 1 2 3 4 5 Miles

0 2 4 6 8 KM

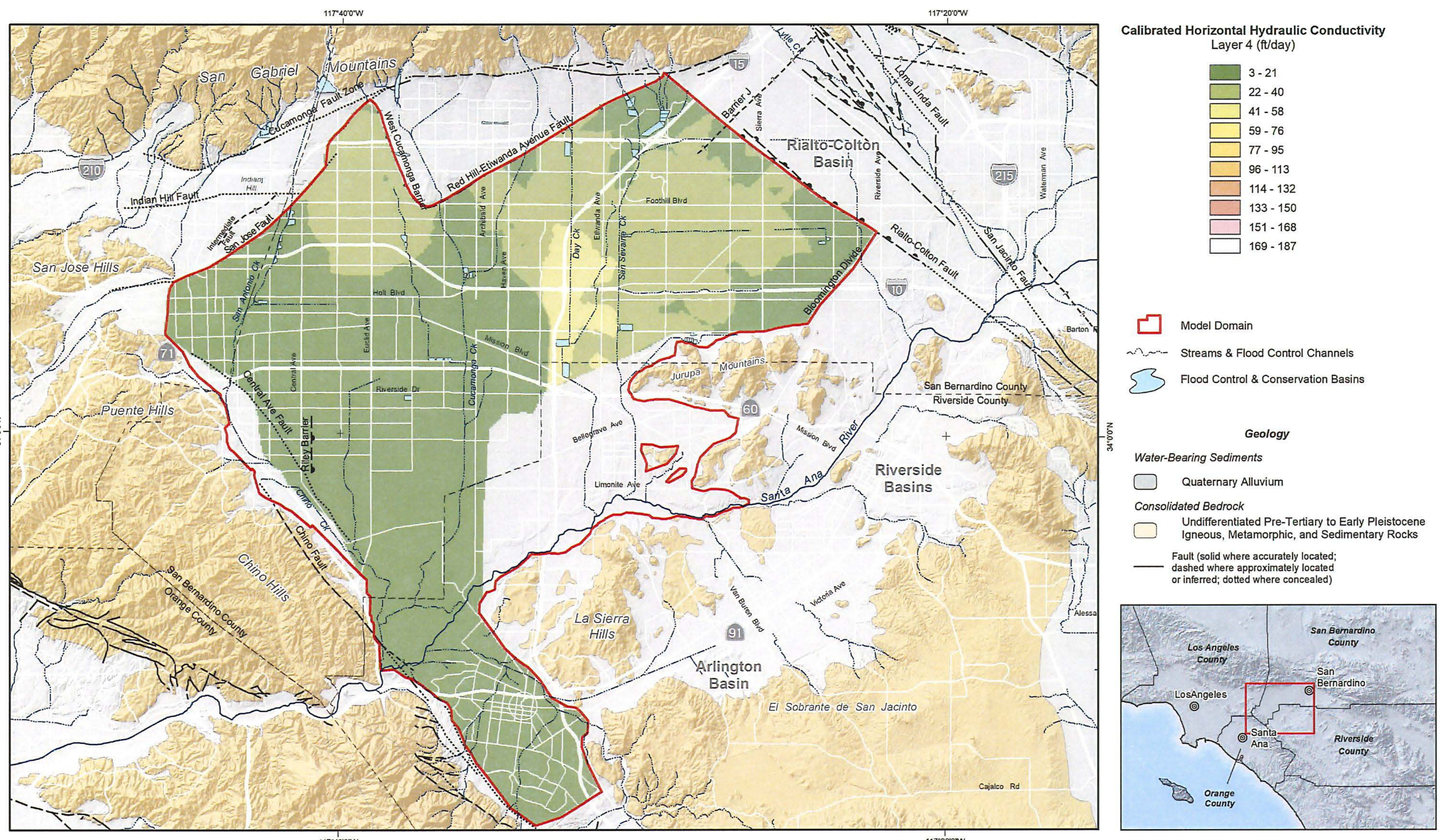
Prepared for:

2020 Safe Yield Recalculation

CHINO BASIN WATERMASTER
Partners in Basin Management

Calibrated Horizontal Hydraulic Conductivity
Layer 3

Figure 5



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Document Name: L4Kh

0 1 2 3 4 5 Miles
0 2 4 6 8 KM

Prepared for:

2020 Safe Yield Recalculation

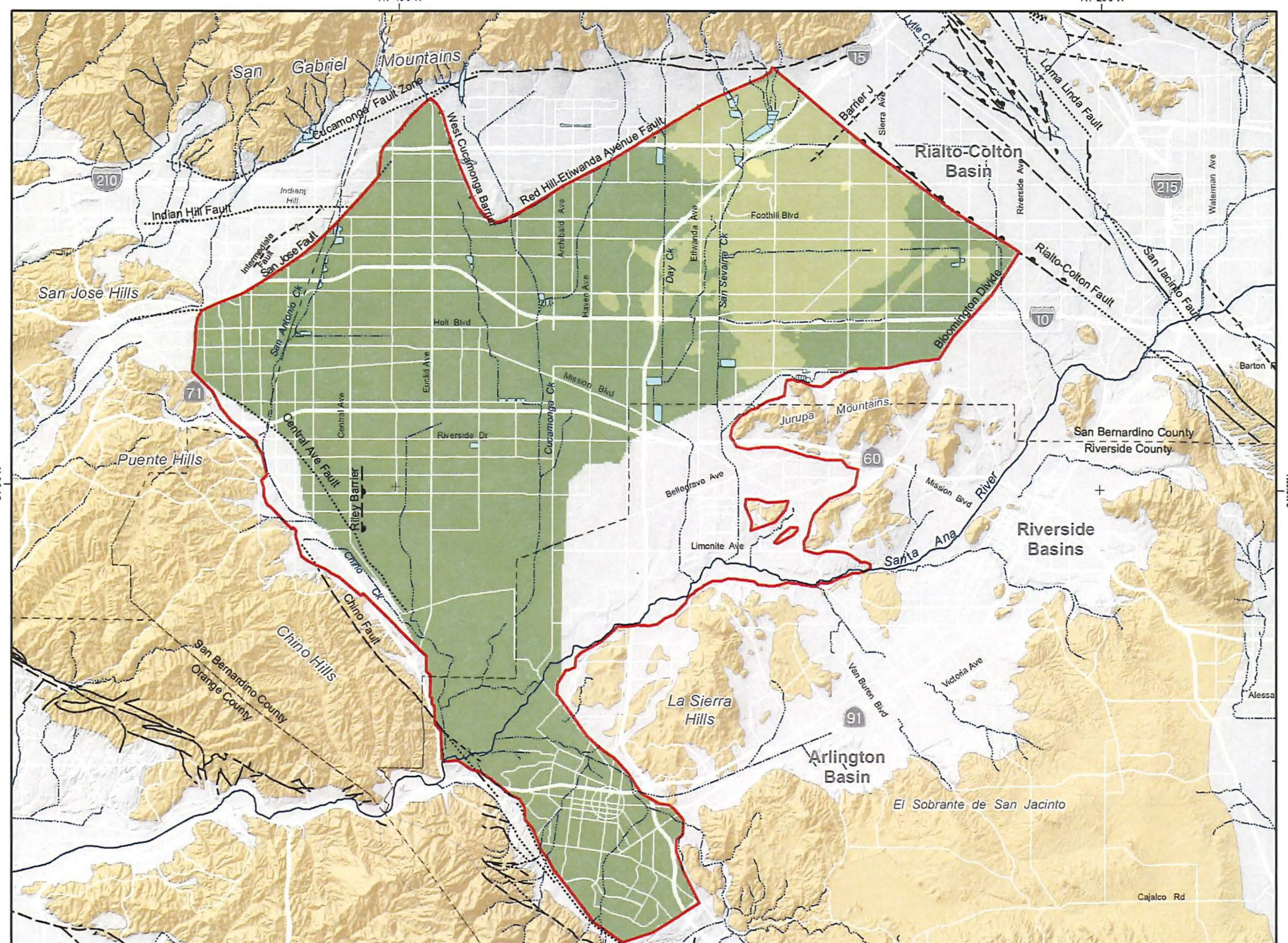
Chino Basin Watermaster – Partners in Basin Management

Calibrated Horizontal Hydraulic Conductivity
Layer 4

Figure 6

Calibrated Horizontal Hydraulic Conductivity
Layer 5 (ft/day)

- 3 - 21
- 22 - 40
- 41 - 58
- 59 - 76
- 77 - 95
- 96 - 113
- 114 - 132
- 133 - 150
- 151 - 168
- 169 - 187



- Model Domain
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

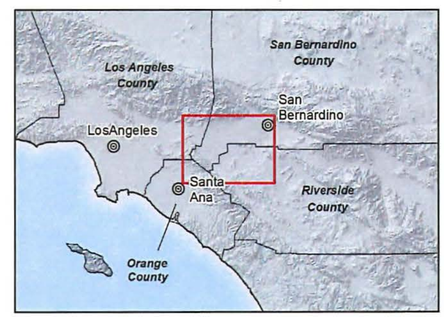
Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

- Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks
- Fault (solid where accurately located; dashed where approximately located or inferred; dotted where concealed)



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0 1 2 3 4 5 Miles
0 2 4 6 8 KM

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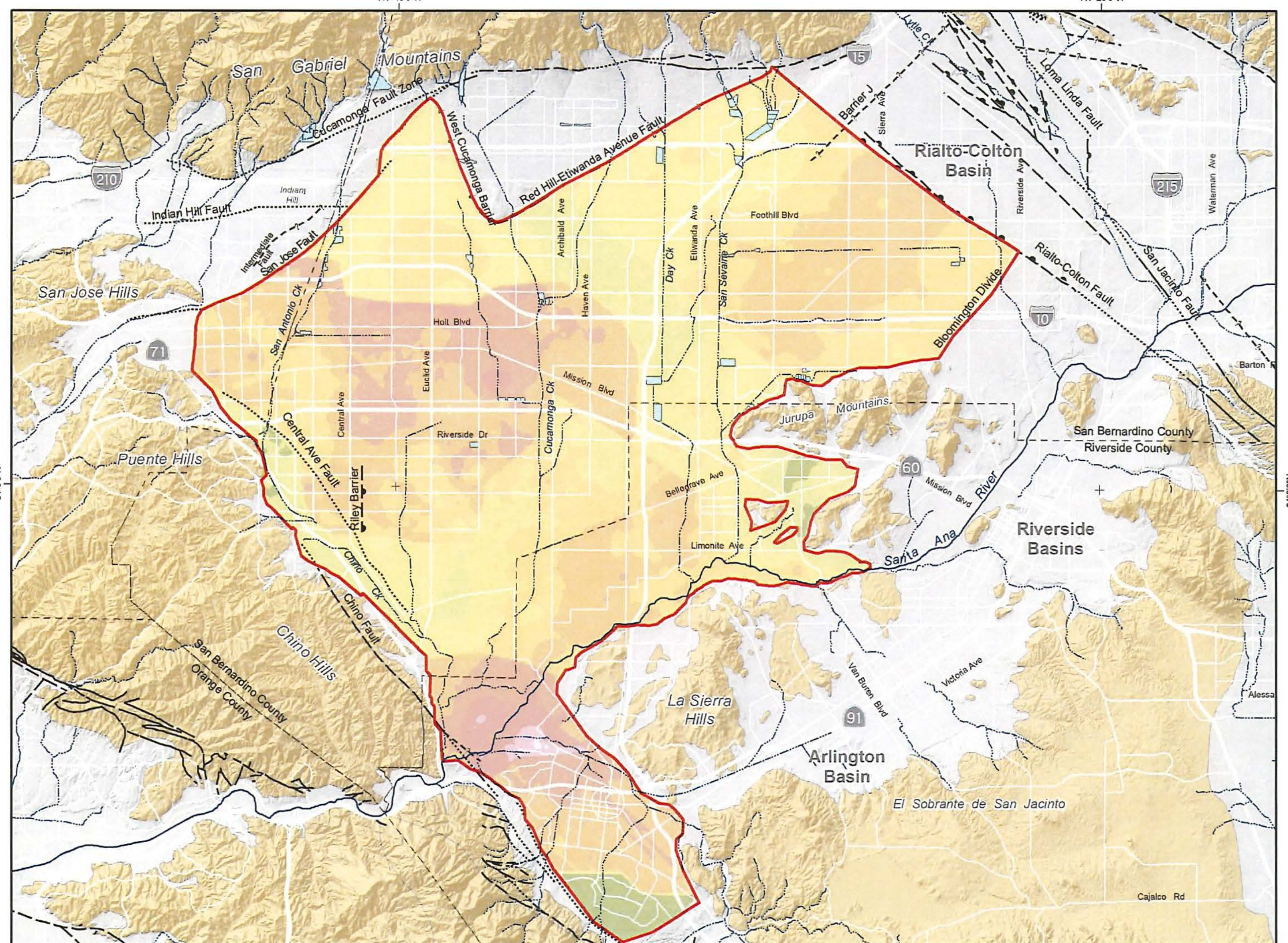
2020 Safe Yield Recalculation

CHINO BASIN WATERMASTER — Partners in Basin Management

Calibrated Horizontal Hydraulic Conductivity
Layer 5

Figure 7



Calibrated Specific Yield
Layer 1

- 0.001 - 0.025
- 0.026 - 0.05
- 0.051 - 0.075
- 0.076 - 0.1
- 0.101 - 0.125
- 0.126 - 0.15
- 0.151 - 0.175
- 0.176 - 0.199
- 0.2 - 0.224
- 0.225 - 0.249

Model Domain

Streams & Flood Control Channels

Flood Control & Conservation Basins

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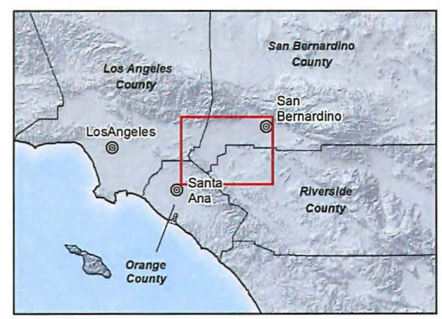
Fault (solid where accurately located; dashed where approximately located or inferred; dotted where concealed)



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0 1 2 3 4 5 Miles
0 2 4 6 8 KM

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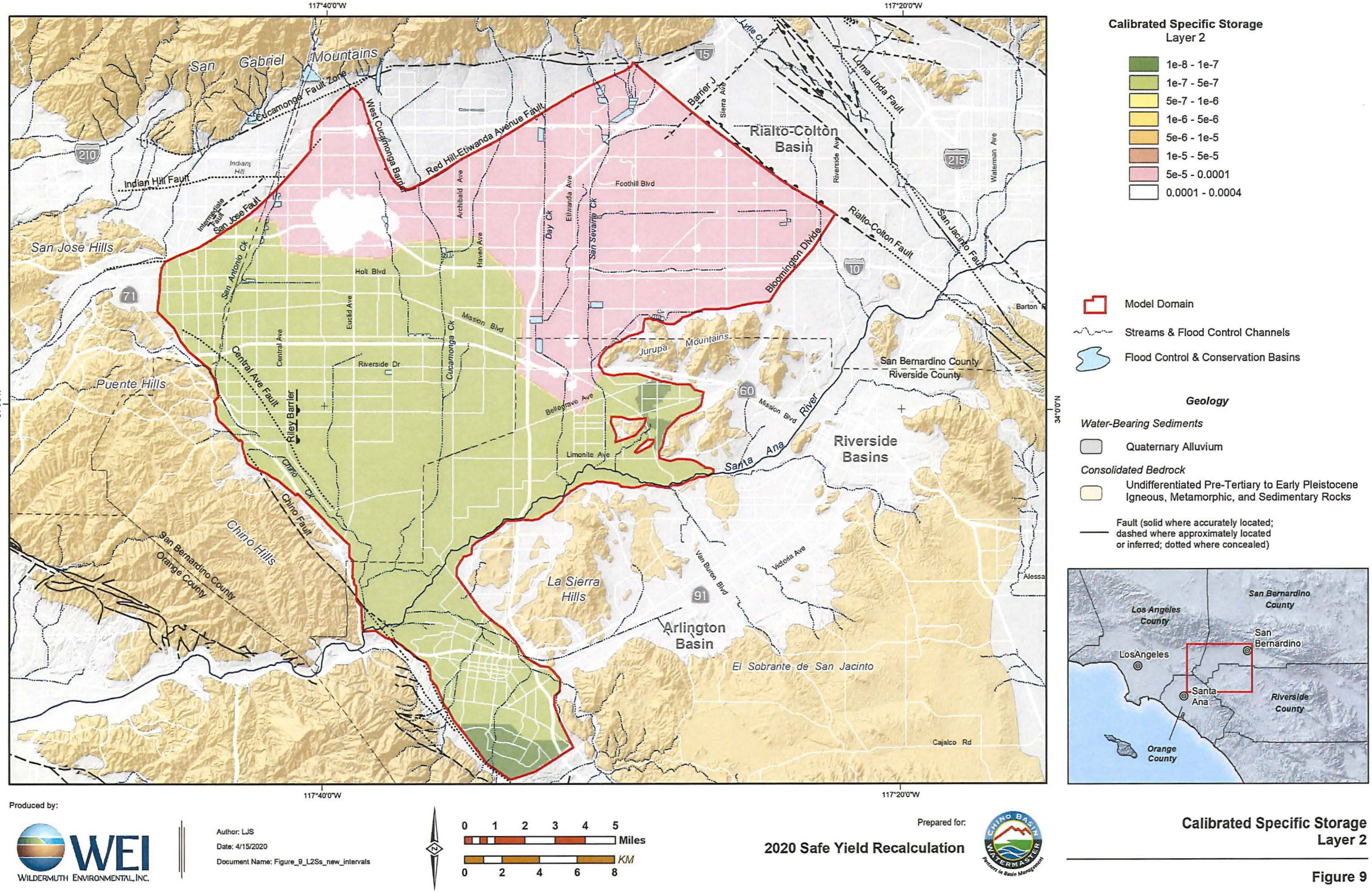
2020 Safe Yield Recalculation

Chino Basin Watermaster — Partners in Basin Management

Calibrated Specific Yield
Layer 1

Figure 8



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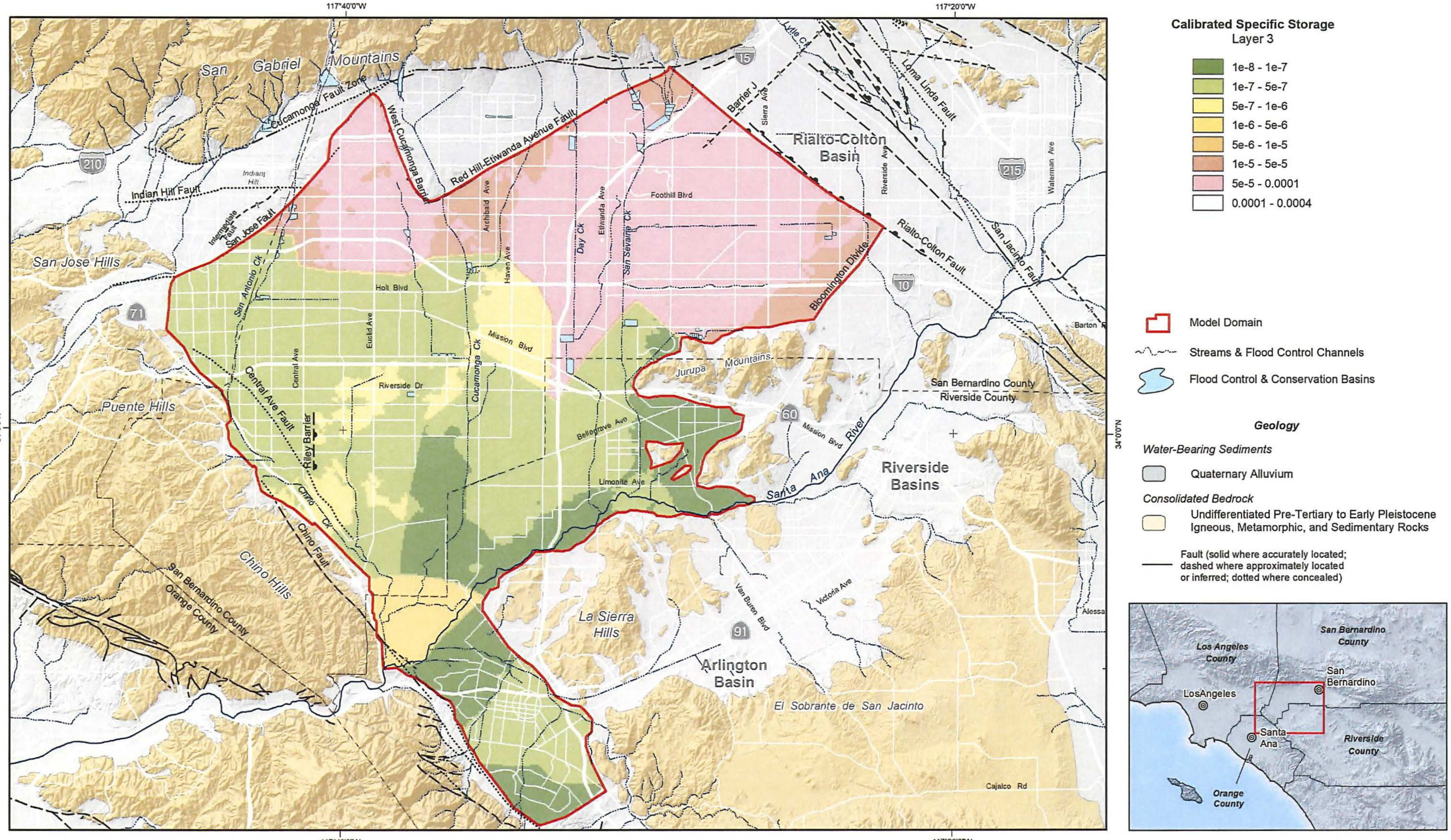
Chino Basin Watermaster

Calibrated Specific Storage
Layer 2

Figure 9



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Document Name: Figure_10_L3Ss

0 1 2 3 4 5 Miles
0 2 4 6 8 KM

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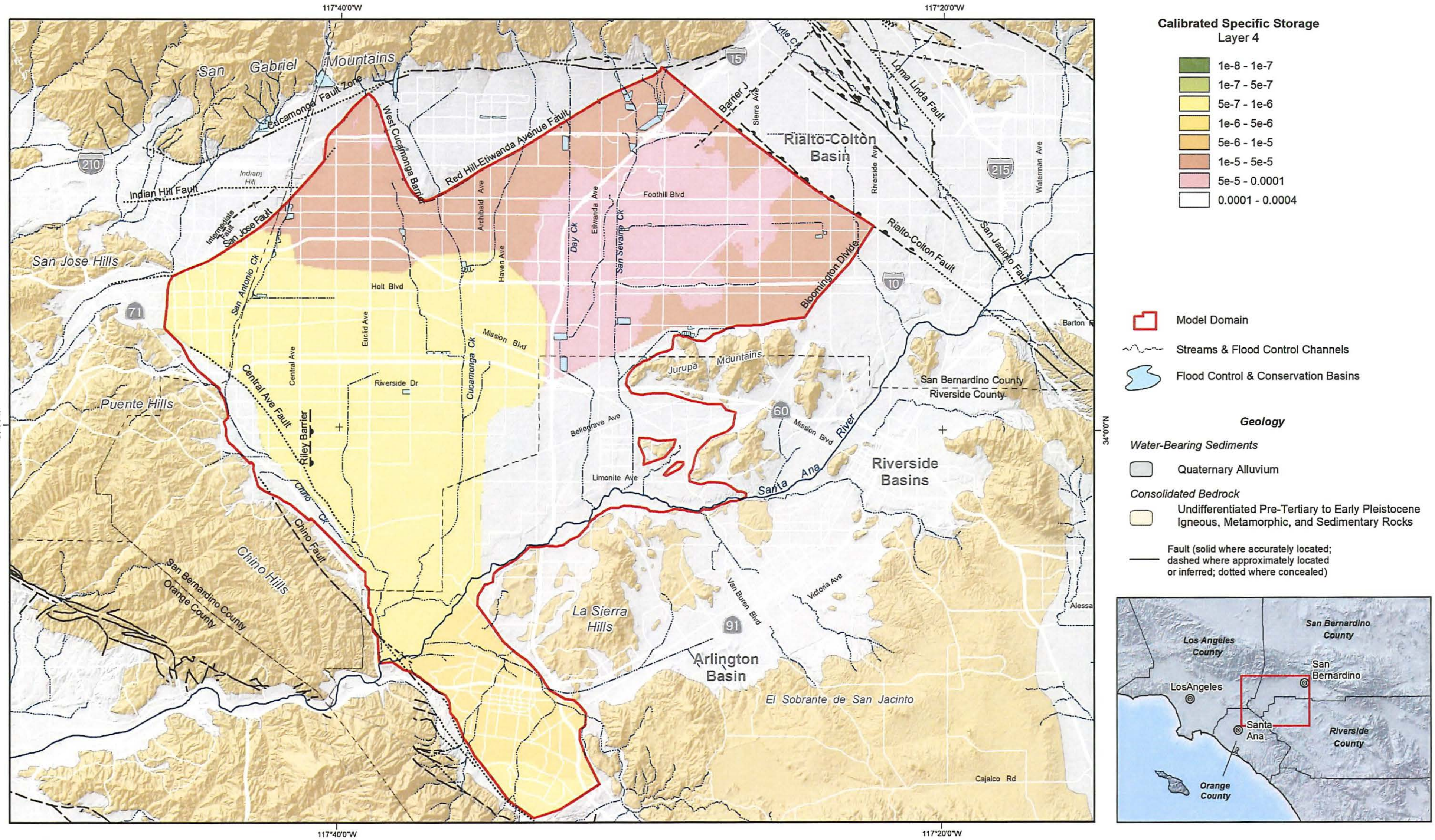
2020 Safe Yield Recalculation

Chino Basin Watermaster — Partners in Basin Management

Calibrated Specific Storage
Layer 3

Figure 10



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Document Name: Figure_11_L4Ss

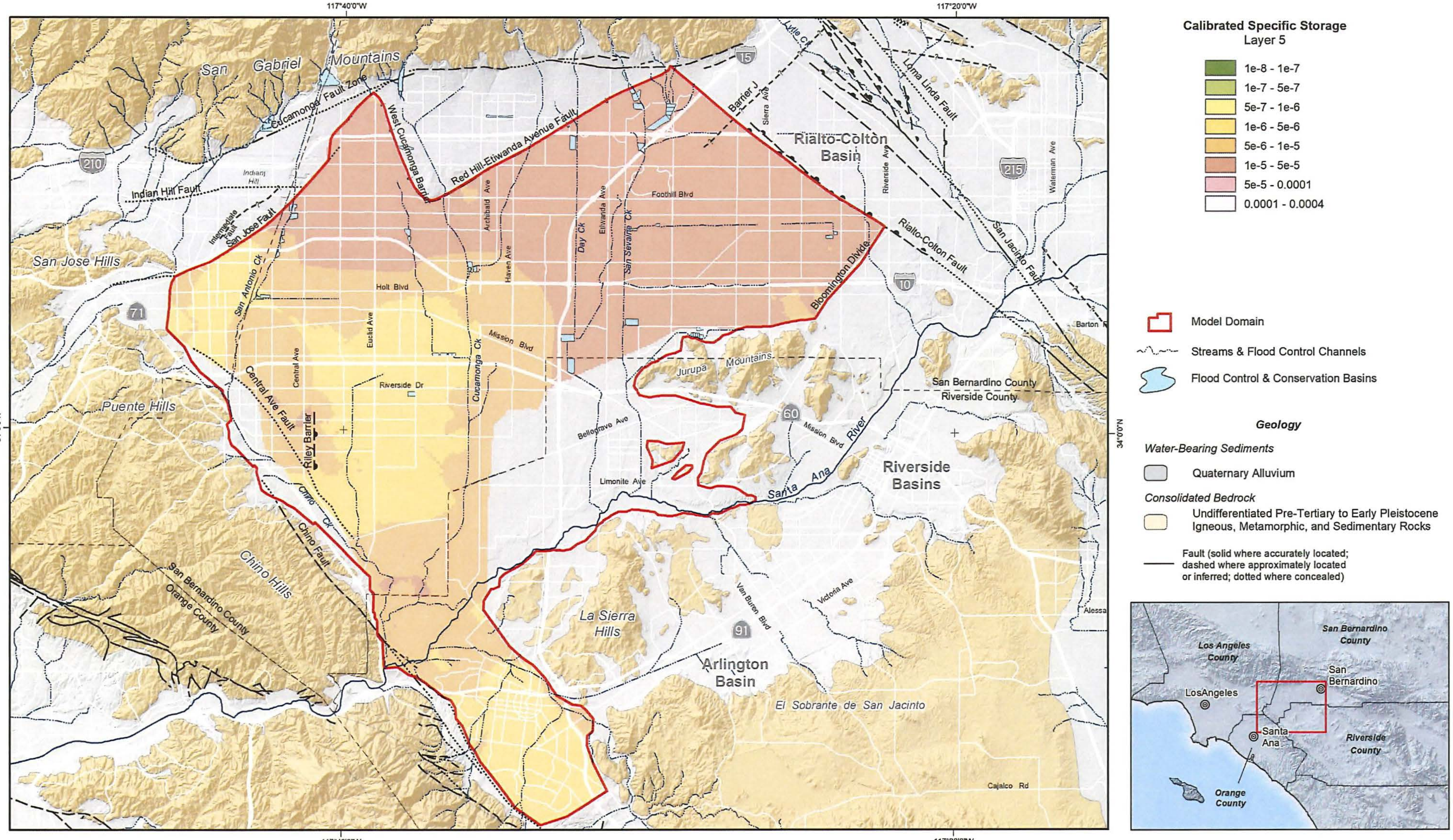
Prepared for:

2020 Safe Yield Recalculation

Chino Basin Watermaster — Partners in Basin Management

Calibrated Specific Storage
Layer 4

Figure 11



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Date: 4/15/2020
Document Name: Figure_12_L5Ss

Prepared for:

2020 Safe Yield Recalculation

Chino Basin Watermaster

Calibrated Specific Storage
Layer 5

Figure 12

Table 1 Comparison of Stress Test Derived Hydraulic Conductivities to Initial Hydraulic Conductivity Values Derived from a Lithology Model and Final Calibrated Values (f/d)

Well Name	Stress Test Based Hydraulic Conductivity Value Provided by THA or WEI (ft/day)	Model Layers Perforated by Well[2]	Initial Estimate of Hydraulic Conductivity from Lithology Model (ft/day)	Initial Parameter Zone Coefficient	Initial Hydraulic Conductivity in Model (ft/day)	Final Parameter Zone Coefficient	Final Hydraulic Conductivity in Model (ft/day)
CH19[1]	5.80	1					
		2					
		3	45.77	0.140	6.41	0.110	5.03
		4					
		5					
ONT 40	61.78	1					
		2					
		3	47.11	0.396	18.64	1.259	59.31
		4					
		5	45.86	0.139	6.38	0.211	9.67
ONT 41	35.29	1					
		2					
		3	45.89	0.396	18.16	1.259	57.77
		4					
		5	54.54	0.139	7.58	0.211	11.50
ONT 43	36.14	1					
		2					
		3	82.28	0.174	14.34	0.617	50.80
		4					
		5	73.70	0.032	2.38	0.021	1.53
ONT 44	53.11	1					
		2					
		3	42.65	0.396	16.88	1.259	53.69
		4					
		5	52.98	0.139	7.36	0.211	11.17
ONT 45	41.74	1	87.50	0.475	41.57	0.982	85.90
		2					
		3	43.17	0.174	7.52	0.617	26.65
		4					
		5	43.36	0.032	1.40	0.021	0.90
ONT 46	155.24	1	91.65	0.581	53.28	0.801	73.39
		2					
		3	49.44	0.396	19.57	1.259	62.24
		4					
		5	42.30	0.139	5.88	0.211	8.92
ONT 47	67.46	1					
		2					
		3	85.55	0.396	33.85	1.259	107.69
		4	85.55				
		5	87.55	0.139	12.17	0.211	18.46
ONT 49	48.01	1	62.24				
		2	0.10				
		3	94.68	0.174	16.50	0.617	58.45
		4	0.10				
		5	61.83	0.032	2.00	0.021	1.28
ONT 50	103.10	1	43.74	1.530	66.92	1.779	77.83
		2					
		3	118.55	0.347	41.14	0.526	62.35
		4					
		5					
ONT 52	40.14	1					
		2					
		3	55.24	0.396	21.86	1.259	69.53
		4					
		5	62.13	0.139	8.64	0.211	13.10
JCSD 22	275.13	1	91.14	1.526	139.08	0.716	65.25
		2					
		3					
		4					
		5					

Table 1 Comparison of Stress Test Derived Hydraulic Conductivities to Initial Hydraulic Conductivity Values Derived from a Lithology Model and Final Calibrated Values (f/d)

Well Name	Stress Test Based Hydraulic Conductivity Value Provided by THA or WEI (ft/day)	Model Layers Perforated by Well[2]	Initial Estimate of Hydraulic Conductivity from Lithology Model (ft/day)	Initial Parameter Zone Coefficient	Initial Hydraulic Conductivity in Model (ft/day)	Final Parameter Zone Coefficient	Final Hydraulic Conductivity in Model (ft/day)
JCSD 23	261.65	1	95.90	1.526	146.34	0.716	68.66
		2					
		3					
		4					
		5					
JCSD 25	162.37	1	84.69	1.526	129.23	0.716	60.64
		2					
		3					
		4					
		5					
MMWC 06	62.40	1					
		2					
		3	41.31	0.396	17.33	1.259	52.00
		4					
		5	46.19	0.160	7.39	0.211	9.74
MVWD 31	15.41	1					
		2					
		3	43.80	0.396	17.33	1.259	55.14
		4					
		5	38.57	0.160	6.17	0.211	8.13
CDA I-13	120.71	1	89.97	1.530	137.66	1.779	160.09
		2					
		3					
		4					
		5					
CDA I-14	133.97	1	84.48	1.200	101.38	1.052	88.86
		2					
		3					
		4					
		5					
CDA I-15	171.49	1	89.97	1.200	107.97	1.052	94.63
		2					
		3					
		4					
		5					
CDA I-16[1]	16.42	1	66.06	0.340	22.46	0.249	16.45
		2					
		3					
		4					
		5					
CDA I-17	11.05	1	43.57	0.340	14.81	0.249	10.85
		2					
		3					
		4					
		5					
CDA I-18	21.01	1	53.92	0.340	18.33	0.249	13.43
		2					
		3					
		4					
		5					
CDA I-20	10.73	1	35.89	0.798	28.64	0.249	8.92
		2					
		3					
		4					
		5					
CDA I-21	18.19	1	53.17	0.798	42.43	0.249	13.21
		2					
		3					
		4					
		5					

Table 1 Comparison of Stress Test Derived Hydraulic Conductivities to Initial Hydraulic Conductivity Values Derived from a Lithology Model and Final Calibrated Values (f/d)

Well Name	Stress Test Based Hydraulic Conductivity Value Provided by THA or WEI (ft/day)	Model Layers Perforated by Well[2]	Initial Estimate of Hydraulic Conductivity from Lithology Model (ft/day)	Initial Parameter Zone Coefficient	Initial Hydraulic Conductivity in Model (ft/day)	Final Parameter Zone Coefficient	Final Hydraulic Conductivity in Model (ft/day)
CDA II-1	193.42	1	72.45	1.200	86.94	1.052	76.20
		2					
		3					
		4					
		5					
CDA II-2	399.65	1	80.98	1.200	97.17	1.052	85.17
		2					
		3					
		4					
		5					
CDA II-3	209.50	1	88.42	1.200	106.11	1.052	93.01
		2					
		3					
		4					
		5					
CDA II-4	200.57	1	92.52	1.200	111.02	1.052	97.31
		2					
		3					
		4					
		5					
CDA II-5	225.09	1	85.35	1.200	102.41	1.052	89.77
		2					
		3					
		4					
		5					
CDA II-6	289.10	1	85.35	1.200	102.41	1.052	89.77
		2					
		3					
		4					
		5					
CDA II-7	300.54	1	86.67	1.200	104.01	1.052	91.16
		2					
		3					
		4					
		5					
CDA II-8	288.89	1	91.18	1.200	109.41	1.052	95.90
		2					
		3					
		4					
		5					
CDA II-9	280.43	1	90.39	1.200	108.47	1.052	95.08
		2					
		3					
		4					
		5					
CDA II-10	623.52	1	71.47	1.200	85.77	1.052	75.17
		2					
		3	57.14	0.347	19.83	0.526	30.06
		4					
		5					
CDA II-11	460.56	1	91.18	1.530	139.50	1.779	162.23
		2					
		3	81.55	0.347	28.30	0.526	42.90
		4					
		5					

1 -- Stress test-based Kh estimated by WEI with Neuman formula for unconfined aquifers; all other stress test-based Kh estimated by others with Jacobs formula for confined aquifers

2 -- Layer 1 is unconfined and layers 2 through 5 are confined.

TECHNICAL MEMORANDUM

April 27, 2020

TO: Peter Kavounas

FROM: Mark Wildermuth, Eric Chiang, Wenbin Wang, Lauren Sather

RE: Review of and responses to Richard Rees and Kapo Coulibaly's questions in their April 15, 2020 memo: *Requests for Additional Information on the Proposed April 2, 2020 "2020 Safe Yield Recalculation Final Report" for Chino Basin*

The following responses were prepared to address Rees and Coulibaly's questions and requests for additional information on the 2020 CVM, as posed in their memo. Please contact Mark Wildermuth if you have any questions regarding the responses provided below.

Comment 1

Mr. Rees and M. Coulibaly: *The 2020 Model presents notably different values for deep infiltration plus applied water (hereafter, "DIPAW"), net recharge, and change in storage through the calibration period of the 2020 Model (i.e., 1977 through 2018) than were calculated by the 2013 Model. The cumulative change in storage calculated by the 2013 Model for the period 1977 to 2000 was negative 268,320 AF. The cumulative change in storage calculated by the 2020 Model for this same period is positive 155,628 AF. In other words, the difference between the cumulative change in storage values calculated by the two models for the same period is 423,836 AF. Please provide a detailed explanation for this difference, including at a minimum the information requested in items (a) and (b) below:*

- *(a) Provide a plot of the cumulative change in storage since 1977 from Table 3-1, "Water Budget for Chino Basin," from the 2015 Report along with the cumulative change in storage since 1977 from Table 6-3, "Water Budget for the Chino Basin for the Calibration Period," in the 2020 Report*

- *(b) Calculate change in storage based on measured groundwater levels and interpreted groundwater contours for 1977 and 2000 and compare the results with the cumulative change in storage values calculated by the 2013 and 2020 Models*

WEI response: WEI is involved in a parallel effort to assist Watermaster and the IEUA in assessing alternative TDS compliance metrics for recycled water use. In that effort, the watershed delineation was refined to comport more accurately with the groundwater basin boundaries, and land use delineations were updated to more accurately reflect water use and salt loading. Since the prior Safe Yield recalculation, the number of hydrologic subareas has substantially increased to more accurately estimate precipitation/runoff processes and stormwater recharge. These improvements were carried forward into the 2020 CVM. In the 2020 CVM, the method for estimating reference ET (ET_0) across the watershed was improved from past reliance on the relationship between the Pomona CIMIS station ET_0 and Puddingstone reservoir evaporation to a new ET_0 model that is based on the empirical relationships of temperature and ET_0 measurements at the Pomona and Riverside CIMIS stations and using these relationships to estimate ET_0 temporally and spatially based on PRISM estimates of monthly temperature across the watershed. In the 2020 CVM, the method for estimating daily precipitation for each hydrologic subarea was improved from past reliance on interpolating daily precipitation at precipitation stations across the watershed using Thiessen polygons to the use of monthly precipitation estimates for each hydrologic subarea based on monthly PRISM estimates and converting those monthly estimates to daily precipitation estimates based on daily precipitation from nearby precipitation stations. As to precipitation, these improvements were made for the period prior to 2002. After 2002, daily precipitation estimates for the hydrologic subareas are based on NEXRAD estimates. The historical DIPAW estimate changes primarily result from these improvements in the data used in the R4 model.

Subsurface inflows from the Cucamonga and Riverside Basins are greater in the 2020 CVM relative to the 2013 Model: the former occurs because it was integrated directly into the 2020 CVM, and the latter occurs due to changes in the estimated hydraulic conductivity in the northeast domain 2020 CVM. Subsurface inflow from the mountain front areas increased due to the refinements in the R4 data for DIPAW (described above).

Streambed infiltration in the Santa Ana River also increased. This is, in part, due to converting the streamflow package in MODFLOW to SFR2, through the incorporation of updated channel geometry, and calibration.

The improvements incorporated into the 2020 CVM are consistent with the Court-ordered Safe Yield recalculation methodology.

In response to part (a) of this comment, we prepared Figure 1. Figure 1 shows the estimated time history of the cumulative change in storage for 2013 Model and the 2020 CVM. Note that rate of divergence between the 2020 CVM projected cumulative change in storage and the comparable 2013 Model projection is the greatest between 1978 and 1988 and that after 1988 the rate of divergence diminishes and two projections have virtually identical trends. This occurs because the updates to the 2020 CVM affect DIPAW more significantly for agricultural land uses with lower imperviousness. To better demonstrate this, we prepared Figure 1a, which compares the estimated time history of the cumulative change in storage for these models for the 2000 through 2018 period referenced to the year 2000. This corresponds to the period where the OBMP has been implemented and a period with significantly less agricultural land uses. The cumulative change in storage for the 2013 Model after 2011 is based on the planning projection used to estimate net recharge and Safe Yield. Note that the cumulative change in storage is nearly identical.

In response to part (b), we did not develop the contour maps and compute the storage as requested. Our experience in the Chino Basin has demonstrated that most of the storage change occurs in the northern part of the basin and that the spatial distribution of wells, measurement data, well construction and temporal availability of water level observations can produce at best, very approximate estimates of the change-in-storage.

Using the suggested substitute storage change methodology involves selecting a representative groundwater level at wells for a specific point in time, plotting the groundwater level on a map, creating groundwater level contours and interpolation between the contours to estimate groundwater levels for each cell in the model grid. This would be done for pairs of years that bracket a period of interest (for example, the 1977 to 2000 as suggested). To undertake this effort, the difference in groundwater level for each model cell would be estimated for each pair of years. The calculated storage change would then be equal to the sum of the differences multiplied by the specific yield.

In short, you are suggesting a substitution of groundwater level data for modeling. We do not believe the suggested substitute methodology is appropriate in this instance. Here is why. Our view is that there are challenges in preparing these maps that could easily result in significant error in the estimation of storage change. Examples include: groundwater level measurement error, groundwater level data at a well may not exist at the time of interest (so no groundwater level is used or an estimated groundwater level is used in place of an actual measurement), spatial density of groundwater level measurements (most wells are far apart), spatial coverage (wells do not cover parts of the basin and extrapolation will be required), drawing contours of equal groundwater level (human error) and interpolation schemes introduce estimation errors between perfect point groundwater level estimates (which we don't have access to) and they can amplify errors with imperfect data (which we mostly have).

Using the calibrated model, we made a calculation to determine how much storage change would occur with a basin-wide increase/decrease of one foot based on the specific yield values estimated through calibration. The answer is 18,000 af.

For comparative context, simple errors in data selection, contouring and involved in the groundwater level approach could easily result in ranges of difference between the model-based estimates and the groundwater level estimate in the amount of 50,000 and 100,000 af. Consequently, the suggested effort is both work intensive and not likely to result in a material improvement or better understanding of change in storage.

Comment 2

Mr. Rees and M. Coulibaly: *Provide calculated net recharge as a column in Table 6-3.*

WEI response: See Table 1.

Comment 3

Mr. Rees and M. Coulibaly: *Section 7 does not discuss or compare the previous net recharge projections based on the 2013 Model and the net recharge values now calculated using the 2020 Model to have occurred during that period. (a) Provide a summary of previous estimates of annual net recharge values for the planning period as identified in the 2015 Report and compare these with the calculated values of net recharge based on actual data in the 2020 Report. (b) Were the differences in net recharge due solely to precipitation (c) Were some differences in net recharge attributable to differences between predicted and actual pumping or water imports during the period? (d) Does this comparison point to any ways to improve the forecasts or process for this and future safe yield recalculations?*

WEI response: Section 7 does compare planning projections of average net recharge for the planning period by decade for 2021 through 2050.

(a) Figure 2 shows the projected net recharge for the period 2011 through 2050 for the 2013 Model and the 2020 CVM.

(b) No.

(c) Yes. The pumping projections used in the 2020 Safe Yield recalculation are about 6,000 to 27,000 afy less for 2015 through 2035 compared to the pumping projections from the prior Safe Yield recalculation.

(d) Watermaster is initiating a process to develop improved pumping projections, replenishment projections, and other planning data for use in its planning work, and it has included this process in its fiscal 2020/21 budget.

Comment 4

Mr. Rees and M. Coulibaly: *For the 2020 Model, please provide the following information to help assess calibration:*

(a) A chart of residuals over time for the calibration period for the 2020 Model.

(b) The residual mean, the absolute residual mean, and the root mean square for the Chino Basin, Cucamonga Basin, and Six Basins, for model layers 1, 3, and 5 in each basin.

WEI response: (a) Please see Figure 3 "Residual time history from Chino Basin calibration"; (b) Please see Figure 4 "Layer 1 Residuals" for wells completed only in model layer 1. All other wells are completed in multiple aquifers, so no maps were prepared. Table 3 contains the requested statistics for all groundwater basins in the 2020 CVM.

Comment 5

Mr. Rees and M. Coulibaly: *Figure 6-11 shows that Cucamonga Basin and Six Basins have all negative residuals, which implies that the 2020 Model over-predicts water levels in these areas. Please provide an explanation of the reason for this spatial bias and any implications for the Chino Basin.*

WEI response: Figure 6-11 shows only residual statistics for the Chino Basin and well locations in the other basins. This figure has been updated to include the mean residual for all of the basins; it is included herein as Figure 5. We acknowledge the appearance of the bias along the boundary of the Six Basins and Chino Basin. The wells in the Six Basins and Chino Basin near the San Jose Fault are perforated across multiple model layers, and the model-estimated groundwater level is influenced by the head in each layer. It is difficult to draw a definitive conclusion from the comparison of mean residual trends across the San Jose Fault. The slight over-prediction in the Six Basins and under-prediction in Chino Basin implied in Figure 5 suggests that subsurface inflow from the Six Basins to the Chino Basin could be higher than would occur if there was less or no bias. That said, the subsurface inflow from the Pomona Basins area of the Six Basins is a relatively small recharge component to the Chino Basin—about 2 percent of annual recharge to the Chino Basin in the projection period—and the effect of the apparent bias on subsurface inflow would be a fraction of that.

Comment 6

Mr. Rees and M. Coulibaly: *Similarly, the western portion of the Chino Basin shows mainly positive residuals (i.e., underprediction) except for the edges. Please provide an explanation for this bias and discuss any implications for the Chino Basin*

WEI response: In general, in this area, the model slightly under-predicts groundwater levels during the calibration period. There is no significant implication for net recharge estimates. The model could overestimate new land subsidence and pumping sustainability challenges in this area.

Comment 7

Mr. Rees and M. Coulibaly: *Please provide (a) maps of the location and values of the hydraulic conductivities and specific yields used for the initial distribution along with the (b) fitted semi-variogram model and (c) for the distribution of final hydraulic parameters (hydraulic conductivity and specific yield) after calibration.*

WEI response: (a) Figures 6 through 9 include location maps and parameter values of the point hydraulic conductivities and point specific yields used for their initial distribution. These maps were prepared at large scale so that their data is readable.

(b) Table 4 contains the parameters for the *Stable* semi-variogram model that was used to rasterize the model parameters. The formula of the stable semi-variogram model is as follows

$$\gamma(h) = b + C_0 \cdot \left(1 - e^{-\frac{h^s}{a}}\right)$$

Where

- b is the nugget of the variogram. This is the value of independent variable at the distance of zero. This is usually attributed to non-spatial variance.
- C_0 is the sill of the variogram, where it flattens out.
- h specifies the lag of separating distances that the dependent variable shall be calculated for.
- s is the smoothness or shape parameter. The smoothness parameter can shape a smooth or rough variogram function. A value of 0.5 will yield the exponential function, while a smoothness of +inf is exactly the Gaussian model. Typically, a value of 10 is close enough to Gaussian shape to simulate its behavior. Low values are "smooth," while larger values are considered to describe a "rough" random field.
- a is the range parameter and is calculated from the effective range r as $a = r/(3^{1/s})$.

(c) Please see Figures 3 through 8 in Watermaster's response to Thomas Harder's February 3, 2020 memo. They can be found here:
https://cbwm.syncedtool.com/shares/folder/e83081106c3072/?folder_id=2396

Comment 8

Mr. Rees and M. Coulibaly: *Figure 6-2 indicates that the monthly discharge from Chino Creek at Shaefer Avenue is overestimated by the 2020 Model. Please explain this discrepancy and describe any effect it has on the overall model.*

WEI response: Strictly speaking, the graphic referred to characterizes the HSPF/R4 model calibration to the USGS gage and not the 2020 CVM calibration. The surface water model fits well for monthly discharges less than about 2,500 afm (88 percent of measured values) and overestimates discharges between 2,500 and 5,000 afm (8 percent of measured values). The same models are used to estimate stormwater recharge in the Upland, Montclair, and Brook's Street Basins, and their calibration performance does not indicate that stormwater recharge is overestimated. There is no significant impact from the overestimation of discharges between 2,500 and 5,000 afm on the net recharge and Safe Yield estimates.

Comment 9

Mr. Rees and M. Coulibaly: *Figure 6-7 a-b: the R^2 does not provide a comprehensive measure to assess the goodness of fit for calibration; the statistics requested in comment 4-b should be displayed on these graphs.*

(a) *Figure 6-7a seems to show that the model does not calibrate particularly well to the lower water levels (funnel shape residual distribution), even without the Chino Hills wells. Please explain this discrepancy and describe the effect it has on the overall model.*

(b) *Figure 6-7c, of simulated and predicted water levels in the Six Basins, shows that the model misses groundwater level trends, which are key metrics for assessing model calibration, especially for prediction of future changes. Please explain this mismatch and any effect the quality of calibration in Six Basins may have on predicted underflow to the Chino Basin or other aspects of the overall model.*

WEI response: We have included the requested statistics on Figures 6-7a-b; they are included herein as Figures 10 and 11, respectively, and for all basins in the 2020 CVM, listed in Table 3.

(a) This is not a discrepancy: it's a model artifact caused by the representativeness of available groundwater level measurements, the monthly time-step used in the model, and the complexity of the geology in the vicinity of the Chino and Chino Hills deep wells. Chino Hills' pumping at its deep wells is intermittent, and large drawdown occurs. It is very difficult to find representative groundwater levels at these wells to calibrate to when the wells are operated this way. The same artifacts were present in the 2013 Model calibration and the recently completed *Integrated Santa Ana River Model* developed for the Santa Ana River HCP. The occurrence of residuals at these wells does not impact the estimates of net recharge and Safe Yield.

(b) The Six Basins is geologically complex with many faults that act as barriers and divide the Six Basins into several smaller basins. The Six Basins is highly reactive in wet years, and the Six Basins model's groundwater level prediction in and immediately following these wet years in the northern part of the Six Basins (i.e., the Claremont Basin) is muted compared to measured groundwater levels. Even with these complexities and larger residuals, the Six Basins model calibration achieves an R^2 of 0.95. Review of Figure 5 shows that the bias in the Claremont Basin is the opposite of the bias in the Pomona Basin and suggests that 2020 CVM estimated inflow from the Claremont Basin could be underestimated (the opposite of what is implied for the Pomona Basin area as described above). That said, the subsurface inflow from the Claremont Basin area of the Six Basins is a relatively small recharge component to the Chino Basin—about 1 percent of annual recharge to the Chino Basin in the projection period—and the effect of the apparent bias on subsurface inflow would be a fraction of that.

Comment 10

Mr. Rees and M. Coulibaly: *The DIPAW approach used is the moving average approach, which does not keep track of storage in the vadose zone. Please provide an explanation of how the vadose storage shown on Figure 6- 12a is estimated.*

WEI response: The continuity equation was used to estimate vadose zone storage in parallel with the moving average.

Comment 11

Mr. Rees and M. Coulibaly: *DIPAW is made of natural recharge (rainfall) and applied water (return flow from irrigation). (a) Please provide a time series of these different components. (b) Given the long lag time, it is assumed that DIPAW values in 1978 are impacted by flows and climate as far back as 1948, so data for at least 30 years preceding the calibration period should also be provided.*

WEI response: (a) The R4 model rootzone module does not distinguish which water is discharged from the rootzone, so we cannot furnish these to you as separate components. (b) It was. Vadose zone initiation began in 1943. See Table 2.

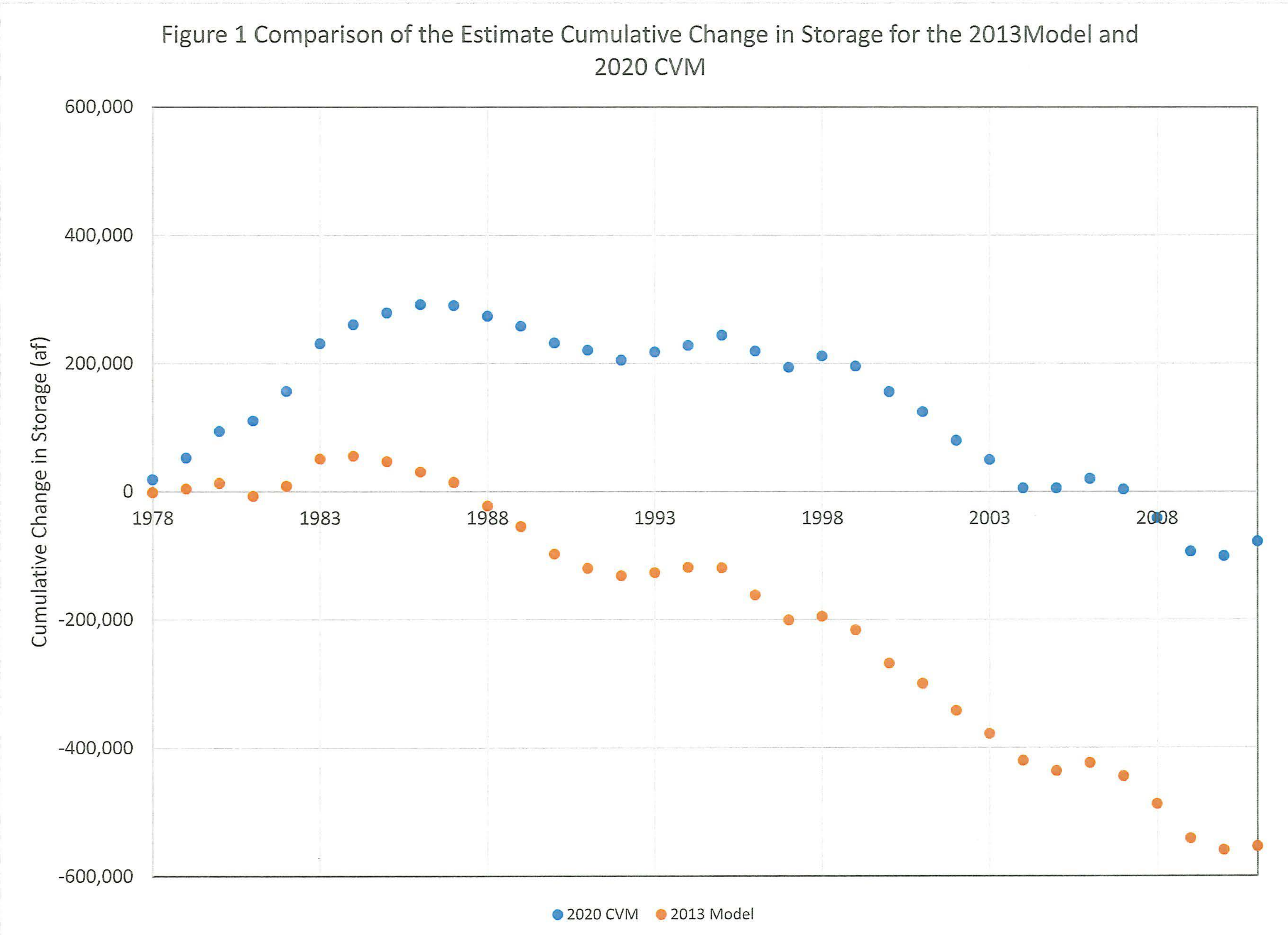


Figure 1 Comparison of the Estimate Cumulative Change in Storage for the 2013Model and 2020 CVM
600,000
400,000
200,000
0
-200,000
-400,000
-600,000
Cumulative Change in Storage (af)
1978
1983
1988
1993
1998
2003
2008
2020 CVM
2013 Model

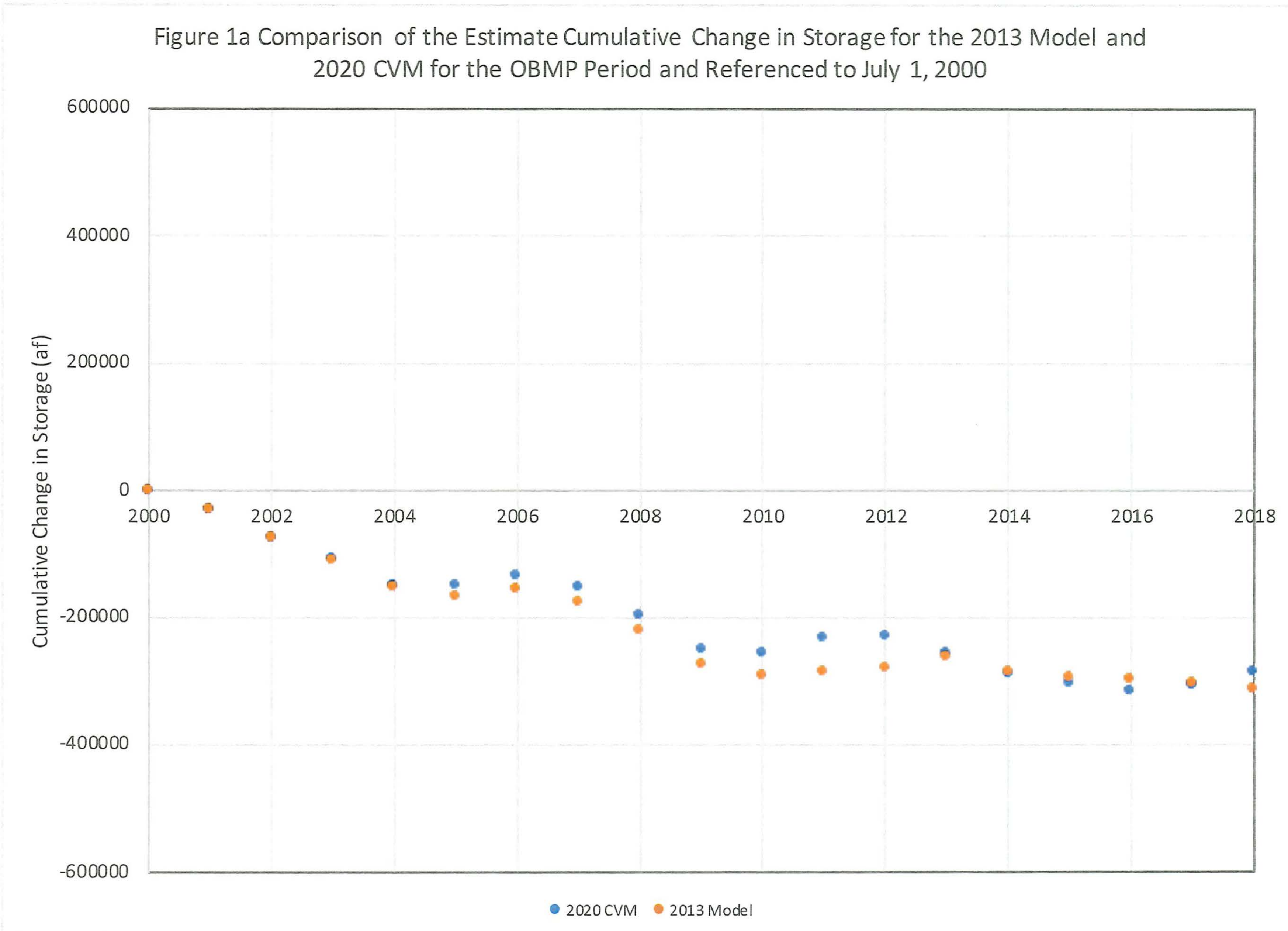
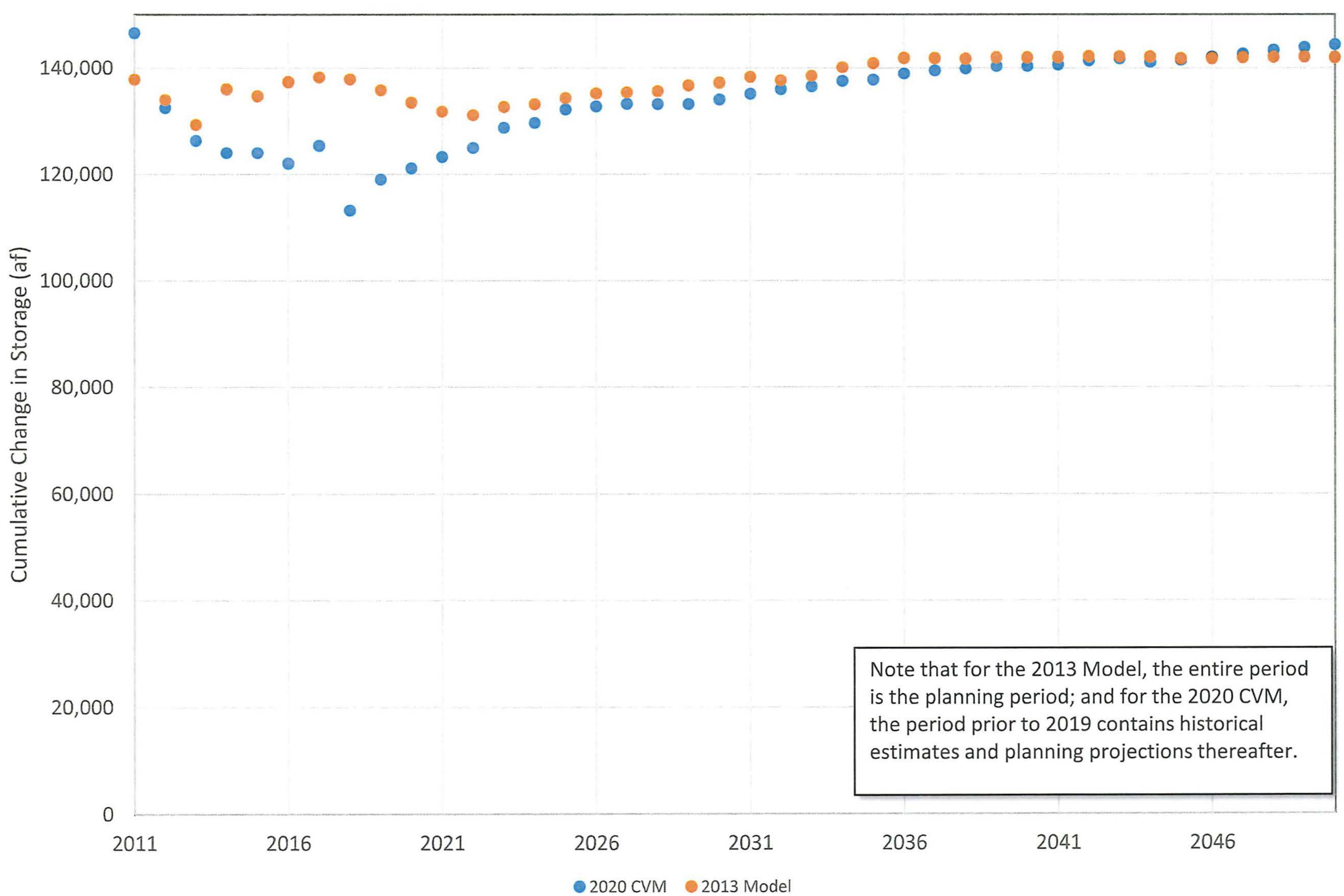


Figure 1a Comparison of the Estimate Cumulative Change in Storage for the 2013 Model and 2020 CVM for the OBMP Period and Referenced to July 1, 2000
Cumulative Change in Storage (af)
600000
400000
200000
0
-200000
-400000
-600000
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020 CVM
2013 Model

Figure 2 Comparison of the Estimate Net Recharge for the 2013 and 2020 Chino Basin Models for the Period 2011 through 2050



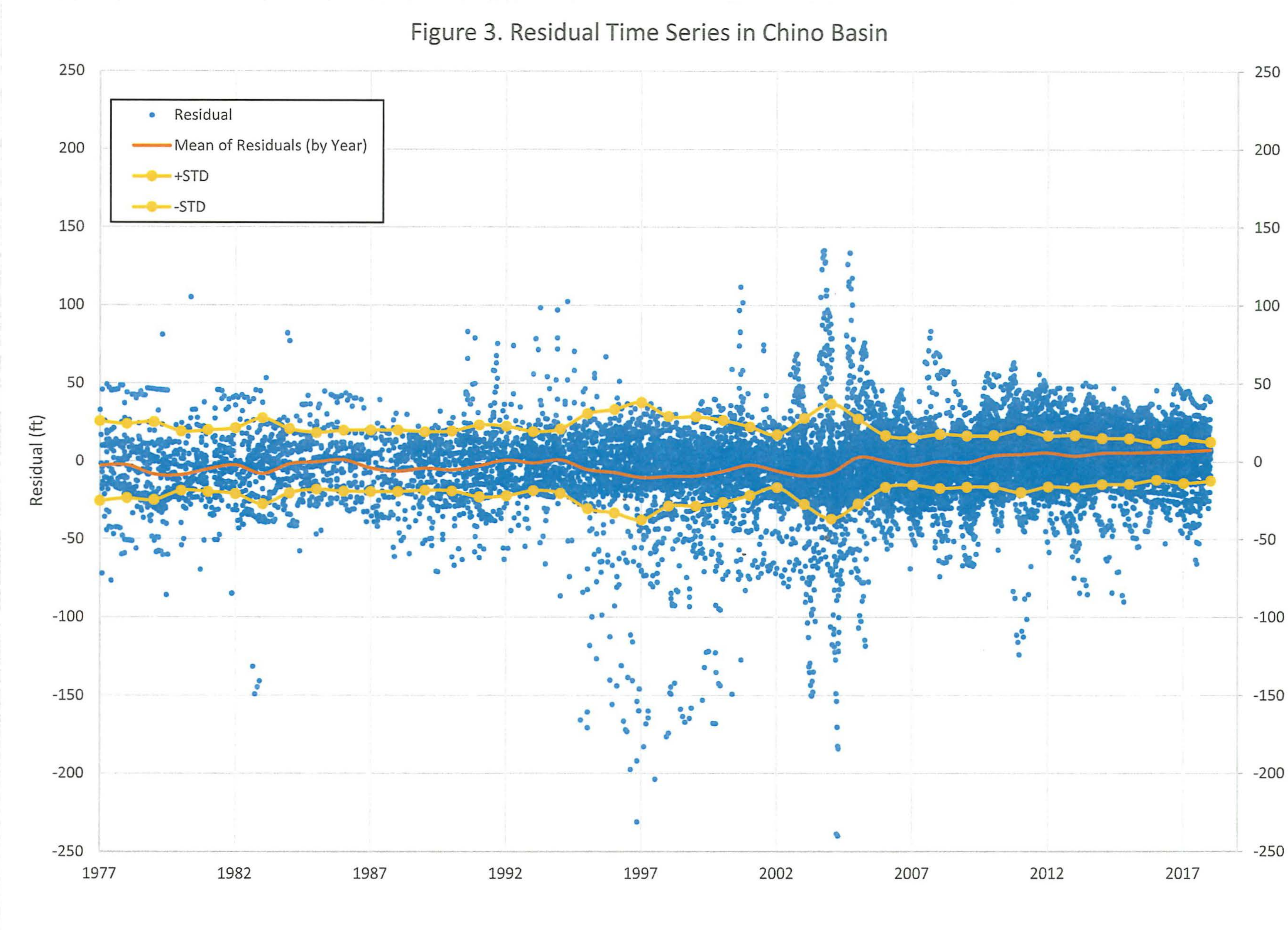
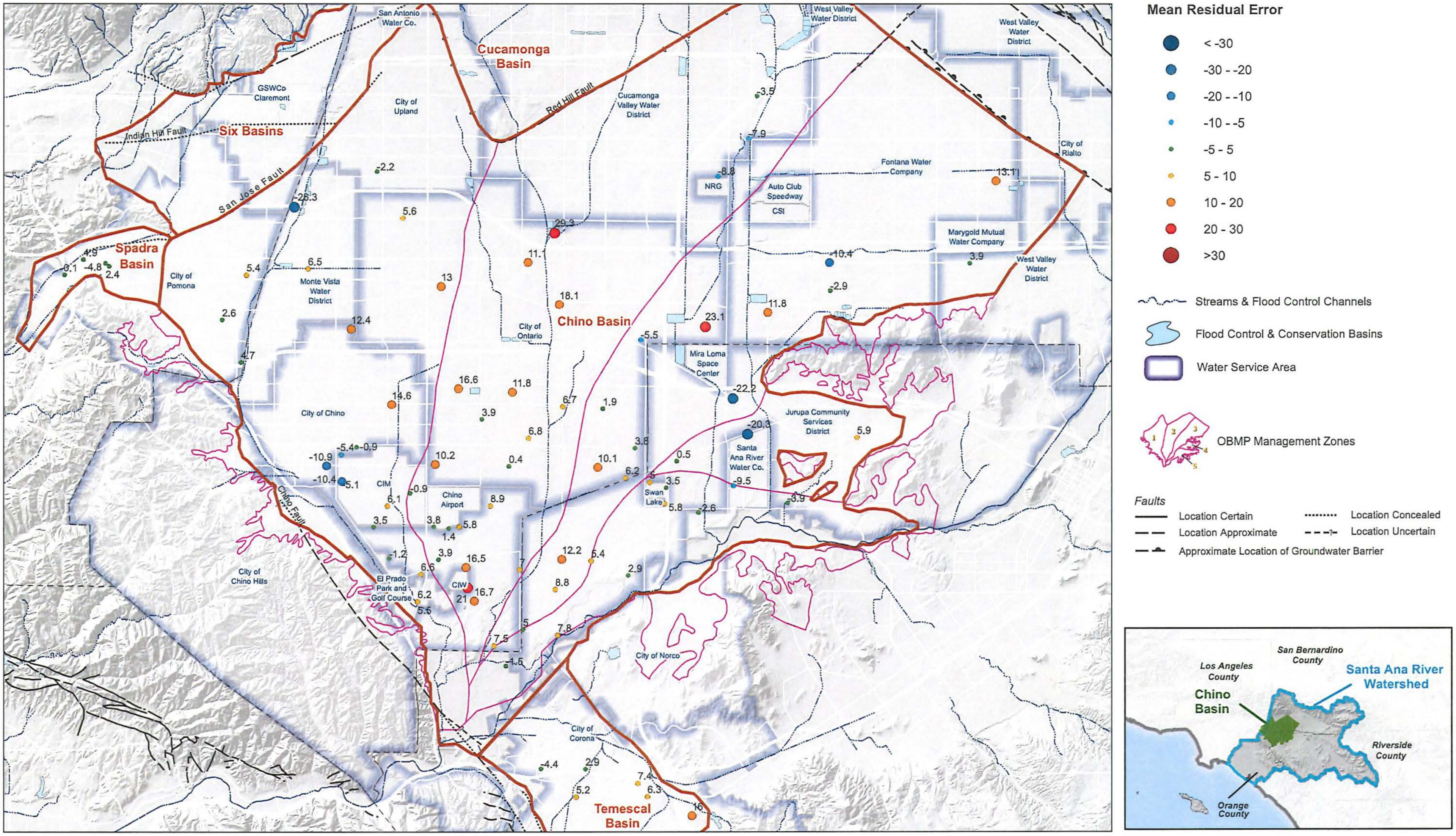


Figure 3. Residual Time Series in Chino Basin
Residual
Mean of Residuals (by Year)
+STD
-STD
Residual (ft)
250
200
150
100
50
0
-50
-100
-150
-200
-250
1977
1982
1987
1992
1997
2002
2007
2012
2017



Prepared by:

WEI Wildermuth Environmental, Inc.

Author: LS
Date: 4/22/2020
File: Figure_4_Mean_Residuals_L1only_v2.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 Km

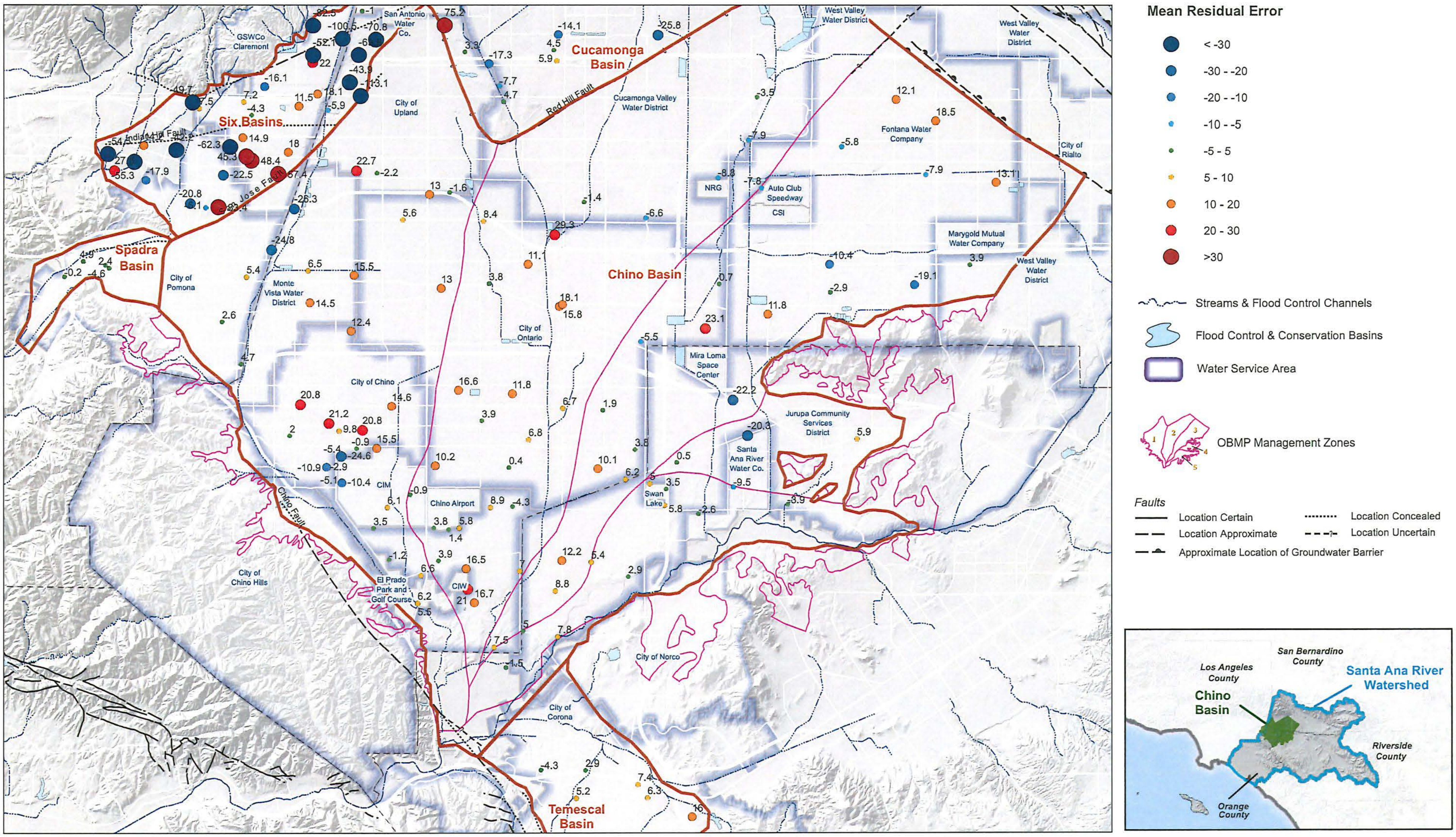
Prepared for:

2020 Safe Yield Recalculation

Chino Basin Watermaster

Layer 1 Residuals
Chino Basin

Figure 4



Prepared by:

WEI
Wildermuth Environmental, Inc.

Author: LS
Date: 4/21/2020
File: Figure 6-11 Mean Residua_Response toRees.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 Km

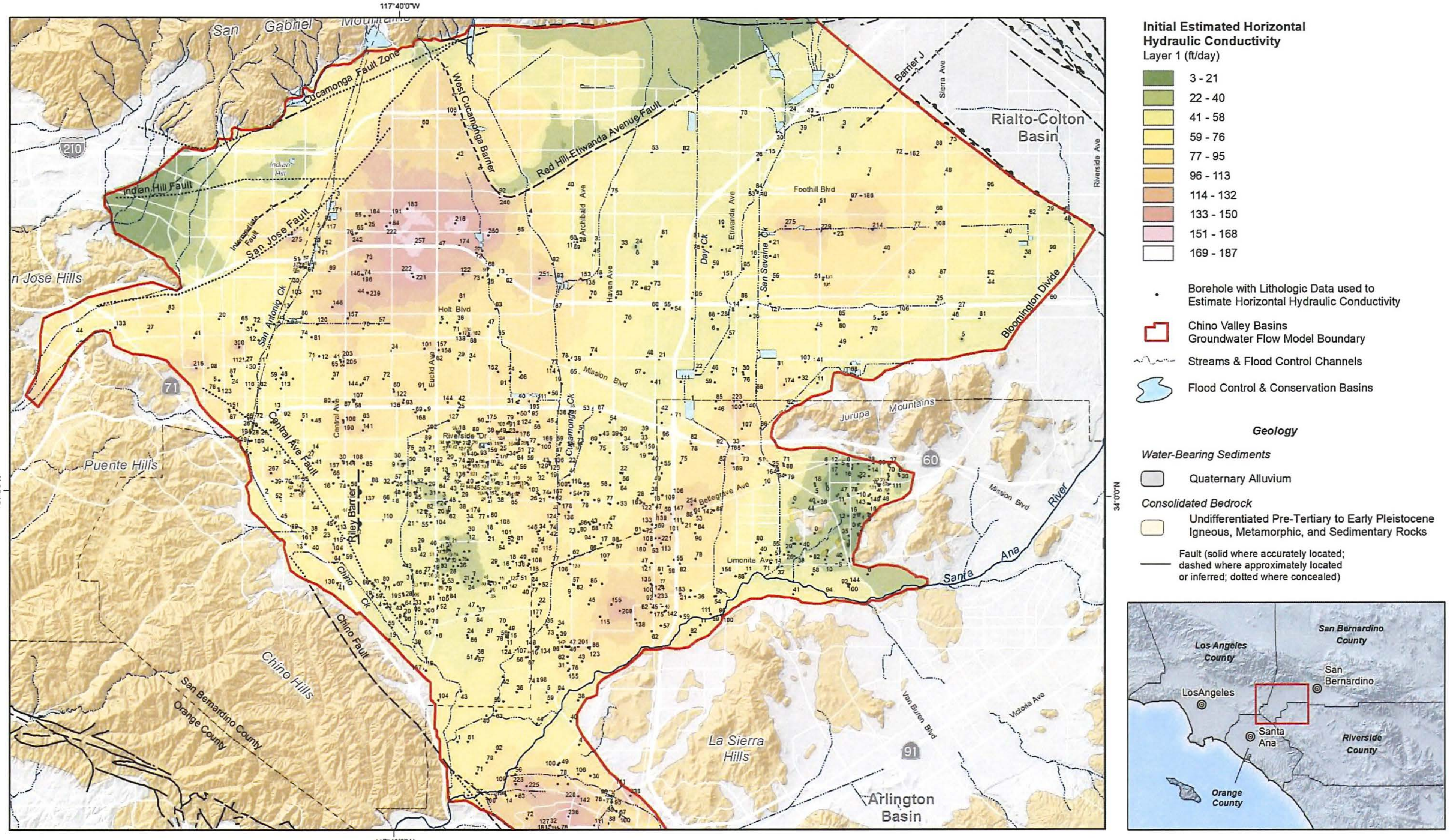
Prepared for:

2020 Safe Yield Recalculation

Chino Basin Watermaster — Partners in Basin Management

Mean Residual Error of Calibration Wells -- Updated

Figure 5



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Author: LJS
Date: 5/8/2020
Document Name: Figure_6-8_Kh_11x17

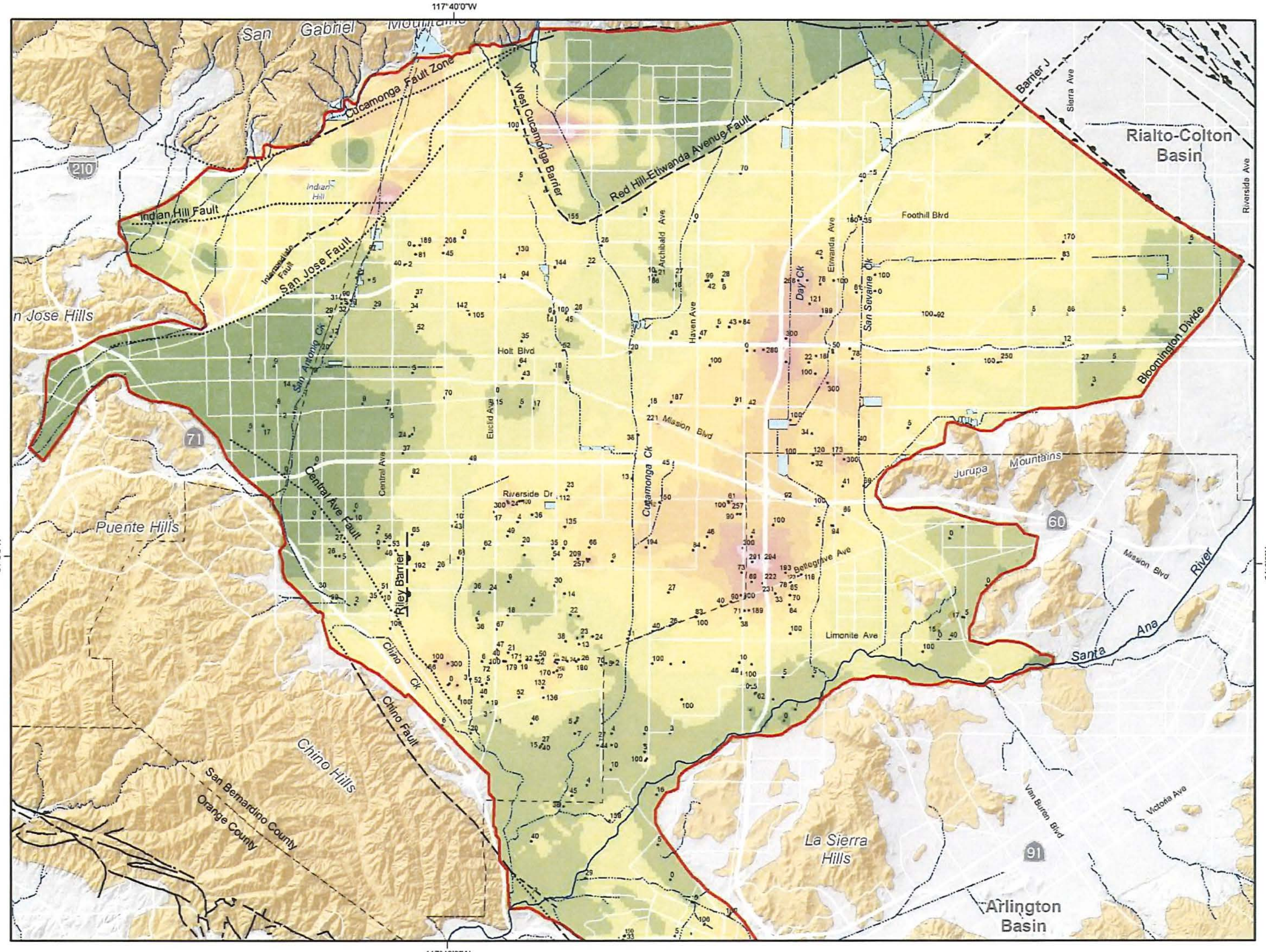
Prepared for:

2020 Safe Yield Recalculation

Chino Basin Watermaster

Layer 1 Initial and Pre-calibrated Horizontal Hydraulic Conductivity Based on Borehole Lithology and Lithologic Modeling

Figure 6



Initial Estimated Horizontal Hydraulic Conductivity
Layer 3 (ft/day)

- 3 - 22
- 23 - 41
- 42 - 60
- 61 - 79
- 80 - 99
- 100 - 118
- 119 - 137
- 138 - 156
- 157 - 175
- 176 - 195

- Borehole with Lithologic Data used to Estimate Horizontal Hydraulic Conductivity
- Chino Valley Basins Groundwater Flow Model Boundary
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

- Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks
- Fault (solid where accurately located; dashed where approximately located or inferred; dotted where concealed)

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0 1 2 3 4 5 Miles
0 2 4 6 8 KM

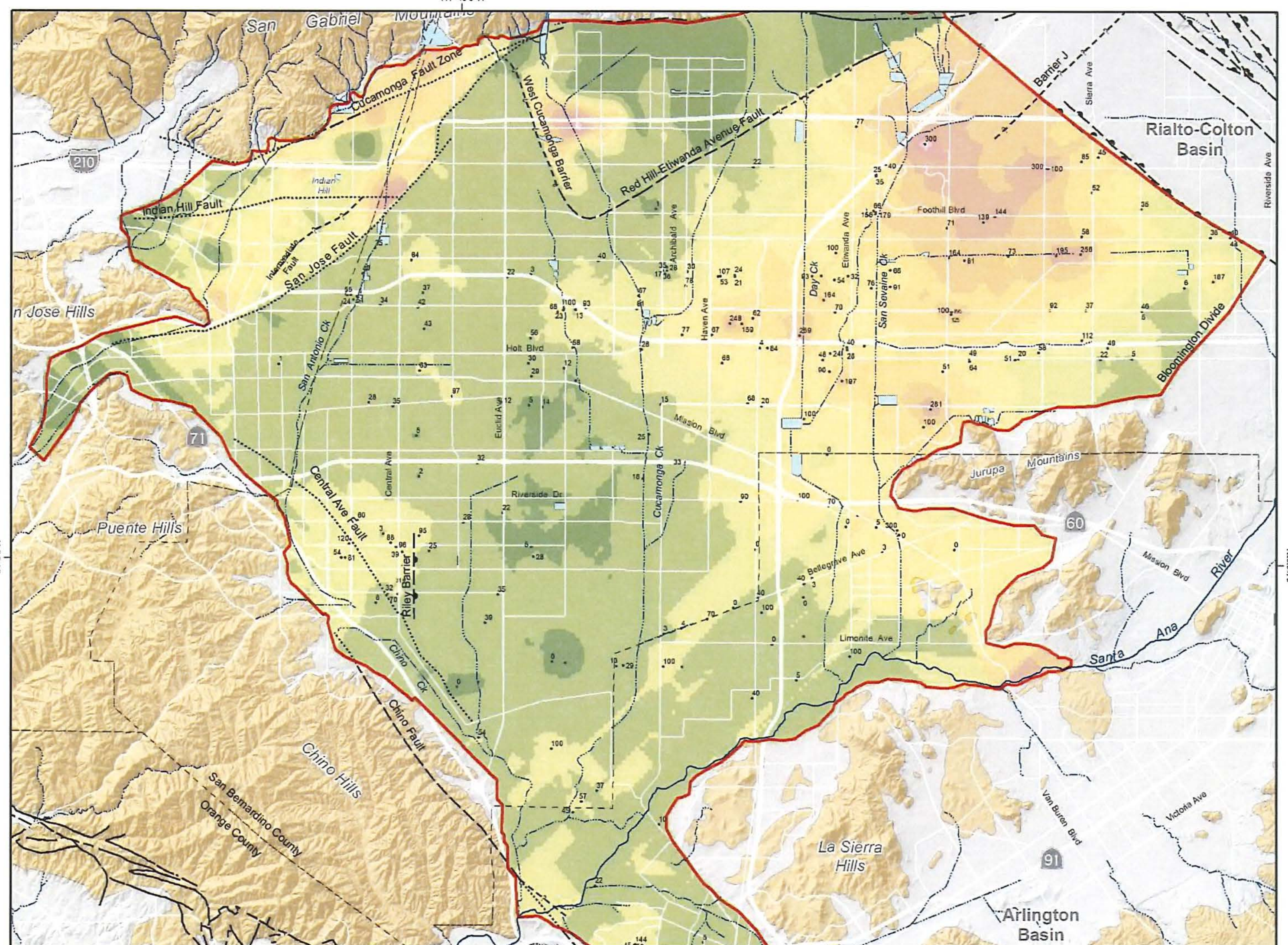
Prepared for:

2020 Safe Yield Recalculation

CHINO BASIN WATERMASTER — Partners in Basin Management

Layer 3 Initial and Pre-calibrated Horizontal Hydraulic Conductivity Based on Borehole Lithology and Lithologic Modeling

Figure 7



Initial Estimated Horizontal Hydraulic Conductivity
Layer 5 (ft/day)

- 3 - 24
- 25 - 45
- 46 - 65
- 66 - 86
- 87 - 107
- 108 - 128
- 129 - 149
- 150 - 170
- 171 - 190
- 191 - 211

Borehole with Lithologic Data used to Estimate Horizontal Hydraulic Conductivity

Chino Valley Basins Groundwater Flow Model Boundary

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

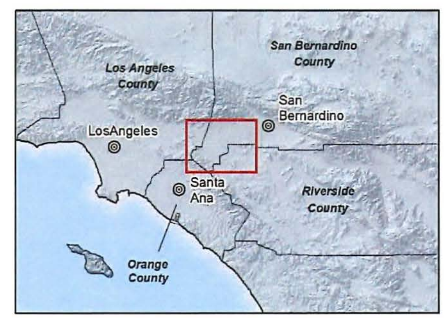
Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Fault (solid where accurately located; dashed where approximately located or inferred; dotted where concealed)



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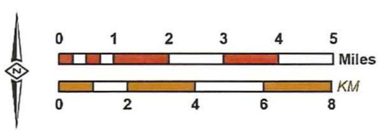
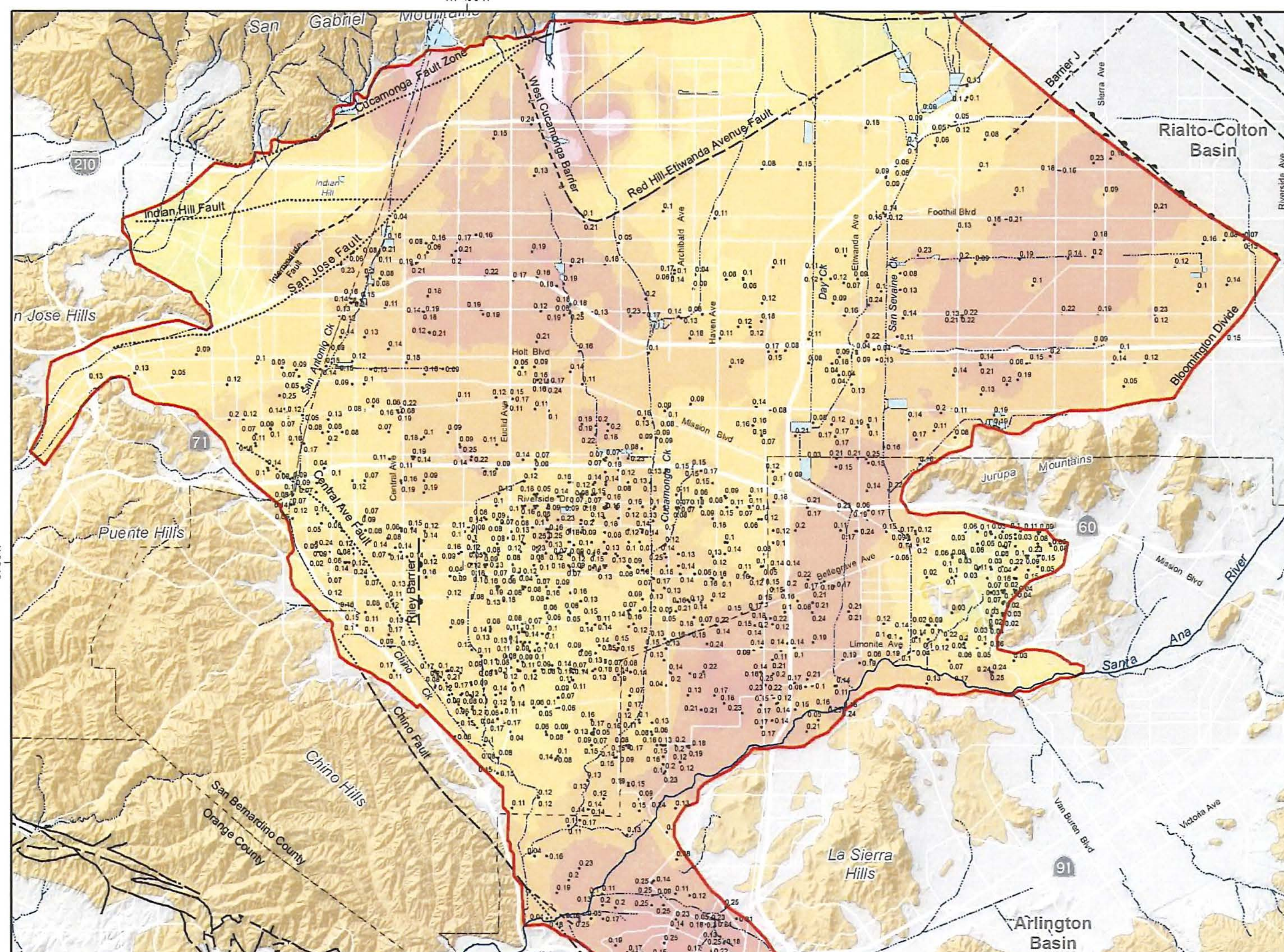


Prepared for:

2020 Safe Yield Recalculation

Layer 5 Initial and Pre-calibrated Horizontal Hydraulic Conductivity Based on Borehole Lithology and Lithologic Modeling

Figure 8



Initial Estimated Specific Yield

Layer 1

- 0.001 - 0.025
- 0.026 - 0.05
- 0.051 - 0.075
- 0.076 - 0.1
- 0.101 - 0.125
- 0.126 - 0.15
- 0.151 - 0.175
- 0.176 - 0.199
- 0.2 - 0.224
- 0.225 - 0.249

Borehole with Lithologic Data used to Estimate Specific Yield

Chino Valley Basins Groundwater Flow Model Boundary

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Fault (solid where accurately located; dashed where approximately located or inferred; dotted where concealed)

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Author: LJS
Date: 5/8/2020
Document Name: Figure_6-8_Kh_11x17

0 1 2 3 4 5 Miles
0 2 4 6 8 KM

Prepared for:

2020 Safe Yield Recalculation

Chino Basin Watermaster

Layer 1 Initial and Pre-calibrated Specific Yield Based on Borehole Lithology and Lithologic Modeling

Figure 9

Figure 10
Comparison of Simulated and Measured Water Levels in the Wells of Chino Basin

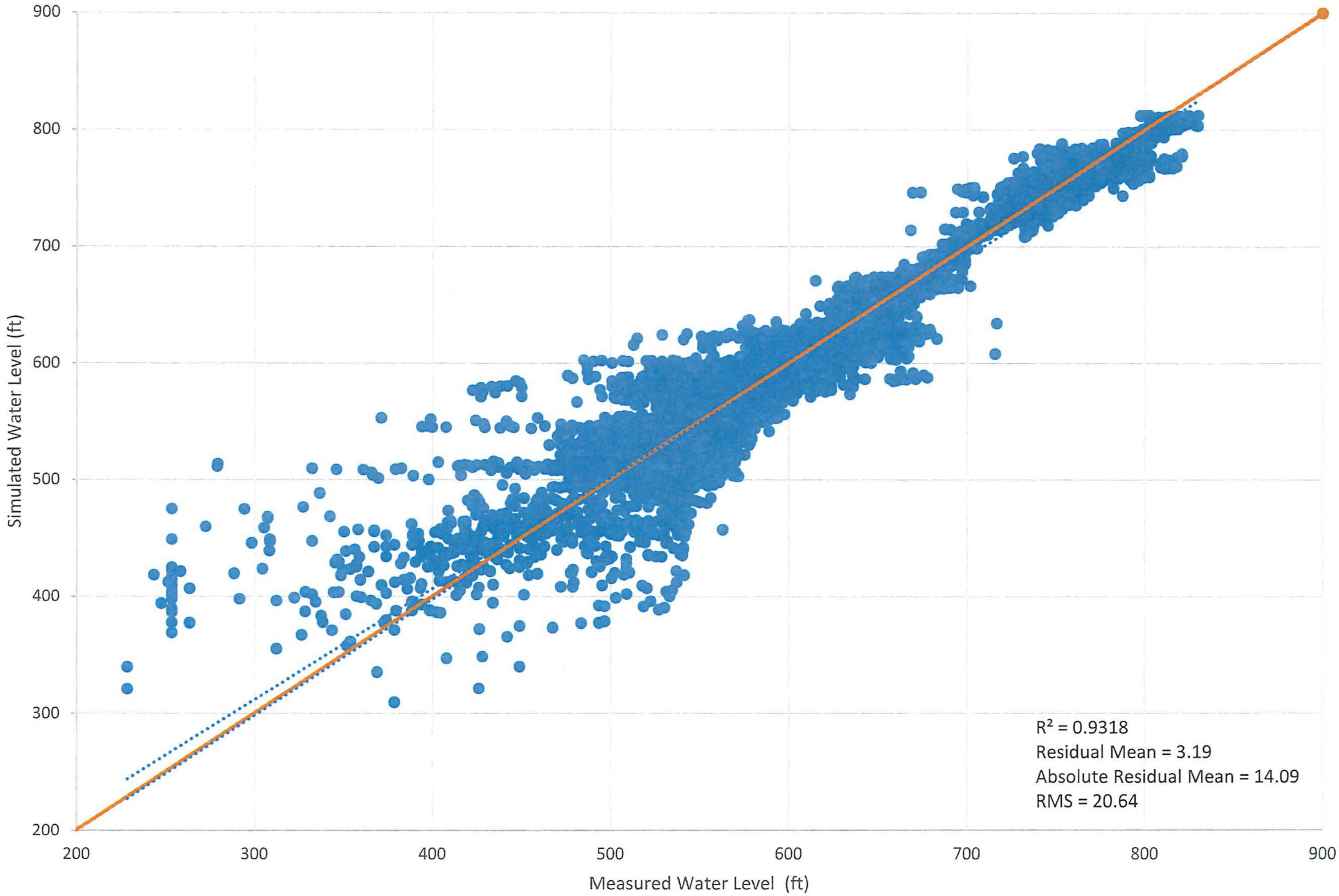


Figure 11
Comparison of Simulated and Measured Water Levels in the Wells of Cucamonga Basin

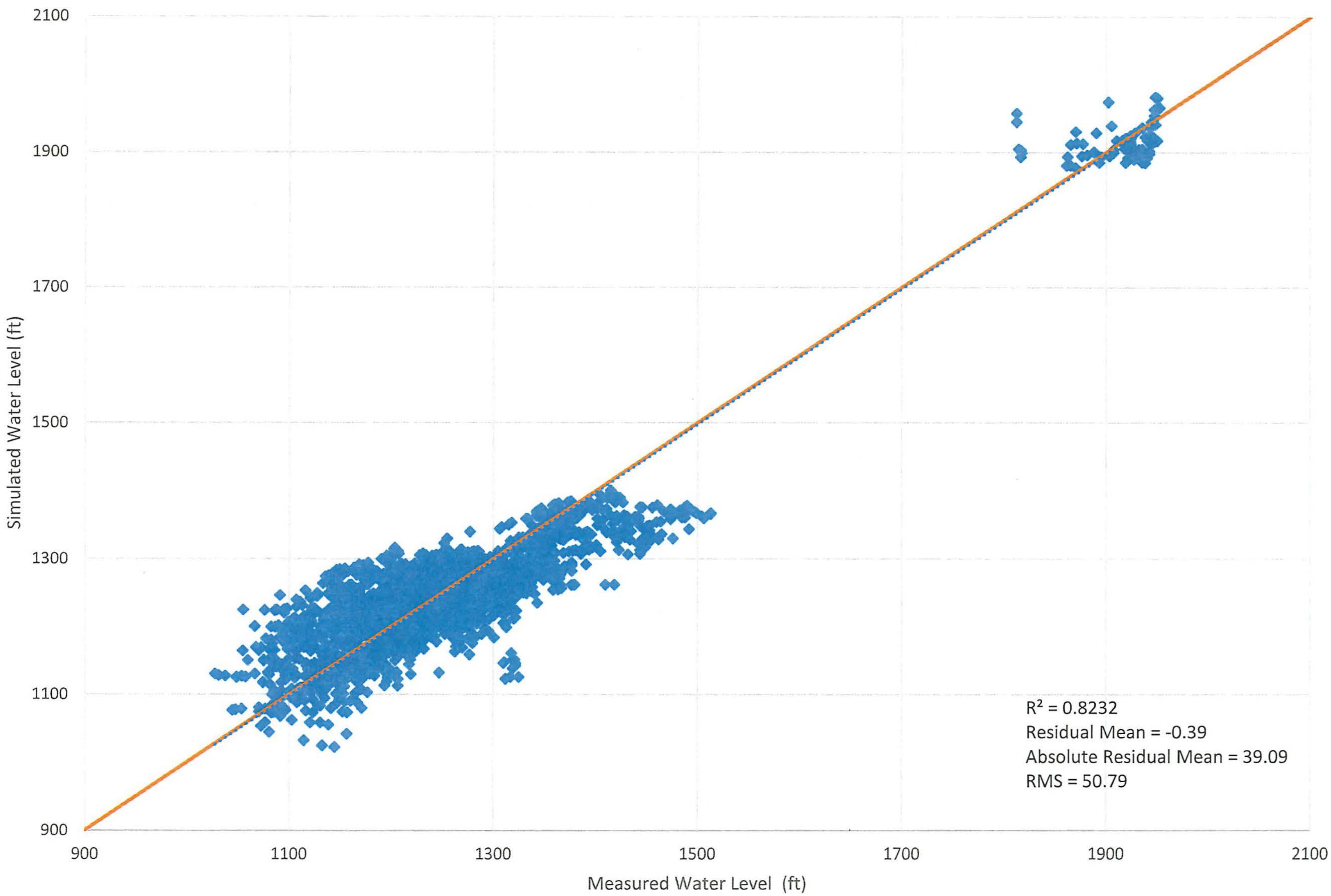


Table 1 Water Budget for the Chino Basin for the Calibration Period (Based on Table 6-3 in Draft Final Report)

Fiscal Year	Recharge														Discharge						Change in Storage		Net Recharge
	Subsurface Inflow										Managed Aquifer Recharge				Groundwater Pumping								
	Bloomington Divide	Chino/Puente Hills, Jurupa Hills, and Rialto Basin	Net Temescal Basin	Pomona Basin	Claremont Basin	Cucamonga Basin	Spadra Basin	Deep Infiltration of Precipitation and Applied Water	Santa Ana River Streambed Infiltration	Streambed Infiltration from Santa Ana River Tributaries	Storm Water	Recycled Water	Imported Water	Total Recharge	CDA Pumping	Overlying Non Ag and Appropriative Pools	Overlying Agricultural Pool	Riparian Veg ET	Rising Groundwater	Total Discharge	Annual	Cumulative	
1978	11,404	8,811	2,502	2,278	2,277	12,032	961	117,423	37,046	24,456	5,183	3,175	6,952	234,499	0	64,771	120,072	16,951	14,495	216,289	18,210	18,210	192,927
1979	11,002	9,659	3,101	2,867	2,574	11,628	576	122,211	33,871	15,620	2,951	3,049	28,347	247,456	0	65,008	118,922	17,257	12,619	213,805	33,651	51,861	186,185
1980	12,497	10,790	3,420	2,922	2,578	11,567	498	126,236	38,002	20,253	4,662	3,232	16,537	253,195	0	69,503	110,885	16,404	14,897	211,689	41,505	93,366	202,125
1981	13,071	10,955	4,216	3,024	2,585	11,537	476	126,479	30,545	7,647	1,219	3,451	20,850	236,055	0	72,927	116,470	17,194	13,035	219,626	16,429	109,795	181,525
1982	13,337	11,289	4,987	2,892	2,470	11,401	480	126,714	33,792	11,112	3,096	3,726	21,641	246,937	0	68,404	101,624	16,868	13,389	200,284	46,652	156,447	191,313
1983	13,316	10,685	5,161	3,008	2,597	11,552	496	132,273	35,436	18,011	6,703	3,873	27,590	270,704	0	67,259	94,508	16,139	17,899	195,805	74,898	231,346	205,202
1984	14,378	9,829	6,112	3,222	2,752	11,871	511	133,497	29,048	8,724	2,472	982	22,400	245,799	0	74,726	107,238	16,642	17,412	216,018	29,782	261,127	188,363
1985	13,577	8,729	6,343	3,085	2,561	11,887	526	128,408	30,446	6,257	2,032	0	20,782	234,631	0	79,626	105,444	16,810	14,364	216,243	18,388	279,515	182,676
1986	12,428	9,439	6,192	3,007	2,456	11,668	549	127,728	33,461	6,062	2,903	0	18,327	234,221	0	83,822	105,254	16,877	15,805	221,757	12,463	291,979	183,212
1987	11,951	8,844	6,493	2,944	2,379	11,309	553	121,909	32,772	2,874	1,789	0	19,938	223,754	0	88,675	104,829	17,090	14,383	224,976	-1,222	290,756	172,344
1988	11,385	7,674	5,839	2,790	2,274	10,771	538	122,069	34,246	2,925	2,641	0	2,485	205,637	0	94,222	95,264	17,187	15,603	222,276	-16,640	274,117	170,361
1989	11,408	7,528	5,339	2,681	2,214	10,364	529	120,836	31,310	1,422	2,393	0	7,332	203,357	0	97,218	89,511	17,407	14,798	218,935	-15,578	258,539	163,820
1990	11,788	7,121	4,579	2,536	2,124	10,448	509	115,495	31,487	433	1,430	0	0	187,950	0	98,914	83,775	17,482	13,942	214,113	-26,163	232,376	156,526
1991	12,630	6,656	4,009	2,421	2,092	10,335	474	113,633	33,477	712	2,198	0	3,634	192,271	0	88,986	83,073	17,525	14,171	203,756	-11,484	220,891	156,941
1992	13,286	7,250	3,737	2,438	2,136	10,393	442	112,979	34,141	1,028	3,598	0	5,568	196,997	0	102,664	77,336	17,736	14,905	212,640	-15,643	205,248	158,788
1993	13,611	8,300	2,863	2,725	2,434	10,588	423	116,794	37,980	2,239	6,619	0	14,224	218,800	0	88,040	83,284	17,404	17,162	205,889	12,910	218,159	170,010
1994	13,637	8,223	3,621	2,994	2,560	10,871	425	117,935	30,748	650	1,486	0	16,448	209,597	0	93,564	72,115	18,155	15,589	199,423	10,174	228,333	159,405
1995	13,478	9,217	2,488	2,899	2,507	10,967	428	119,075	35,361	1,538	4,662	0	10,375	212,995	0	98,173	62,171	17,711	19,136	197,191	15,803	244,136	165,773
1996	13,289	9,146	3,546	3,017	2,560	11,015	455	117,398	29,441	709	2,425	0	82	193,085	0	109,609	71,220	18,429	18,553	217,811	-24,726	219,410	156,021
1997	13,292	9,072	3,290	2,829	2,430	10,883	481	116,836	30,483	1,007	3,305	0	16	193,925	0	112,998	68,968	18,564	18,917	219,448	-25,523	193,887	156,427
1998	13,650	8,754	2,402	2,803	2,417	10,727	503	117,046	33,821	1,637	5,780	0	8,352	207,895	0	104,141	45,302	18,238	22,456	190,138	17,757	211,644	158,848
1999	13,956	8,514	3,516	2,936	2,489	10,756	494	115,042	26,381	519	1,007	0	5,839	191,449	0	118,738	46,730	19,035	22,794	207,298	-15,849	195,795	143,780
2000	14,451	7,890	2,858	2,707	2,341	10,563	508	109,843	27,081	499	1,985	507	997	182,232	523	133,086	46,538	18,938	23,315	222,400	-40,168	155,628	138,476
2001	14,556	7,970	3,132	2,532	2,254	10,223	525	107,823	25,419	598	3,162	500	6,538	185,230	9,470	120,396	41,429	18,717	26,464	216,476	-31,245	124,382	133,011
2002	15,177	7,242	3,565	2,467	2,206	10,028	517	102,792	25,922	230	1,148	505	6,493	178,292	10,173	129,760	38,650	18,472	26,544	223,599	-45,307	79,075	126,279
2003	15,747	6,518	2,932	2,377	2,145	9,868	504	102,305	28,672	859	6,284	185	6,548	184,945	10,322	123,471	36,507	18,157	26,630	215,087	-30,142	48,934	133,425
2004	16,088	6,780	1,994	2,407	2,123	9,860	492	99,010	27,465	536	3,357	49	7,607	177,768	10,480	128,548	36,809	18,069	27,669	221,574	-43,807	5,127	124,374
2005	14,346	7,918	721	2,643	2,336	9,816	481	99,647	30,922	5,917	17,648	158	12,259	204,813	10,595	112,943	34,503	17,178	29,844	205,064	-251	4,876	145,373
2006	14,568	7,648	1,891	3,152	2,571	9,897	467	99,823	30,439	1,806	12,940	1,303	34,567	221,073	19,819	113,553	30,812	17,561	24,576	206,321	14,752	19,627	143,065
2007	15,150	7,607	1,268	2,911	2,413	9,826	412	96,008	29,276	79	4,745	2,993	32,960	205,647	28,529	123,695	29,919	18,276	21,441	221,859	-16,212	3,415	129,978
2008	15,044	7,346	1,173	2,627	2,240	9,842	384	93,275	31,703	1,530	10,205	2,340	0	177,709	30,116	127,696	26,280	18,358	20,003	222,453	-44,744	-41,329	137,008
2009	15,271	7,363	696	2,509	2,178	9,950	414	91,489	33,318	839	7,512	2,684	0	174,220	28,456	137,345	23,386	18,561	18,475	226,223	-52,003	-93,331	134,500
2010	15,584	6,402	562	2,448	2,167	9,809	441	88,512	35,285	1,939	14,273	7,210	5,000	189,632	28,964	108,983	22,038	18,686	18,067	196,739	-7,107	-100,438	140,669
2011	15,960	6,889	557	2,601	2,299	9,891	452	88,763	36,213	3,358	17,052	8,065	9,465	201,564	28,941	94,413	18,042	18,739	18,765	178,901	22,663	-77,775	146,530
2012	15,577	6,971	1,397	2,713	2,317	9,820	441	84,009	34,463	463	9,271	8,634	22,560	198,637	28,230	108,501	22,412	19,282	15,649	194,074	4,563	-73,212	132,511
2013	15,144	6,651	1,516	2,676	2,203	9,748	426	80,130	33,536	243	5,271	10,479	0	168,023	27,380	111,748	24,074	17,348	13,871	194,421	-26,398	-99,610	126,325
2014	15,067	6,355	1,371	2,645	2,144	9,548	440	78,395	34,301	241	4,299	13,593	795	169,195	29,626	118,849	22,131	17,426	13,348	201,380	-32,185	-131,795	124,032
2015	15,230	5,760	1,217	2,547	2,096	8,721	458	75,817	34,907	421	8,001	10,840	0	166,014	30,022	104,317	17,552	17,580	13,585	183,056	-17,042	-148,837	124,009
2016	15,716	5,015	1,057	2,498	2,062	7,809	449	73,547	36,134	476	9,236	13,222	0	167,221	28,191	101,301	16,908	17,824	14,147	178,371	-11,150	-159,988	122,028
2017	15,967	5,587	1,529	2,462	2,056	8,311	423	72,874	35,805	1,920	11,575	13,934	13,150	185,593	28,284	98,960	16,191	17,869	15,261	176,565	9,028	-150,960	125,379
2018	15,711	5,385	2,306	2,510	2,072	8,041	388	69,532	32,664	2,165	4,494	13,212	35,621	194,101	30,088	93,904	16,776	18,147	13,914	172,828	21,272	-129,687	113,206
Statistics for the Calibration Period 1978 through 2018																							
Total	572,725	325,781	125,499	111,751	95,688	426,142	19,947	4,381,613	1,326,822	159,955	223,013	131,900	472,281	8,373,116	418,208	4,133,457	2,484,952	728,293	737,893	8,502,803	-129,687		6,302,749
Percent	6.8%	3.9%	1.5%	1.3%	1.1%	5.1%	0.2%	52.3%	15.8%	1.9%	2.7%	1.6%	5.6%	100.0%	4.9%	48.6%	29.2%	8.6%	8.7%	100.0%			
Average	13,969	7,946	3,061	2,726	2,334	10,394	487	106,869	32,362	3,901	5,439	3,217	11,519	204,222	10,200	100,816	60,609	17,763	17,997	207,385	-3,163		153,726
Median	13,956	7,674	2,932	2,707	2,317	10,393	480	113,633	33,318	1,530	4,299	507	7,607	198,637	0	101,301	46,730	17,711	15,805	212,640	-7,107		156,021
Maximum	16,088	11,289	6,493	3,222	2,752	12,032	961	133,497	38,002	24,456	17,648	13,934	35,621	270,704	30,116	137,345	120,072	19,282	29,844	226,223	74,898	291,979	205,202
Minimum	11,002	5,015	557	2,278	2,056	7,809	384	69,532	25,419	79	1,007	0	0	166,014	0	64,771	16,191	16,139	12,619	172,828	-52,003	-159,988	113,206

Table 2 Estimated DIPAW (Excluding OWDS Discharge) at the Rootzone, Vadose Zone Storage and DIPAW Discharge to Saturated Zone

Year	DIPAW at Rootzone	Starting Storage in Vadose Zone	DIPAW at Saturated Zone	Ending Storage in Vadose Zone	Year	DIPAW at Rootzone	Starting Storage in Vadose Zone	DIPAW at Saturated Zone	Ending Storage in Vadose Zone
1943	174,698	0	12,478	162,219	1997	100,603	635,189	116,836	618,956
1944	175,758	162,219	25,033	312,944	1998	137,454	618,956	117,046	639,364
1945	152,616	312,944	35,934	429,627	1999	59,366	639,364	115,042	583,689
1946	137,864	429,627	45,781	521,710	2000	83,161	583,689	109,843	557,006
1947	147,229	521,710	56,297	612,641	2001	85,900	557,006	107,823	535,083
1948	114,466	612,641	64,474	662,634	2002	53,176	535,083	102,792	485,468
1949	121,177	662,634	73,129	710,682	2003	99,689	485,468	102,305	482,851
1950	141,584	710,682	83,242	769,024	2004	64,903	482,851	99,010	448,744
1951	112,394	769,024	91,270	790,148	2005	150,701	448,744	99,647	499,798
1952	206,211	790,148	106,000	890,359	2006	63,968	499,798	99,823	463,943
1953	114,865	890,359	114,204	891,019	2007	42,753	463,943	96,008	410,688
1954	139,462	891,019	124,166	906,315	2008	65,855	410,688	93,275	383,268
1955	103,718	906,315	131,574	878,459	2009	62,076	383,268	91,489	353,855
1956	108,842	878,459	139,349	847,952	2010	83,642	353,855	88,512	348,986
1957	93,748	847,952	133,567	808,133	2011	91,054	348,986	88,763	351,276
1958	185,939	808,133	134,294	859,778	2012	49,131	351,276	84,009	316,398
1959	77,535	859,778	128,931	808,382	2013	44,350	316,398	80,130	280,618
1960	77,858	808,382	124,645	761,596	2014	48,186	280,618	78,395	250,408
1961	70,085	761,596	119,135	712,546	2015	57,254	250,408	75,817	231,845
1962	126,314	712,546	119,981	718,879	2016	52,447	231,845	73,547	210,745
1963	85,352	718,879	117,422	686,809	2017	85,217	210,745	72,874	223,088
1964	103,894	686,809	114,730	675,973	2018	46,436	223,088	69,532	199,992
1965	117,206	675,973	115,073	678,106	2019	83,347	199,992	68,414	214,925
1966	131,171	678,106	109,714	699,563	2020	83,362	214,925	70,654	227,632
1967	159,379	699,563	112,893	746,049	2021	83,377	227,632	71,823	239,186
1968	103,276	746,049	110,308	739,017	2022	83,393	239,186	73,046	249,533
1969	198,049	739,017	117,046	820,020	2023	83,408	249,533	73,119	259,822
1970	87,581	820,020	115,528	792,073	2024	83,423	259,822	73,798	269,448
1971	95,456	792,073	115,650	771,879	2025	83,439	269,448	76,723	276,163
1972	93,059	771,879	109,015	755,923	2026	83,454	276,163	77,507	282,109
1973	143,559	755,923	113,731	785,751	2027	83,469	282,109	77,962	287,616
1974	109,045	785,751	115,959	778,837	2028	83,485	287,616	77,884	293,217
1975	101,791	778,837	118,224	762,404	2029	83,500	293,217	77,731	298,986
1976	78,738	762,404	114,825	726,316	2030	83,515	298,986	78,662	303,839
1977	98,939	726,316	115,796	709,459	2031	83,508	303,839	79,555	307,792
1978	218,406	709,459	117,423	810,442	2032	83,508	307,792	80,269	311,031
1979	133,701	810,442	122,211	821,932	2033	83,508	311,031	80,565	313,974
1980	184,350	821,932	126,236	880,046	2034	83,507	313,974	81,379	316,102
1981	82,618	880,046	126,479	836,185	2035	83,507	316,102	81,429	318,180
1982	116,757	836,185	126,714	826,228	2036	83,506	318,180	82,433	319,253
1983	187,813	826,228	132,273	881,768	2037	83,506	319,253	82,901	319,858
1984	96,588	881,768	133,497	844,858	2038	83,506	319,858	83,073	320,291
1985	92,519	844,858	128,408	808,970	2039	83,505	320,291	83,366	320,431
1986	111,038	808,970	127,728	792,280	2040	83,505	320,431	83,255	320,681
1987	73,244	792,280	121,909	743,614	2041	83,518	320,681	83,370	320,828
1988	93,633	743,614	122,069	715,179	2042	83,547	320,828	83,850	320,525
1989	84,123	715,179	120,836	678,466	2043	83,576	320,525	84,001	320,100
1990	68,974	678,466	115,495	631,945	2044	83,605	320,100	84,202	319,503
1991	100,255	631,945	113,633	618,567	2045	83,634	319,503	84,303	318,835
1992	115,532	618,567	112,979	621,120	2046	83,663	318,835	84,378	318,120
1993	184,520	621,120	116,794	688,845	2047	83,692	318,120	84,596	317,216
1994	73,134	688,845	117,935	644,044	2048	83,721	317,216	84,923	316,014
1995	138,746	644,044	119,075	663,714	2049	83,750	316,014	85,133	314,632
1996	88,873	663,714	117,398	635,189	2050	83,779	314,632	85,317	313,094

Table 3 Calibration Statistics for Groundwater Basins in the 2020 CVM

Basin	Residual Mean	Absolute Residual Mean	RMSE
Chino Basin	0.061	14.230	21.411
Six Basins	-16.272	49.012	65.849
Cucamonga Basin	-0.394	39.085	50.792

Table 4 Stable Semivariogram Model Parameters used in Chino Basin

Model Layer	Hydraulic Parameters	C0	b	h	r	s
Layer1	Sy	2.31E-03	0	400	4800	0.21934
Layer1	Kh	2.27E+03	0	400	4800	0.24219
Layer1	Kv	3.86E+02	0	400	3000	0.20000
Layer3	Kh	5.34E+03	0	400	4000	0.24922
Layer3	Kv	3.37E+03	0	400	4000	0.25449
Layer5	Kh	5.34E+03	0	400	4000	0.24922
Layer5	Kv	3.37E+03	0	400	4000	0.25449

Response to Questions and Comments on the April 2, 2020 Safe Yield Recalculation Report

April 23, 2020 Letter from Overlying (Agricultural Pool) re Safe Yield Recalculation for Chino Basin Questions

Comment No. 1a. Page 1, first paragraph. Comment reads: "1a: Safe Yield is computed over arbitrary 10-year increments; however, the safe yield calculation should consider a Base Period with a time period whose average precipitation is equal to the long-term precipitation average. If the Safe Yield is not computed over a hydrologic base period but based on court ordered methodology, resulting Safe Yield values could be biased in the results when the precipitation record is recycled in some fashion for the future predictions."

Response. This comment is noted. This comment does not request any information or explanation regarding the 2020 Safe Yield Recalculation Final Report. Nevertheless, the comment reflects a misstatement and an apparent misunderstanding of the Court-ordered methodology. The 10-year period selected is not arbitrary. It was ordered by the Court and informed by the exercise of professional judgment. A long-term hydrology is used with precipitation data being evaluated over a 122-year period and adjusted after considering the veracity and integrity of the data collected. The 10-year forecast takes into account projected conditions that are expected to occur over the ensuing 10 years. While it is possible to extend the period for additional increments of time, longer forecasting entails further speculation. Historical experience in evaluating trends in the Chino Basin suggests that the projections become less reliable as they extend beyond the 10-year horizon. It is considerably easier to adjust to discrepancies between set expectations over a 10-year period than longer periods of time and consequently there is less risk to the parties and to the basin.

Comment No. 1b. Page 1, second paragraph. Comment reads: "1b: A Planning period spanning 62 years (from 1950 through 2011) was used to estimate net recharge and Safe Yield (Section 7.2). But planning simulations only extend for a 32-year period from 2019 through 2050, and Safe Yield is computed for every 10-year period. Why isn't the entire period of 62 years from 2018 through 2070 used for determining Safe Yield?"

Response. The comment offers several assertions as the basis for a foundation for a question that is addressed in the response to Comment 1.a. above. Further, please see the response to the 4/23 Appropriative Pool Response to Comment No. 82.

Comment No. 2. Page 1, third paragraph. Comment reads: "The table "Summary of Net Recharge by Decade in the Calibration Period" indicates that net recharge is about 1.0 million acre-feet from 2011 through 2018. Extrapolating this 8-year record for 10 years gives approximately 1.25 million acre-feet over the 2011 through 2020 period which is approximately 125,000 acre-feet per year. (a) Why is Safe Yield 135,000 acre-feet and not 125,000 acre-feet for the 2011 through 2020 period? (b) Was there or will there be an adjustment in Storage Accounts to account for the difference?"

Response. (a) The Safe Yield value of 135,000 afy was calculated in the prior Safe Yield recalculation and it is based on long-term average recharge. The 125,000 afy hindcast mentioned in the comment is based on actual hydrology that includes the most intense dry-period in the Chino Basin area in the instrumental record (see the April 2, 2020 Safe Yield Recalculation Report, Figure 3-14). (b) The Court-ordered Safe Yield reset methodology does not provide for any retroactive adjustments to Safe Yield or storage accounts. The probability of future hydrology is determined on the basis of the predicted reoccurrence of a multitude of wet, normal and dry years through the historic record. The recent hydrology adds to the lengthy record; it is not a substitute. Over the fullness of time, series of wet, normal and dry years have occurred and are reasonably expected to occur again in the future.

Comment No. 3. Page 1, fourth paragraph. Comment reads: "The Draft Report dated March 23, 2020 included Figures 7-6 and 7-7 which are missing in the final report. These should be included. Also, in these figures, the precipitation used for future conditions is not shown, and that may help to figure out increasing DIPAW trends."

Response. The figures referenced by the commenter and associated text in the March 23rd draft were replaced with other figures and text that more clearly communicate the trends in DIPAW.

Comment No. 4. Page 1, fifth paragraph. Comment reads: "DIPAW increases from 2019 through 2050 in Table 7-2. Total pervious area is decreasing through this period, so it is not clear why DIPAW should increase."

Response. In the 2020 SYR1 planning scenario, DIPAW discharging from the rootzone to the vadose zone is equal to the long-term average DIPAW based on 62 years of daily precipitation, ET and applied water consistent with the cultural condition for each year. The DIPAW in Table 7-2 is the DIPAW discharge from the vadose zone to the saturated zone. In the planning period, the DIPAW discharge to the saturated zone is asymptotically approaching the DIPAW discharge at the rootzone.

Comment No. 5a. Pages 1, sixth paragraph. Comment reads: "5a: Section 7.4 states that "the primary driver for the reduction in net recharge during the 2021 through 2030 period were changes in cultural conditions prior to the planning period and extremely low precipitation that occurred during the 20 years prior to the planning period". However, Figure 7-7 (in Draft Report) showed an increase in net recharge from 2021 through 2030."

Response. The April 2, 2020 Safe Yield Recalculation report also shows an increase in net recharge from 2021 through 2030. There is no inconsistency between the administrative draft report and the April 2, 2020 report and the observed and modeled conditions contained therein.

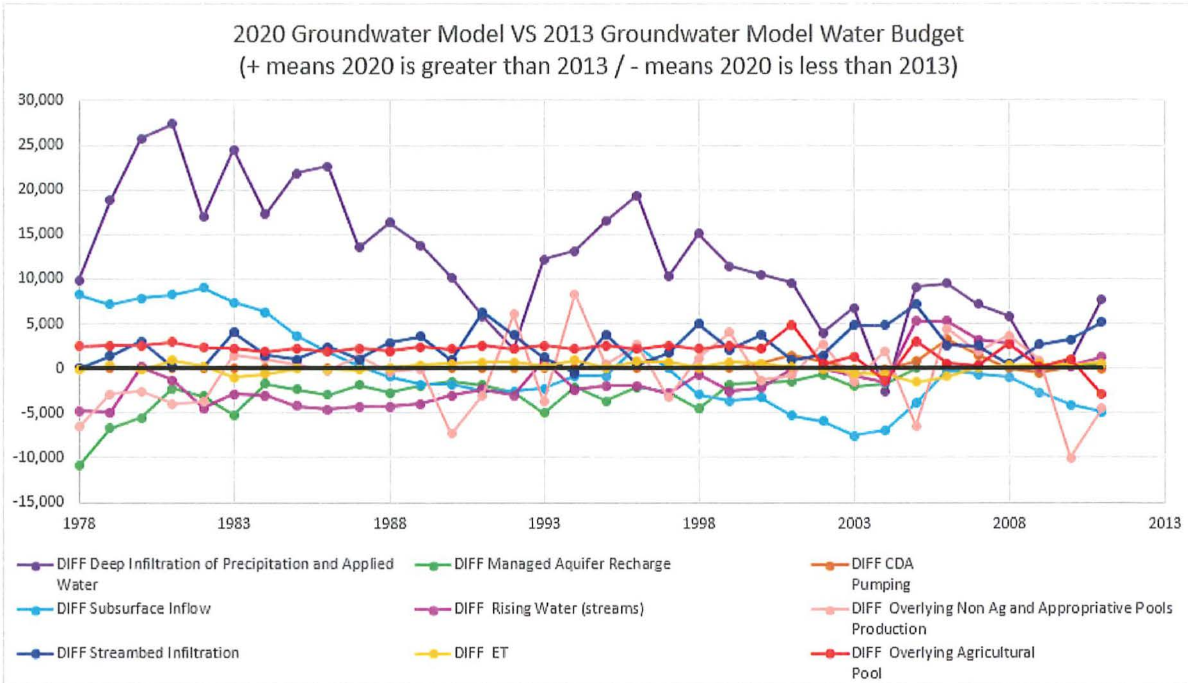
Comment No. 5b. Page 2, first paragraph. Comment reads: "5b: Also, if the last 20 years of the precipitation record are from drought conditions (2011 through 2020 in the calibration period which would coincide with the 2050 through 2070 of the predictive period) then why were drought conditions not considered in the Safe Yield determination."

Response. Drought conditions were considered. Recall that recharge in the planning period is based on the simulation of 62 years of daily precipitation, ET and applied water consistent with the cultural condition for each year. Prolonged dry periods occur in the 1950 through 2011 period (e.g., 1950 through 1977, 1999 through 2011).

Comment No. 6. Page 2, second paragraph. Comment reads: "Safe Yield was decreasing through the years in the 2007 model but increasing in the 2020 model (up to 2050). What was different between the models to cause that?"

Response. The differences are due to new data, better use of data and other improvements that were incorporated in the update of the 2007 model to the 2013 model and recent update of the 2013 model to the 2020 CVM.

Comment No. 7a. Page 2, fourth paragraph. Comment reads: "The figure below shows the difference between 2020 model and 2013 model values for various inflows. These flow amounts are not consistent between the models. The figure was generated from tables in the 2020 and 2013 Safe Yield update reports. 7a: The largest differences are in DIPAW followed by Subsurface inflow. (i) Why were these differences larger in earlier times and smaller in later times? If the differences are due to more refined precipitation and more refined R4 model infrastructure, then that refinement was considered throughout the time period so a generally constant difference through time would be expected. (ii) Did precipitation decrease through time in one model and not in the other, such that DIPAW and subsurface inflow differences show temporal trends?"



Response. (i) Several improvements were incorporated into the update of the 2013 model to the 2020 CVM and the major improvements include:

- WEI is involved in a parallel effort to assist Watermaster and the IEUA in assessing alternative TDS compliance metrics for recycled water use. In that effort, the watershed delineation was refined to comport more accurately with the groundwater basin boundaries, and land use delineations were updated to more accurately reflect water use and salt loading. In the update of the 2013 model to the 2020 CVM the number of hydrologic subareas has substantially increased to more accurately estimate precipitation/irrigation/runoff processes and stormwater recharge.
- In the update of the 2013 model to the 2020 CVM, the method for estimating reference ET (ET0) across the watershed was improved from past reliance on the relationship between the Pomona CIMIS station ET0 and Puddingstone reservoir evaporation to a new ET0 model that is based on the empirical relationships of temperature and ET0 measurements at the Pomona and Riverside CIMIS stations and using these relationships to estimate ET0 temporally and spatially based on PRISM estimates of monthly temperature across the watershed.
- In the update of the 2013 model to the 2020 CVM, the method for estimating daily precipitation for each hydrologic subarea was improved from past reliance on interpolating daily precipitation at precipitation stations across the watershed using Thiessen polygons to the use of monthly precipitation estimates for each hydrologic subarea based on monthly PRISM estimates and converting those monthly estimates to daily precipitation estimates based on daily precipitation from nearby precipitation stations. As to precipitation, these improvements were made for the period prior to 2002. After 2002, daily precipitation estimates for the hydrologic subareas are based on

NEXRAD estimates. The historical DIPAW estimate changes primarily result from the improvements in the data used in the R4 model described in this and the two prior bulleted items.

- Subsurface inflows from the Cucamonga and Riverside Basins are greater in the 2020 CVM relative to the 2013 model: the former occurs because during the model update process the Cucamonga Basin was integrated directly into the 2020 CVM, and the latter occurs due to changes in the estimated hydraulic conductivity in the northeast domain of the 2020 CVM. Subsurface inflow from the mountain front areas increased due to the refinements in the R4 data for DIPAW (described above).
- In the update of the 2013 model to the 2020 CVM, streambed infiltration in the Santa Ana River also increased. This is, in part, due to converting the streamflow package in MODFLOW to SFR2, through the incorporation of updated channel geometry, and calibration.

(ii) No.

Comment No. 7b. Page 2, fifth paragraph. Comment reads: "7b: Why are there differences in fixed value items such as Managed Aquifer Recharge (MAR), and overlying Non-Agricultural and Appropriative Pools pumping? Was the reporting in earlier years adjusted?"

Response. In the update of the 2013 model to the 2020 CVM, the stormwater recharge prior to the availability of IEUA stormwater recharge estimates is based on R4 simulations with improved data relative to the 2013 model. As to the other MAR estimates, the data used in the in the update of the 2013 model to the 2020 CVM was taken from IEUA and Watermaster records. As to Overlying Non-Agricultural and Appropriative Pools pumping, the data used in the update of the 2013 model to the 2020 CVM was taken from Watermaster records. Some of the pumping assigned to the Overlying Agricultural Pool in the 2013 model was incorrectly assigned to the Overlying Non-Agricultural Pool and this has been corrected.

Comment No. 8. Page 3, first paragraph. Comment reads: "It was explained at the Agricultural Pool March meeting that the new model had more updated and refined inputs and that is why results are different between models, that the differences are not too large each year, that calibration statistics of both models are comparable, and that differences in cumulative storage do not matter since models are being used for future MPI evaluations. However, the cumulative storage impact of the two models is considerably different. The net storage between any two years is the space between the water levels of those two years. If the two models were calibrated to the same data, then something is inconsistent on a model-wide scale. For instance, between 1978 and 1999, the 2020 model shows a cumulative increase in water levels while the 2015 model shows that water levels have declined during that same time period as noted in the figure below. The figure was generated from tables in the 2020 and 2013 Safe Yield update reports."

Response. This comment is noted. First, it includes an incorrect representation. There is one model, not two. The 2013 model was updated to the 2020 CVM to include new data, improvements in the use of data and further refinements. Second, for the purpose of estimating Safe Yield under the Court-ordered methodology, the model-estimated storage change for the 2013 model and the 2020 CVM for the period 2000-2018 closely track each other.

Comment No. 9. Page 3, second paragraph. Comment reads: "It was mentioned that the 2013 model was used to evaluate the impacts of the storage management plan, but the Safe Yield was estimated using the updated 2020 model. It was mentioned that they should give the same results but that is hard to reconcile until the 2020 model is used to evaluate impacts of storage management since it is a different model and anticipated results may be different."

Response. This comment is noted. The 2020 CVM has been used for purpose of addressing Safe Yield. Its application for other purposes is not before Watermaster. See response to Comment No. 8 above.

Comment No. 10. Page 4, first paragraph. Comment reads: "A total water budget is not provided for any model. A water budget that includes R4/HSPF models, and vadose zone approximations along with the groundwater budgets helps to understand the other annual water budget terms such as precipitation, root zone ET, and how they changed from earlier models."

Response. This comment is noted. The 2020 Safe Yield Recalculation Final Report reflects the application of the Court-ordered methodology. The comment suggests further work to assist in the understanding of the changes related to the model update. Watermaster disagrees that such work is reasonably required to accept the recommendations in the Final Report.

Response to Questions and Comments on the April 2, 2020 Safe Yield Recalculation Report

April 23, 2020 Letter from the Appropriative Pool re Technical Review of the Models and Methodology Used as a Basis for the 2020 Safe Yield Reset

Comment No. 1. Page 2, first paragraph. Comment reads: "The methodology described in WEI (2020) to estimate the Safe Yield of the Chino Basin for the period from 2021 to 2030 generally follows the methodology described in Appendix A to the Safe Yield Reset Agreement. Watermaster Rules and Regulations Section 6.5 specifies "The reset will rely upon long-term hydrology and will include data from 1921 to the date of the reset evaluation." As described in WEI (2020), the 2020 Safe Yield estimation relies on precipitation data for the period 1950 to 2011 and does not include precipitation data extending back to 1921 as was specified in the Rules and Regulations Section 6.5 (d). As such, the methodology used in the 2020 Safe Yield reset does not explicitly comply with the Chino Basin Rules and Regulations."

Response. The methodology used in the 2020 Safe Yield Reset Final Report ("Final Report") follows the methodology in the Court's April 28, 2017 order as carried forward in the Chino Basin Watermaster Rules and Regulations. The court-ordered methodology requires, and the 2020 Safe Yield recalculation used, a long-term historical record of precipitation falling on current and projected future land uses to estimate the long-term average net recharge to the Basin. The Court order states that the Safe Yield reset will <u>rely</u> upon long-term hydrology and will include data from 1921 to the date of the reset evaluation (emphasis added). Watermaster used long-term precipitation data from 1895 to the present to estimate the long-term average precipitation inclusive of the period 1921 to the present. From that analysis we selected the period 1950 through 2011, a sixty-two year period, for the planning period. It represents a balancing between the availability of climate change factors (1915 through 2011) and the need to select a period where the average period-precipitation equals the long-term average precipitation, per standard practice. The long-term average precipitation for 1921 to 2011 period is greater than the long term average precipitation and use of the 1921 to 2011 period would overestimate the long term recharge, net recharge and Safe Yield. Use of the 1921 to 2011 period would not be consistent with the court-ordered methodology

Comment No. 2. Page 2, second paragraph. Comment reads: "The Court-approved methodology to estimate the Safe Yield of the Chino Basin relies on a series of models to simulate the distribution and movement of water at the land surface, within the unsaturated zone, and within the aquifer system. While there is no explicit statement in WEI (2020) or previous Safe Yield Reset documentation that says so, it is assumed that the Watermaster considers these models appropriate to help determine the Safe Yield because they are widely-accepted, widely-tested, and/or acceptably calibrated to measured data. Indeed, the latest versions of the Chino Basin models are calibrated to an extensive dataset within what would be considered industry standards."

Response: The initial form of the Watermaster model was critically reviewed by the Assistant to the Special Referee in 2007. The Watermaster model has been updated over time to incorporate and reflect new and better data. Watermaster views the model to be reasonable, appropriate and effective. It has engaged and accepted peer review from expert consultants representing parties to the Judgment. In addition, Watermaster engaged the services of Will Halligan in 2020, an independent expert, to evaluate the Final Report. For reasons stated in the Final Report and repeatedly in these Response to Comments, the use of the model in support of the recommendation is reasonable and prudent.

Comment No. 3. Pages 2 to 3. Comment reads: "While the models used to determine the Safe Yield of the Chino Basin can be considered calibrated, there is significant uncertainty in the numerous combinations and distributions of parameters derived to achieve calibration and it is not possible that the calibration is unique. In other words, there are other combinations of parameters, all within plausible ranges, that, if assigned to the model, could result in an acceptable calibration. Each calibrated model would result in a different water budget and estimate of Safe Yield. To be clear, the magnitude of data available for developing and calibrating the Chino Basin models is extensive and it is among the best constrained models with which I have experience. Nonetheless, there is no way to directly measure all the parameters across every square inch of the basin necessary to develop a perfectly complete water budget and achieve a perfectly constrained model. A primary concern I have is that the Chino Valley Model is being presented as "accurate" and the implication is that it is the only correct model. Some model-derived data are being presented to the nearest acre-foot implying a level of accuracy that is not defensible given the uncertainty of the input parameters. In reality, the model presented in the report is one of many plausible hydrogeological conceptualizations of the Chino Basin, each of which would result in a calibrated model."

Response: This comment is noted. Watermaster disagrees with the Comment. The development of the Model was initially subject to critical review and scrutiny by the Assistant to the Special Referee (see Response to Comment No.2 above). The Comment misstates the degree of risk of error associated with uncertainty arising from the use of the Model. The Model has been calibrated. The Watermaster Engineer has a high degree of confidence in the use of the Model for the purpose of estimating Safe Yield as the Court has previously ordered. Watermaster has followed the specific methodology and employed an independent expert to evaluate the propriety of Watermaster's use of the model in this specific instance. Use of the Model is reasonable and prudent.

Comment No. 4. Page 3, second paragraph. Comment reads: "All these parameters, and more, are uncertain and variations in assigned values change the water budget. There is further uncertainty in the assumptions necessary to develop the future water budget that is analyzed with the model to determine the Safe Yield (projected magnitude and location of pumping, recharge, and hydrology). Depending on how the uncertainty is addressed dictates the model outcome."

Response: This comment is noted. The Comment expresses an objection to the Court ordered methodology. Moreover, Watermaster disagrees that "these parameters and more, are uncertain" as alleged in the Comment detract from or undermine confidence in the application of the fully calibrated Model. (See Responses to Comments 2 and 3 above).

Comment No. 5. Pages 3-4. Comment reads: "This uncertainty is apparent when comparing the water budgets of the previous Safe Yield reset model (WEI, 2015b)5 with the results of the current one (WEI, 2020).6 For example, changes in model assumptions to estimate Deep Infiltration of Precipitation and Applied Water (DIPAW) were revised between the previous model and current one that resulted in significant differences in this recharge over the previous Safe Yield estimation period from 2011 to 2020. The differences in annual DIPAW during this time period were as much as approximately 27,000 acre-ft (see Table 1). Both models were/are acceptably calibrated, but the water budgets are different. In the current model, other assumed model parameters would likely have been changed during calibration to adjust to the new recharge rates and achieve acceptable calibration. The revised DIPAW rates may be more representative than the original. However, they are still estimated and subject to change in the future as more information becomes available, as is the case for all assumed parameters in the model. If the past is any indication of the future, the next model will likely have a different set of DIPAW values, and/or other revised model input values that will likely yield different results. This type of uncertainty is inherent in all surface water and groundwater models."

Response: This comment is noted. See above Responses to Comment Nos 2-4 above. There is one Model, continuously updated to account for new data and best practices. The Model is subject to change on the basis of new data; this is precisely the point. As new and better information is collected, the Model will be regularly and routinely updated and applied in accordance with the Court ordered methodology.

Comment No. 6. Page 4, second paragraph. Comment reads: "Following the above observations, it is my opinion that the most significant omission from the WEI (2020) model analysis and report is an uncertainty analysis. Performance of a predictive uncertainty analysis using publicly-available software is now commonplace in the technical literature and is considered standard practice in groundwater modeling. Uncertainty analysis is also a California Department of Water Resources (CDWR) best management practice for predictive model analysis in support of the Sustainable Groundwater Management Act (SGMA). Such an analysis would consider multiple realizations of the models with ranges of parameter values, each constrained in such a way as to result in acceptable calibration. The estimated Safe Yield from each model realization would be plotted on a cumulative probability chart, which can be used to identify an acceptable range within which to manage the basin. This would provide the basin managers with a sense as to potential variability in the Safe Yield estimate, for use in making decisions."

Response: This comment is noted. See above Responses to Comment Nos 2-5. The Final Report provides a recommendation that is derived from following the Court ordered methodology. The fact that other additional technical work evaluations might be undertaken by Watermaster in connection with making a recommendation for Safe Yield does not detract from the reasonableness and prudency of the recommendation. The application of the Court ordered methodology in this case was subjected to expert comment and independent peer review.

Comment No. 7. Page 5, first paragraph. Comment reads: "In keeping with the estimated nature of the Safe Yield and to be consistent with the language in the Safe Yield Methodology adopted by the Court, I recommend to replace the word "Recalculation" in the title of the report with "Reset" or "Redetermination." The same would apply to other areas of the report where "recalculation" is used."

Response: The process through which the Basin's Safe Yield is estimated and reset is described in various manners throughout the Watermaster guidance documents. Paragraph 15.(a) of the Judgment refers to the Court's retained jurisdiction to undertake a "redetermination" of the Safe Yield. Paragraph 10.(a)(1) of the Appropriative Pool Pooling Plan, Exhibit "H" to the Restated Judgment, refers to a reduction in Safe Yield "by reason of recalculation thereof." The OBMP Implementation Plan, in its discussion of Program Elements 8 and 9, variously refers to the "comput[ation]", "estim[ation]," "re-determination" and "reset" of the Safe Yield. The Court's April 28, 2017 order found that the reset of the Safe Yield to 135,000 afy was a "recalculation" and required Watermaster to conduct a Safe Yield "evaluation and reset process" beginning in 2019. Based on all of these descriptions, it is unclear that the use of one description as opposed to another in WEI's report has any import or effect.

The Court's April 28, 2017 order explains the Safe Yield evaluation and reset process that Watermaster must follow. This includes the Court's adoption of a specified methodology for this process, that includes the methodology in the Reset Technical Memorandum. Step 5 of the Reset Technical Memorandum's methodology includes the qualitative evaluation of groundwater production at the net recharge estimated by the groundwater flow model.

Comment No. 8. Page 5, second paragraph. Comment reads: "Section 1.2 pg. Listing of undesirable results: It should be noted that these undesirable results are listed as examples and that not all are specific to the Chino Basin."

Response. This comment is noted. The language of the Final Report does not imply these results are specific to the Chino Basin and instead reflects the commonly held view of what is an "undesirable result". (See Sustainable Groundwater Management Act – Water Code Section 10721(x).) The fact that not all potential results are present in the Chino Basin does not change the customary use of the phrase "undesirable results".

Comment No. 9. Page 5, third paragraph. Comment reads: "Section 1.2 pg. 1-2, last paragraph: It would be helpful to clarify the relationship between net recharge and Safe Yield prior to this point."

Response. The relationship of net recharge to Safe Yield is developed in text that follows the report text referenced by commenter.

Comment No. 10. Page 5, fourth paragraph. Comment reads: (a) "Section 1.3 pg. 1-4: Is this long-term hydrology analogous to/defined by the base period?"

..."meets other Safe Yield related criteria,..." (b) Are these the criteria you discuss in Sections 1.3.1 through 1.3.5? If so, this isn't clear. If not, what are the criteria, per the title of this section? MPI is not discussed as a criterion as per the court approved methodology and consistent with the title of Section 1.3.

Response. (a) Yes. (b) Text revised to read: "If the period includes representative long-term hydrology and meets other safe yield related criteria *described below*, the net recharge for that period can be assumed to be the safe yield."

Comment No. 11. Page 5, fifth paragraph. Comment reads: "Section 1.3.1 pg. 1-4, 1st paragraph: The base period needs to be defined. What period was used and why was the selected period used. What is its significance with respect to the Chino Basin Safe Yield calculation? How is it applied? The connection is not clear."

Response. This section of the report provides the theoretical foundation for the safe yield concept as commonly used groundwater management. The application of these concepts is presented in Section 7 of the Report.

Comment No. 12. Page 5, sixth paragraph. Comment reads: "Section 1.3.1 pg. 1-4, last paragraph: I'm not sure what you are saying here. (a) If the historical record is not useable, what did you use? (b) Is this only for land use or does it apply to precipitation as well?"

Response. (a) The historical record cannot be used directly to estimate future Safe Yield because the cultural conditions of the past are changing over time and not representative of the future. We updated and calibrated models based on the historical record and applied them with current and projected cultural conditions to estimate future net recharge and Safe Yield. (b) Land use and the associated water management practices.

Comment No. 13. Page 5, seventh paragraph. Comment reads: "Section 1.3.2 Storage pg. 1-4: (a) Need to define what is meant by the term "operational storage space." Presumably "operational storage" is a subset of the total storage space; (b) has the volume and spatial distribution required for "operational storage" been defined?"

Response. (a) Operational storage space is the volume of storage required to regulate variable recharge over time to ensure that the safe yield can be pumped. This definition was added as footnote to the report text. (b) No.

Comment No. 14. Page 5, eighth paragraph. Comment reads: "Section 1.3.3 Basin Area pg. 1-5: More explanation is needed to justify assigning the recharge and discharge terms for the hydrologic boundary to the adjudicated boundary. Are you confident that the net recharge/safe yield calculated for one area and applied to another is representative?"

Response. The area being referred to is located in the northern part of the Chino Basin that lies between the boundary defined by the Judgment and the hydrologic boundary used in the 2020 CVM. The short answer is yes.

Comment No. 15. Page 5, ninth paragraph. Comment reads: "Section 1.3.4 Cultural Conditions, pg. 1-5: There is some confusion as to what constitutes a "cultural condition." I think a definition and examples of such would be helpful up front. For example, are groundwater production patterns, stormwater capture/recharge, storage programs, and basin re-operation considered cultural conditions? Along those lines, are the changes in drainage patterns described in Section 1.3.5 considered cultural conditions?"

Response. The report text has been modified to include a definition of cultural conditions that reads: "Cultural conditions, as used herein, refers to land use and associated soil, crop and water management practices." The text in Section 1.3.5 has been included in Section 1.3.4.

Comment No. 16. Page 6, first paragraph. Comment reads: "Section 1.4 Court Direction to Reset Safe Yield, pg. 1-6, Section 4.4, 2nd Sentence: "The reset will rely upon long-term hydrology and will include data from 1921 to the date of the reset evaluation." The methodology described in Section 7.2, using an average precipitation from 1950 to 2011, appears to contradict what was directed by the Court."

Response. See Response to Comment No. 1.

Comment No. 17. Page 6, second paragraph. Comment reads: "Section 1.5 Court Approved Methodology to Calculate Safe Yield pg. 1-7, No. 5: This is a critical criterion to defining safe yield, which is not mentioned in Section 1.3."

Response. Section 1.3 provides the theoretical foundation for the safe yield concept as commonly used groundwater management. Section 1.5 describes court-ordered methodology that specifies additional requirements to calculate Safe Yield specific to the Chino Basin.

Comment No. 18. Page 6, third paragraph. Comment reads: "Section 1.6 Scope of Work, pg. 1-8 Task 5: This task bullet implies that multiple planning simulations would be conducted. Did this occur?"

Response. We simulated the 2020 SYR1 scenario once. Upon evaluation of basin response to the SYR1 scenario, we concluded there was no MPI or undesirable results. Therefore, pursuant to the Court-ordered methodology, no iterations were required.

Comment No. 19. Page 6, fourth paragraph. Comment reads: "Section 1.7 Scope of the Model Update, pg. 1-8, 2nd paragraph: We need assurance that the outflow reported by Cucamonga and Six Basins is the same as the inflow to Chino. Have the changes you implemented in the Chino Basin model been implemented in the models relied on by the neighboring basins?"

Response. The short answer to the question is "yes". The 2020 Chino Valley Model includes the Chino, Cucamonga, Six, Spadra and Temescal Basins. The model calculates the subsurface discharge among the basins.

Comment No. 20. Page 6, fifth paragraph. Comment reads: "Section 1.8 Scope of the Planning Projection Update, pg. 1-8, 1st paragraph: The last sentence indicates future water supply and demand information was "provided by the Parties and others." Who/what are the "others"?"

Response. Non-Chino Basin Judgment parties in the Six and Temescal Basins.

Comment No. 21. Page 6, sixth paragraph. Comment reads: "Section 2.5 Aquifer Systems pg. 2-13, 2nd paragraph: (a) Have the aquifer and aquitard layers in the Cucamonga and Six Basins areas been revised to match the new Chino Basin conceptualization or vice versa? (b) How do the aquifers line up at the basin boundaries? (c) Are the conceptualizations identified in WEI (2012) and WEI (2017) the latest?"

Responses (a) and (b). The Response to Comment No. 8 in "Appendix E-1 Comments and responses for first colleague peer review of the 2020 Safe Yield Recalculation Model" provided the following answer to questions (a) and (b).

"Cucamonga and Six Basins are considered to be hydrogeologically separated from the Chino Basin and the hydrostratigraphy (layering) is different than the Chino Basin. The connections to Chino Basin from the Cucamonga and Six Basins are simulated as barriers. The deep aquifers in Cucamonga and Six Basins will be modeled as weakly connected to Chino Basin's deep aquifer-system by using the barrier's hydraulic conductivity parameter."

Response (c). The latest Cucamonga Basin conceptualization is included in WEI (2012). The latest published conceptualization for the Six Basins is included in WEI (2017). Six Basins recently updated its conceptualization and the updated conceptualization is included in the 2020 CVM.

Comment No. 22. Page 6, seventh paragraph. Comment reads: "Section 2.6 Aquifer Properties pg. 2-18, Equation and 1st full paragraph: While this relationship may work in a laboratory on a sample with a known grain size distribution and cementation, it has little value in interpreting general descriptions of "sand" and "clay" from driller's logs. Attached is a typical driller's log from the Chino Basin. What is the source of the equation on the top of pg. 2-18? How was the equation on the top of page 2-18 applied to the information in a driller's log such as the one attached (see Attachment A)? This equation is similar to those published by Hazen (2011) and others. It is noted that, in most cases, it is only applicable to sediments with grain size distributions in the range of 0.1 to 0.3 mm (Fetter, 2001)."

Response: The initial estimates of the aquifer parameters of the 2020 CVM are obtained by analyzing over 1100 lithological (driller's) logs, where the lithological codes are related to hydraulic parameters. The equation of the top of page 2-18 of the draft report is given solely to illustrate the relationship between the soil texture (grain size) and hydraulic conductivity. That equation was developed by M. King Hubbert in his paper The Theory of Ground-water Motion published in 1940. Freeze and Cherry (1979) illustrates how the equation was derived. The Hubbert equation is indeed similar to the Hazen equation $K = C \times (d_{10})^2$ published in 1911, and both equations involve an empirical constant that must be adjusted to include influence of other properties that affect flow.

Comment No. 23. Page 6, eighth paragraph. Comment reads: "Section 2.6 Aquifer Properties pg. 2-18, 2nd paragraph: It is noted that McCuen et al., 1981 addresses soil infiltration, not specific yield."

Response: This comment is noted. This comment does not request any information or explanation regarding the 2020 Safe Yield Recalculation Final Report and is therefore not addressed further.

Comment No. 24. Page 6, ninth paragraph. Comment reads: "Section 2.6.1 Compilation of Existing Well Data pg. 2-18, 1st sentence: See comment above."

Response: This comment is noted. This comment does not request any information or explanation regarding the 2020 Safe Yield Recalculation Final Report and is therefore not addressed further.

Comment No. 25. Page 7, first paragraph. Comment reads: "Section 2.6.2 Classification of Texture and Reference Hydraulic Values for Aquifer Sediments pg. 2-18, 2nd paragraph, 2nd sentence: (a) How have data from these pumping tests been used to constrain the texture analysis? Other than this statement, there is no mention of how pumping test data, which are specifically designed and conducted to address model needs, were used to either determine initial parameter values or constrain calibrated values. Pumping tests have been conducted on all of the Chino Basin Desalter Wells, which provides critical information for constraining aquifer parameters in one of the most vital areas of the basin – where hydraulic control is achieved and maintained. It is my opinion that data obtained from controlled pumping tests are more reliable than grain size analysis for determining hydraulic conductivity and, if interference well measurements can be obtained, storage coefficients."

Response. As to question (a) Please see the discussion in Section 5 on how the initial hydraulic conductivities based on the lithologic model are adjusted to pre-calibration values. We created a new Appendix E that contains, among other things, Table E-1 that compares horizontal hydraulic conductivity estimates from aquifer stress tests estimated by others and by WEI to initial hydraulic conductivity estimates based on the lithologic model, the initial estimates of hydraulic conductivity prior to calibration and final calibrated values.

Comment No. 26. Page 7, second paragraph. Comment reads: "Section 2.6.2 Classification of Texture and Reference Hydraulic Values for Aquifer Sediments pg. 2-19, last paragraph of section: "Using this method, specific yield, horizontal hydraulic conductivity, and vertical hydraulic conductivity values were computed for each layer at each well location." Are the values computed using texture analysis initial values?"

Response. Yes, initial values for K_h, K_v, and S_y for each layer at each well location were computed using hydraulic properties corresponding to the sediment textures. These values are then adjusted to pre-calibration values as discussed in Section 5 and final calibrated values as discussed in Section 6.

Comment No. 27. Page 7, third paragraph. Comment reads: "Section 2.6.4 Specific Yield pg. 2-20: What were the criteria for accepting a driller's log as useful for the analysis? Model estimated specific yields should be compared to values derived from pumping tests to confirm modeling results."

Response. Each well completion report was reviewed and professional judgment was used to determine if the lithologic description was acceptable for inclusion in the textural analysis.

Comment No. 28. Page 7, fourth paragraph. Comment reads: "Section 2.6.5 Specific Yield pg. 2-20: Model estimated hydraulic conductivity or values derived from texture analysis should be compared to values derived from pumping tests to confirm modeling results. It is my understanding that a table of pumping test-derived hydraulic conductivity values will be provided in the final report."

Response. See Response to Comment No. 25.

Comment No. 29. Page 7, fifth paragraph. Comment reads: "Figures 2-10, 2-11, and 2-12. These figures need to be relabeled to make it clear that they are pre-calibrated parameter distributions.

Response. The figure titles have been revised indicating that they are pre-calibrated parameters.

Comment No. 30. Page 7, sixth paragraph. Comment reads: Section 2.6.6 Vertical Hydraulic Conductivity pg. 2-21: It is not clear in this section how you determined vertical hydraulic conductivity."

Response. The vertical hydraulic conductivity for each layer at each well location were calculated based on the equation in Section 2.6.2 (on page 2-19 of the draft report). For each layer, the calculated values were interpolated to all model cells in that layer using the Kriging method.

Comment No. 31. Page 7, sixth paragraph. Comment reads: "Section 2.7 Land Subsidence in the Chino Basin pg. 2-21: Land subsidence is, in part, a function of the storage properties of the aquitards, which you have now included in the model as Layers 2 and 4. This section should include a discussion of why model layers 2 and 4 where included in the 2020 CVM and their relationship to future land subsidence evaluations. Have the inelastic and elastic storage properties that dictate aquitard compaction been incorporated into this model? As it appears that the land subsidence package has not been included in this model, when you calibrate land subsidence, you will need to adjust the elastic/inelastic storage properties during that process. During that process, it may be prudent to adjust the other aquifer parameters in the model to optimize calibration. This will cause changes to the model-predicted water budget."

Response: 2020 CVM was updated to enable it to be calibrated for land subsidence. Calibration for land subsidence will be done in the next fiscal year as part of the land subsidence management work being done by Watermaster. As noted in Appendix B-20, the volume of groundwater discharged from aquitards due to land subsidence within MZ1 is estimated at 181 afy. This quantity is insignificant in the overall water budget of the 2020 CVM.

Comment No. 32. Page 8, first paragraph. Comment reads: "Section 3.1.1.1 Subsurface Inflow from Adjacent Groundwater Basins pg. 3-2, 1st paragraph: Is there no inflow from the Cucamonga Basin and Six Basins?"

Response. This section refers to subsurface inflow into the 2020 CVM domain. The Cucamonga and Six Basins are in the 2020 CVM domain.

Comment No. 33. Page 8, second paragraph. Comment reads: "Section 3.1.1.4 MAR pg. 3-3: This should be spelled out in the title. Also, this is defined as "Managed Artificial Recharge" in some parts of the report and "Managed Aquifer Recharge" in others."

Response. The report text has been updated.

Comment No. 34. Page 8, third paragraph. Comment reads: "Section 3.1.2.1 Groundwater Pumping pg. 3-3: It should be noted that Agricultural pumping after 2004 is metered."

Response. The report text was updated and now reads: "Overlying agricultural groundwater pumping was estimated: by the R4 model for the period 1978 through 2004 and in the planning scenarios and is therefore dependent on the same data as the R4; and with pumping estimates provided by the Chino Basin Watermaster that relies on meters installed at some wells and a water duty method for the other wells."

Comment No. 35. Page 8, fourth paragraph. Comment reads: "Section 3.2.5 Precipitation, 1st full paragraph on pg. 3-6 and Figure 3-13: Is the precipitation data presented in this section and shown on Figure 3-13 spatially averaged over the 2020 CVM or is this data for a specific location? In addition to providing general observations on the range of precipitation over the 2020 CVM for the historic period, as well as the occurrence of dry periods, a statistical evaluation of the distribution of rainfall data showing standard deviation bands about the mean should also be provided. An example of the statistical distribution of rainfall for a 75-year time period for a Riverside County station is provided as an example in the upper left graph of Attachment B. For comparison, the example precipitation data set is evaluated for a 10-year moving average (same time length used for the Safe Yield reset; lower left graph). These data are further evaluated to assess the probability for an average rainfall over a 10-year period exceeding the mean (graphs shown on the right). For the example shown, the probability that any 10-year period may exceed the mean rainfall for the period is 49.5% and may exceed the mean by 50% is about 18%. Using the 16th and 84th percentile distributions (+/-1 standard deviation) of rainfall to estimate DIPAW could provide additional useful information on the possible likely range in groundwater recharge for use in management decisions."

Response. Figure 3-13 shows the spatially-averaged annual precipitation falling on the 2020 CVM watershed. The spatially-averaged annual precipitation was estimated from the gridded monthly precipitation estimates obtained from the PRISM Climate Group and spatially averaged over the 2020 CVM. It appears that this comment is based on a misunderstanding that average precipitation was used to estimate long-term recharge. Average precipitation is not used in the 2020 Safe Yield recalculation, so the remainder of the comment is not addressed.

Comment No. 36. Page 8, fifth paragraph. Comment reads: "Section 3.2.5 Precipitation, last paragraph on pg. 3-6: What was the time period for the daily precipitation data used with the HSPF and R4 models?"

Response. The HSPF models were calibrated for Cucamonga and Day Creeks using the time periods that bracket their available gaged discharge records which were 1949 to 1975 and 1950 to 1971, respectively; and 1950 through 2011 for the planning period. The R4 model was calibrated for surface water discharge with precipitation data from 2005 through 2018. The R4 models used precipitation data from 1943 through 2018 for the calibration period and 1950 through 2011 for the planning period.

Comment No. 37. Page 8, sixth paragraph. Comment reads: "Figure 3-7. It appears that the Cypress Channel is represented as being fully concrete lined. Based on City of Chino staff review of aerial photos, it appears that approximately 3,000 feet of the channel located immediately north of Kimball Avenue (within the CIM property) is unlined and the channel condition along this segment may be characterized as natural soft bottom."

Response: We reviewed similar aerial photos and concur. Figure 3-7 has been updated.

Comment No. 38. Page 8, seventh paragraph. Comment reads: "Section 5.1 Surface Water Models 2nd paragraph, 2nd sentence. This sentence implies you used HSPF to estimate MAR? Is that true?"

Response. The HSPF model is used to estimate surface water discharge from the San Gabriel Mountains streams draining to the Chino Valley area. This discharge becomes a boundary inflow to streams simulated by R4. Local runoff plus these boundary inflows are routed through the stream systems across the Chino Valley, including the routing of surface water through conservation basins where MAR of stormwater occurs.

Comment No. 39. Page 9, first paragraph. Comment reads: "Section 5.2.1 Model Domain and Grid 1st full paragraph on pg. 5-2. As noted on the March 27 technical conference call, these layers don't pinch out but are simulated with the same hydrologic parameters as the overlying layer."

Response: Geologically the confining layers 2 and 4 pinch out near the east of MZ2. Since model layers in a numerical model may not be partially removed (i.e., pinched out), the geologically pinched-out portion of the model layers 2 and 4 are simulated with same hydraulic parameters as the respective overlying layer.

Comment No. 40. Page 9, second paragraph. Comment reads: "Section 5.2.1 Model Domain and Grid 2nd paragraph on pg. 5-2. "The Six Basins consists of three layers and the Cucamonga and Spadra Basins consist of two layers." How is the layering in the adjacent basins reconciled at the Chino Basin boundary with the 5-layer model in the Chino Basin?"

Response. Please see responses (a) and (b) to Comment No. 21.

Comment No. 41. Page 9, third paragraph. Comment reads: "Section 5.2.3 Hydraulic Properties and Zonation 1st full paragraph on pg. 5-3, 2nd sentence. "The calculated parameter value for any model..." Do you mean "cell" instead of "model"? If not, I don't understand this sentence.

Response. It should be "cell" not "model." The report text was updated.

Comment No. 42. Page 9, fourth paragraph. Comment reads: Section 5.2.3 Hydraulic Properties and Zonation (last paragraph, page 5-3 and Table 5-1). Tabulation of the range of aquifer parameters for each zone/layer would be more meaningful than the zone coefficients."

Response: The report text and Table 5-1 have been updated. Table 5-1 now consists of 5-1a that shows the initial parameter estimates and ranges based on the lithology model and 5-1b shows the initial parameter estimates and ranges used to start the calibration. The latter values are based on the formula shown on Section 5.2.3.

Comment No. 43. Page 9, fifth paragraph. Comment reads: "Table 5-2: Add the range of parameter values assigned."

Response: This comment seems to be referring to Table 5-1 as comment is not relevant to Table 5-2. Please see Response to Comment No. 42 above.

Comment No. 44. Page 9, sixth paragraph. Comment reads: "Section 5.2.4.1 Initial Condition In the Vadose Zone (last paragraph, page 5-3 and Figure 5-4): Considering lag time is a key parameter that relates the amount of time it takes for DIPAW to move through the vadose zone, it is recommended to include more control points than the few, widely distributed evaluated boreholes used in the model."

Response: This comment is noted. This comment does not request any information or explanation regarding the 2020 Safe Yield Recalculation Final Report and is therefore not addressed further.

Comment No. 45. Page 9, seventh paragraph. Comment reads: "Section 5.2.4.1 Initial Condition In the Vadose Zone, pg 5-4, 2nd paragraph: The last sentence of the paragraph indicates the linear reservoir approach "was difficult to calibrate and created unrealistic volumes of water stored in the vadose zone." (a) Despite the calibration difficulties, did it calibrate? (b) Were the "unrealistic volumes of stored water" too little or too much? (c) How is the volume of water stored in the vadose zone known to be unrealistic when using the linear reservoir approach?"

Response. (a) We did not attempt full-scale calibration of the 2007 model with the linear reservoir approach due to the initial condition challenge, the difficulty in estimating K and unrealistic amounts of vadose zone storage that resulted in test simulations. (b) Too much. (c) In our 2007 testing the linear reservoir approach, the vadose zone became largely saturated.

Comment No. 46. Page 9, eighth paragraph. Comment reads: "Section 5.2.4.2 Initial Condition in the Saturated Zone, pg. 5-5. How much data was available to constrain the groundwater levels in the Cucamonga and Six Basins? Show control points on Figures 5-5a and 5-5b."

Response. The measured water levels around April – July of 1977 in the 77 wells were used to derive the initial water level in Six Basin, while measured water levels from 14 wells at the same time were used to derive initial water level in Cucamonga Basin. The derived initial water levels were further adjusted based on the groundwater model. Figures 5-5a and 5-5b were updated.

Comment No. 47. Page 9, ninth paragraph. Comment reads: "Section 5.2.5.1 Subsurface Inflow from Mountain Boundaries, pg. 5-5. The surface water inflow from the San Gabriel Mountains, which is the basis for the subsurface inflow, is highly uncertain."

Response: This comment is noted. This comment does not request any information or explanation regarding the 2020 Safe Yield Recalculation Final Report and is therefore not addressed further.

Comment No. 48. Page 9, tenth paragraph. Comment reads: "Section 5.2.5.3 Recharge from San Gabriel Mountain Streams Tributary to the Santa Ana River, 1st paragraph, last sentence. The storm-water capture is estimated so, in this case, you are calibrating the model to estimated data. This introduces uncertainty to the results. More robust measurement of stormwater capture will improve the reliability of the calibration."

Response: This comment is noted. This comment does not request any information or explanation regarding the 2020 Safe Yield Recalculation Final Report and is therefore not addressed further.

Comment No. 49. Page 10, first paragraph. Comment reads: "Section 5.2.5.4 Surface Water and Groundwater Interaction in the Santa Ana River and Its Lower Tributaries, 1st paragraph on pg. 5-7. Is there a reference document that you relied on to characterize the Santa Ana River streambed? If so, please cite."

Response: The report text has been updated to cite USGS Water Supply Paper 1849: Roughness Characteristics of Natural Channels.

Comment No. 50. Page 10, second paragraph. Comment reads: "Section 5.2.6.2 Streamflow-Routing Package (SFR2). (a) What were the streambed hydraulic conductivities used for SFR2? (b) What is the basis for the streambed hydraulic conductivity values? (c) Do the streambed hydraulic conductivities vary from stream segment to stream segment? If so, what is that based on? (d) Were streambed conductivities varied during PEST calibration?"

Response. (a) and (c) The streambed conductivity for the Santa Ana River was calibrated to be 1 f/d and does not vary from segment to segment. The streambed conductivity of segments in Chino Creek ranges between 0.05 and 1 f/d. (b) and (d) The streambed conductivities were initially estimated based on observed soil texture in the streambed along Santa Ana River and tributaries and the final conductivity values were determined during the calibration process based on measured inflows to the Santa Ana River and its tributaries, measured Santa Ana River discharge at Prado dam and groundwater levels.

Comment No. 51. Page 10, third paragraph. Comment reads: "Section 5.2.6.5 Evapotranspiration Segments Package (ETS), 2nd paragraph. What was the extinction depth that you assigned to the ETS package? What was it based on?"

Response. The Extinction depth assigned to the ETS package is 20 ft. Please refer to Appendix B-18 of the draft report for a description of how the amount of water consumed by the riparian vegetation in Prado through evapotranspiration (ET) was estimated as well as how the model calculates the portion of this amount that is derived from groundwater.

Comment No. 52. Page 10, fourth paragraph. Comment reads: "Section 5.2.6.5 Evapotranspiration Segments Package (ETS), 2nd paragraph, last sentence. "When MODFLOW solves for groundwater elevations, the evapotranspiration rate of a model cell is determined by using the user defined relationship of evapotranspiration rate to the calculated depth." What user defined relationship did you use specific to this model?"

Response. The relationship is shown in Figure B-18-2. Please refer to Appendix B-18 of the draft report for a description of how the amount of water consumed by the riparian vegetation in Prado through evapotranspiration (ET) was estimated as well as how the model calculates the portion of this amount that is derived from groundwater.

Comment No. 53. Page 10, fifth paragraph. Comment reads: "Section 5.2.6.6 Horizontal-Flow Barrier Package (HFB): How did you determine the horizontal hydraulic conductivities assigned to the horizontal flow barriers (i.e. faults)?"

Response. The horizontal hydraulic conductivities of the horizontal flow barriers were initially estimated and then determined through calibration.

Comment No. 54. Page 10, sixth paragraph. Comment reads: "Section 5.2.7.2 Sensitivity Process (SEN) and Observation Process (OBS) (page 5-9): This section should be expanded to include a discussion on how "Observational Sensitivities" were used in the modeling process."

Response. The following paragraph has been added to Section 5.2.7.2: "Prior to executing model calibration, the observation sensitivity values were calculated, and used to guide the selection of calibration wells ensuring that adequate observation sensitivities exist in the selected wells.

Comment No. 55. Page 10, seventh paragraph. Comment reads: "Table 5-1. While I think I understand why you constructed this table the way you did, it is not very meaningful to the average reader. These values are multipliers and not actual values assigned to zones. I'd like to see a table showing the initial parameter estimate and the range of values that the initial estimate was allowed to vary during the PEST calibration."

Response: Please see the Response to Comment No. 42.

Comment No. 56. Page 10, eighth paragraph. Comment reads: "Section 6 – Model Calibration, 1st sentence, pg 6-1): Model calibration does not "validate" the water budget. It results in inflow and outflow values used to "estimate" the water budget."

Response. The report text was updated and now reads: "The purpose of model calibration is to estimate the best set of the model parameters and to use them to estimate the water budget."

Comment No. 57. Page 10, ninth paragraph. Comment reads: "Section 6.2.1 Calibration to Estimated Discharge and Diversion, 1st paragraph, page 6-2: (a) Were the HSPF and R4 models calibrated based on IEUA data for the time period 2005 to 2017? (b) Were the IEUA data rather than model data used explicitly for stormwater MAR in the model? The time range for measured data and calibrated data used in the model is not clear from the discussion in this section and in Section 5.1."

Response. (a) The R4 model was calibrated based on IEUA data for the time period 2005 to 2017 and USGS discharge data. (b) Yes, and when IEUA recharge estimates were not available, HSPF/R4-based stormwater MAR estimates were used.

Comment No. 58. Page 10, tenth paragraph. Comment reads: "Section 6.2.1 Calibration to Estimated Discharge and Diversions, last paragraph on pg. 6-2: Is the evapotranspiration (ET) referenced in this paragraph the Puddingstone Data? Is the ET data depth-dependent? How did you determine depth-dependent ET?"

Response. Puddingstone Reservoir evaporation data was used to estimate evaporation from water stored in conservation facilities. Evapotranspiration data is not used.

Comment No. 59. Page 11, first paragraph. Comment reads: "Section 6.3.2 Selection of Calibration Data, 3rd paragraph. "To ensure that the water level measurements were distributed evenly over time, and to avoid bias toward high-frequency water level measurements, a subset of water level measurements were selected for calibration purposes and the selected water levels are at least 15-days apart." It seems to me that if you are collecting groundwater levels at high frequency (e.g. multiple times per day or daily), selecting an average groundwater level for the month would be more representative and avoid bias or the possibility of inadvertently selecting an outlier"

Response: This comment is noted. This comment does not request any information or explanation regarding the 2020 Safe Yield Recalculation Final Report and is therefore not addressed further.

Comment No. 60. Page 11, second paragraph. Comment reads: "Section 6.3.3 Sensitivity Analysis and Covariance Matrix, pg. 6-6, 2nd and 3rd paragraphs: Generally, parameters that are correlated either directly or inversely are tied during parameter estimation such that the parameters move together (or inversely) but not independently in order to reduce parameter estimation runs. This section indicates the correlated parameters were "excluded." Does this mean these parameters were fixed and not included in the parameter estimation process? This would be counter to the approach generally used for parameter estimation."

Response: The correlated parameters were not fixed and are included in the parameter estimation process. Correlated parameters were adjusted as a group based on their initial parameter ratios.

Comment No. 61. Page 11, third paragraph. Comment reads: "Section 6.3.4.2 Calibration Results, pg. 6-8, 4th paragraph. "...indicate that the model parameterization and the water budget for the 2020 CVM are accurate: it would not be possible to achieve good calibration in the groundwater basin and the surface water system, as indicated by the high values for the coefficient of determination and NSE index, if the model parameterization and the water budget were not accurate." The use of the term "accurate" is not appropriate for this model or any other model relying on assumptions and estimates with varying degrees of uncertainty to achieve calibration. Models are simplified representations of a natural system and there are inherent uncertainties in the parameters and necessary simplifications used to describe the system, which is very complex. Given this, models may or may not provide reasonable predictions (e.g. Oreskes et al. 1994, Poeter 2007,10 Doherty et al 2010, and Rubin 2003). The 2020 CVM is no different. A predictive uncertainty analysis is needed to characterize the uncertainty in the water budget and Safe Yield estimated using the 2020 CVM."

Response: See Response to Comment No. 6.

Comment No. 62. Page 11, fourth paragraph. Comment reads: "Pg. 6-7 last paragraph: Presumably meant to read "at deep wells screened in layers 3 and 5 of the so-called ..."."

Response. The report text has been updated.

Comment No. 63. Page 11, fifth paragraph. Comment reads: "Section 6.3.5 Residual Analysis, pg. 6-9, 2nd paragraph. There is no statement in the report that says what this calibration means for estimating Safe Yield."

Response. The report text has been updated. The first sentence of the paragraph now reads: "The Cucamonga, Six, Spadra, and Temescal Basins are included in the 2020 CVM and they contribute subsurface inflow to the Chino Basin. Thus, these basins need to be well calibrated to ensure the reliability of the subsurface inflow estimates to the Chino Basin."

Comment No. 64. Page 12, first paragraph. Comment reads: "Section 6.3.6.1.3.3 MAR, pg 6-12 and Table 6-3: Table 6-3 is for the time period 1978 through 2018, though in Section 5.1 the available data for calibration is 2005 through 2018. Please clarify which data set are used for calibration."

Response. See Response to Comment No. 36.

Comment No. 65. Page 12, second paragraph. Comment reads: "Section 6.3.6.3 Change in Storage. This change in storage should be checked against a change in storage using changes in hydraulic head and specific yield across the model area. We need to know if the changes in storage estimated from the model/spreadsheet are consistent with what is physically happening in the basin."

Response. This is not required because the model is calibrated to match observed groundwater levels.

Computing change in storage from groundwater level measurements requires the creation of groundwater level maps from groundwater levels at well. There are challenges in preparing these maps that could easily result in significant error in the estimation of storage change. Examples include: groundwater level measurement error, groundwater level data at a well may not exist at the time of interest (so no groundwater level is used or an estimated groundwater level is used in place of an actual measurement), spatial density of groundwater level measurements (most wells are far apart), spatial coverage (wells do not cover parts of the basin and extrapolation will be required), drawing contours of equal groundwater level (human error) and interpolation schemes introduce estimation errors between perfect point groundwater level estimates (which we don't have access to) and they can amplify errors with imperfect data (which we mostly have).

Most of the storage change occurs in the northern part of the basin and that the spatial distribution of wells, measurement data, well construction and temporal availability of water level observations can produce at best, very approximate estimates of the change-in-storage. The process required to estimate change in storage involves: selecting a representative groundwater level at well for a specific point in time, plotting the groundwater level on a map, creating groundwater level contours and interpolation between the contours to estimate groundwater levels for each cell in the model grid. This would be done for pairs of years that bracket a period of interest. To undertake this effort, the difference in groundwater level for each model cell would be estimated for each pair of years. The calculated storage change would then be equal to the sum of the differences multiplied by the specific yield.

Using the calibrated model, we made a calculation to determine how much storage change would occur with a basin-wide increase/decrease of one foot based on the specific yield values estimated through calibration. The answer is 18,000 af. For comparative context, simple errors in data selection, contouring could easily result in ranges of difference between the model-based estimates and the groundwater level estimate in the amount of 50,000 and 100,000 af. Consequently, the suggested effort is both work intensive and not likely to result in a material improvement or better understanding of change in storage. Prior to the next scheduled Safe Yield reset, Watermaster will convene a process to review methods for verifying groundwater storage change estimates.

Comment No. 66. Page 12, third paragraph. Comment reads: "Section 6.3.6.4 Total Basin Storage, table at the top of pg. 6-15. Quantifying the storage in the basin to the nearest acre-ft suggests a level of accuracy that is not realistic. These should be rounded."

Response: This comment is noted. In our view the rounding is not required. The suggested change in formatting and presentation does not impact the recommendation regarding Safe Yield and is therefore not addressed further.

Comment No. 67. Page 12, fourth paragraph. Comment reads: "Section 6.3.7 Net Recharge, 2nd table on pg. 6-15. Same comment as for Section 6.3.6.4."

Response: This comment is noted. This comment does not request any information or explanation regarding the 2020 Safe Yield Recalculation Final Report and is therefore not addressed further.

Comment No. 68. Page 12, fifth paragraph. Comment reads: "Table 6-2. Initial and Calibrated Parameter Zone Scalers: The table should include the range of actual values derived for each zone as well as the bounds that PEST was allowed to vary during calibration."

Response. The report text was updated, Table 6-2 was replaced with a new Table 6-2 responsive to the comment that shows the final calibrated parameter estimates. The report text was updated and now reads: "Table 6-2 contains the final calibrated parameter values."

Comment No. 69. Page 12, sixth paragraph. Comment reads: "Table 6-3. Water Budget for the Chino Basin for the Calibration Period: Please identify which data are estimated (modeled) and which are measured."

Response. The water budget tables, Tables 6-3 and 7-2 have been updated to indicate recharge and discharge components that are directly input (I) to the 2020 CVM and components that are 2020 CVM results (R). The report text in Section 6 has been updated to read: "Individual recharge and discharge components with a column heading of "I" were input directly into the 2020 CVM and components with a column heading "R" are computational results produced by the 2020 CVM."

Comment No. 70. Page 12, seventh paragraph. Comment reads: "Section 6 Figures: The horizontal hydraulic conductivity and specific yield parameter distribution maps from the calibrated model, as provided via email from WEI on April 15, 2020 in response to my request for information, should be included in the report (see my comments to these data starting on pg. 10 below). In addition, I'd like to see parameter distribution maps for vertical hydraulic conductivity for each layer of the model provided in the report as well. Further, aquifer parameters derived from pumping tests should be shown on the maps or provided in a table and referenced to a location on the maps. The table of "stress derived hydraulic conductivities" and calibrated model aquifer parameters provided via email on April 15, 2020 will suffice although I'd like the well locations in the table shown on the aquifer parameter maps of horizontal hydraulic conductivity."

Response: Appendix E containing these exhibits will be incorporated into the final report.

Comment No. 71 Page 12, eighth paragraph. Comment reads: "Section 7.2 Long-Term Historical Records Used to Estimate Net Recharge (procedures, pages 7¬2 and 7-3, Table 7-2 and Figures 7-6 and 7-7). The use of the long-term average precipitation and ETo in the HSPF and R4 simulations with DWR change factors should also include application of the 16th and 84th percentile precipitation and ETo values to provide upper and lower bounds for estimated DIPAW. Such a range can be incorporated into an uncertainty analysis as part of an overall assessment of the potential projected range in Safe Yield of the basin."

Response. This comment appears to be based on a misunderstanding of the approach used to estimate long-term average recharge. Long-term average recharge is not based on long term average precipitation.

We selected the years 2018, 2030, 2040, 2070 to estimate the average recharge from 62 years of daily precipitation, applied water and ET specific to the cultural conditions in those years and adjusted for climate change. In each year we use surface water models to estimate the daily response to precipitation, applied water and ET. We calculate recharge on a daily basis. Then we aggregate the daily data to monthly values. There is no expectation of a specific precipitation in the future, just the expected recharge with specific cultural conditions. We use linear interpolation to estimate recharge between the years mentioned above.

Comment No. 72. Page 13, first paragraph. Comment reads: "Section 7.3 Present and Projected Future Cultural Conditions, 1st sentence. It was my understanding that land subsidence will be evaluated with a future version of the model. If that is still the case, this sentence should be modified to reflect that."

Response. The report text was updated to read: "The 2020 CVM was used to project net recharge, groundwater levels and the state of hydraulic control for the 2019 through 2050 period."

Comment No. 73. Page 13, second paragraph. Comment reads: "Section 7.3.1.1 Groundwater Pumping Projections, pg. 7-5, 2nd paragraph. Pumping distribution and magnitude could change the Safe Yield of the basin. Potential changes in pumping patterns should be evaluated to assess how we can optimize the basin and preserve Safe Yield."

Response: This comment is noted. Potential changes in pumping patterns and the impact on Safe Yield is speculative. Forecasted pumping conditions based upon hypotheticals are not suitable for developing a recommendation of Safe Yield. However, it is true that potential changes in pumping patterns may have a beneficial impact on Safe Yield if they are enforceable or otherwise reasonably certain to occur. It is possible that such an evaluation might be undertaken in connection with an update to the OBMP.

Comment No. 74. Page 13, third paragraph. Comment reads: "Section 7.3.1.2 Methodology to Project Replenishment Obligations, pg. 7-7: This description indicates it was assumed that 80% of replenishment would occur via unused pumping rights and stored water. Presumably, the 80% assumption has some influence on the Safe Yield estimate. Knowing (now) that this assumption influences the calculated Safe Yield, the Appropriators may opt to modify their behavior and cause more (or less) replenishment to be satisfied from storage than 80%. This is just one example of how the model should be used as a tool for the development of the Safe Yield recalculation and not the sole predictor of Safe Yield."

Response: This comment is noted. See Response to Comment No. 73. The assumption that 80 percent of replenishment obligation would occur via unused pumping rights and stored water is based on an investigation by Watermaster on the historical use of such water to meet replenishment obligations and thus it is representative of the behavior of the Parties. Changing this assumption for the Safe Yield recalculation is completely speculative. However, actual commitments to changes in pumping and replenishment behavior may have a positive impact on Safe Yield and might be considered in connection with updates to the OBMP.

Comment No. 75. Page 13, fourth paragraph. Comment reads: "Section 7.3.2 Impacts of Drought and Future Water Conservation Vadose Zone Storage Initial Conditions: While this section describes discrete periods of relatively recent drought, what would be the effect of using stored water rather than using replenishment water to augment the calculated net recharge, assuming this would become a temporary adjustment (increase) to the reset SY?"

Response: This comment calls for a speculation that is outside the scope of the 2020 Safe Yield recalculation effort. See Response to Comments No.s 74 and 75.

Comment No. 76. Page 13, fifth paragraph. Comment reads: "Section 7.3.2, last paragraph. All the parameters listed in this paragraph, with the possible exception of the initial groundwater levels, are estimated. These estimated values resulted in the DIPAW recharge term, which is also estimated. This comment is only to emphasize that the use of the term "accurate" in Section 6.3.4.2 is inappropriate and misrepresents the reliability of the model."

Response: See response to Comment No. 3.

Comment No. 77. Page 13, sixth paragraph. Comment reads: "Section 7.3.3 Conservation Related Impacts of Assembly Bill 1668 and Senate Bill 606, pgs 7-9 and 7-10: While the imposed irrigation ETAF will likely result in reduced DIPAW and net recharge and Safe Yield, has the implied irrigation reductions also been accounted for in the planned water demand scenarios? One would think the conservation effort would offset the amount of water used."

Response. No, the water demand and supply plans do not account for legislation as they were developed before the legislation became law.

Comment No. 78. Page 13, seventh paragraph. Comment reads: "Section 7.4.3 Change in Storage, pg. 7-10, 1st paragraph of section: Is the controlled overdraft of the basin accounted for in the methodology to estimate Safe Yield? If so, how?"

Response. The controlled overdraft of 200,000 af pursuant to the original Judgment and some of the Reoperation water authorized by the Peace II Agreement occurred in the period prior to the planning projection and the impact of these controlled overdraft were incorporated directly into the calibration. Reoperation pursuant to the Peace II Agreement has been accounted for in the planning scenario used to estimate net recharge and Safe Yield. See Section 7.3.1.2 and Table 7-3.

Comment No. 79. Page 13, eighth paragraph. Comment reads: "Section 7.4.4 1st Table. For the recharge components, there are two rows that appear to represent Santa Ana River Streambed Infiltration. I believe one of them may represent streambed infiltration from Santa Ana River tributaries(?) Also, the last recharge component for Managed Artificial Recharge appears to be cut off – should be "Recycled and Imported."

Response: The report text was updated to expand the rows to fully show the intended text.

Comment No. 80. Pages 13 to 14. Comment reads: "Section 7.4.4, pg. 7-12, 2nd paragraph and Figure 7-7. The reduction in net recharge for the 2021 to 2030 time period resulting from carryover of the extreme dry period in the 20 years preceding the planning period is a relatively short-term phenomenon and does not represent a long-term hydrological average. The Safe Yield should be estimated by more than just 10 years into the future in order to average out relatively short-term climatic variations, such as the recent dry period."

Response. This comment is noted. Watermaster disagrees. Forecasting conditions for periods in excess of 10 years would depend upon increased speculation and therefore, risk to the Basin and the parties to the Judgment. Watermaster followed the Court Ordered methodology. (See 4/23 Ag Pool Response to Comment No. 1a and 4/29 Workshop Response to Comment No. 2.)

Comment No. 81. Page 14, second paragraph. Comment reads: "Section 7.6 Recommended Safe Yield. In implementing the methodology for estimating Safe Yield described in Section 7.1, did you identify MPI in any of the iterative model runs to determine Safe Yield, as per No. 5 of that section? If so, at what initial Safe Yield did you determine MPI, what was the nature of the MPI, and where did it occur?"

Response. Upon evaluation of basin response to the SYR1 scenario, we concluded there was no MPI or undesirable results. Therefore, pursuant to the Court-ordered methodology, no iterations were required.

Comment No. 82. Page 14, third paragraph. Comment reads: "Section 7.6 Recommended Safe Yield. It appears that the Safe Yield is estimated from the average net recharge of the time period from 2020 to 2030. However, there is nothing in the Court-ordered methodology or Rules and Regulations that require Watermaster to limit the prospective time period over which the net recharge is estimated to the 10-year period over which the Safe Yield will be applied. In fact, it is contrary to relying on a long-term hydrology as a basis for the estimate."

Response. The Court-ordered methodology was the methodology used in the prior Safe Yield recalculation and the ten-year period used to set the Safe Yield is included, albeit implicitly, in that methodology. There is great uncertainty in how the parties will pump and manage storage in the next ten years and that uncertainty is greater beyond ten years. Using the period beyond ten years involve speculation is not prudent given prior experience. For example, the pumping projections used in the 2020 Safe Yield recalculation are about 6,000 to 27,000 afy less for 2015 through 2035 period used in the prior Safe Yield recalculation. Over the last 20 years, the parties have consistently pumped less groundwater than they projected and this has the effect of overestimating net recharge and Safe Yield. This over-estimation increases relative risk to the Basin and the parties to the Judgment and is not therefore reasonable and prudent in this case. (See Response to Comment No. 80, 4/23 Ag Pool Response to Comment No. 1a and 4/29 Workshop Response to Comment No. 2.)

Comment No. 83. Page 14, fourth paragraph. Comment reads: "Appendix B: The appendix includes three WEI memos, one dated 2/6/20 and two others dated 2/11/20.
(a) The 2/6 memo indicates the step 7 density analyses were performed independently by two to three persons and then those results were averaged. What was the variability in the spread of the independent analyses? (b) One of the 2/11 memos describes the assumptions attributable to septic system contributions to groundwater recharge, and indicates the "unit" contributions decrease with time. Most existing septic systems have been in-service for decades, and if true then what explanation(s) are provided to support assumed decreasing contribution to groundwater recharge? It does not seem reasonable to assume their operational efficiencies have changed. (c) The other 2/11 memo discusses groundwater discharged from aquitards due to land subsidence, and indicates such contribution is considered negligible. Please provide what estimated volume would be anticipated and considered negligible."

Response: (a) Between all seven years analyzed, the variability in the spread of the independent analyses averaged 11 percent and ranged from 0 percent to 55 percent. (b) The decreasing trend of septic tank contributions to groundwater recharge reflects effects of water use conservation. The numbers that were used in the model are given in Appendix B-19. (c) The volume of groundwater discharged from aquitards due to land subsidence in the Management Zone 1 (MZ1) of the Chino Valley Watershed was described in Appendix B-20. The volume of groundwater discharged from aquitards due to land subsidence of all active model cells within MZ1 is calculated as 181 afy.

Comment No. 84. Page 14, fifth paragraph. Comment reads: "Appendix D, D-162. The message of the figure is not evident."

Response. Figure D-162 was inadvertently included in Appendix D and it will be deleted from the final report.

Comment No. 85. Pages 14 to 15. Comment reads: "Pg. 2 second to last paragraph and Table 1: WEI has stated that the stress test hydraulic conductivities that I provided for the Chino Basin Desalter wells were based on Jacob's straight-line solution for confined aquifers and that, in so doing, the values are overestimated because the aquifer is unconfined. The application of the Jacob straight line method for estimating aquifer transmissivity and hydraulic conductivity can easily be corrected by plotting and analyzing adjusted drawdown values using the following relationship:

$$s' = s - s^2/\, 2h$$

Where:

s' = adjusted drawdown (ft)
s = measured drawdown (ft)
h = aquifer thickness (ft)

For the stress test-derived horizontal hydraulic conductivity at Chino II-2, the value in Table 1 of the WEI response to comments is approximately 400 ft/day. When the correction is applied to the drawdown data, the adjusted hydraulic conductivity for unconfined conditions is approximately 470 ft/day. Both corrected and uncorrected values are significantly higher than the value used in the calibrated model for that location (approximately 85 ft/day). Hydraulic conductivity values derived from pumping tests are higher than model calibrated values at all of the desalter wells. Were the stress test horizontal hydraulic conductivity data summarized in Table 1, or a corrected version, used to constrain aquifer parameterization during calibration? What were the upper and lower bounds assigned to the initial hydraulic conductivity values in PEST? Was the prior information from the stress test data used to constrain the bounds assigned to PEST? Were they allowed to vary as high as the values derived from pumping tests?"

Response. See Response to Comment No. 25

Comment No. 86. Page 15, second paragraph. Comment reads: "Figure 3. There is a significant change in horizontal hydraulic conductivity along straight lines in multiple locations of Layers 1 and 2. These lines correlate to parameter zones described in WEI (2020). It is noted that, from a conceptual perspective, sediments would not be expected to be deposited with linear boundaries as shown on these maps. There is likely a high degree of uncertainty in how these zones are simulated in the model. It is further noted that the horizontal hydraulic conductivities shown for Layer 1 along Bellgrave Avenue and in the vicinity of Mission Boulevard and the 60 Freeway are lower than indicated from pumping test-derived data."

Response. This comment is noted. This comment does not request any information or explanation regarding the 2020 Safe Yield Recalculation Final Report, and is therefore not addressed further.

Comment No. 87. Pages 15 to 16. Comment reads: "Page 3, Equation at the top of page. This relationship applies to horizontal flow of water in an aquifer and is representative if there isn't significant vertical flow of water in the borehole. Are there significant hydraulic head differences between aquifers in the model? If so, what are the magnitude of differences?"

Response. As shown in Table 6-1, most calibration wells were single-layer wells. There are no significant hydraulic head differences at the location of multiple-layer calibration wells.

Comment No. 88. Page 16, second paragraph. Comment reads: "Page 3, last paragraph, last sentence. While the residuals at the Ayalla Park monitoring well may not impact the Safe Yield estimate significantly, future calibration for land subsidence will involve changes to the aquifer storage properties in this area, which may improve groundwater level calibration but will also change the water budget and could result in changes to the Safe Yield."

Response. We have estimated the amount of water released from storage by compaction of aquitards in the subsiding area of the basin and concluded that the contribution to yield is negligible. Please see Appendix B-20.

Comment No. 89. Page 16, third paragraph. Comment reads: "As mentioned earlier in this letter, the biggest omission in the 2020 Safe Yield Recalculation is a predictive uncertainty analysis. Such an analysis has become an industry standard procedure when using complex models to inform groundwater basin management decisions. The predictive uncertainty analysis would involve developing multiple versions (preferably hundreds) of the Chino Valley Model, each with unique parameter distributions. The unique model distributions can be developed automatically using PEST and its associated utility programs. Parameter bounds would be selected to be within plausible ranges based on available data. The water budgets for realizations with acceptable model calibrations would then be processed to determine the Safe Yield for each realization, resulting in a range of Safe Yield estimates for the basin. I recommend conducting this analysis prior to finalizing the Safe Yield for the next 10 years."

Response: This comment is noted. Watermaster disagrees that the suggested expanded modeling effort is required to develop a reasonable and prudent recommendation for the recalculation of Safe Yield. (See Response to Comment No. 6).

Comment No. 90. Pages 16 to 17. Comment reads: "In addition to the predictive uncertainty analysis and prior to finalizing the Safe Yield, I recommend the following:

- (a) Conduct a check of the change in groundwater storage for the period 2011 to 2018 using the following relationship:

$$Vw = (Sy)(A)(\Delta h)$$

Where:

Vw	=	the volume of groundwater storage change (acre-ft).
Sy	=	specific yield of aquifer sediments (unitless).
A	=	the surface area of the aquifer within the Chino Basin (acres).
Δh	=	the change in hydraulic head (i.e. groundwater level) (feet).

The change in groundwater storage will be specific to the shallow aquifer (Model Layer 1). The areal distribution of specific yield should be the same as that used in the calibrated model used to estimate Safe Yield. Either model-generated or hand-drawn groundwater contours for 2011 and 2018 would be exported to/digitized in GIS software, which can then be used to calculate the change in hydraulic head across the area. The storage change estimated in this way would then be compared to the change in storage shown in Table 6-3 of the model report WEI (2020).

- (b) Compute the Safe Yield for the 2020 to 2030 time period based on a long-term projected net recharge from at least 2020 to 2050 in order to smooth out short-term hydrologic conditions such as the lingering impacts of recent historic dry conditions.

- Use the above information to inform the AP for redetermining the Safe Yield of the Chino Basin for the 2020 to 2030 time period.

Response:
(a) See Response to Comment No. 65. (b) Please see Response to Comment No. 82.

Response to Questions and Comments on the April 2, 2020 Safe Yield Recalculation Report

April 29, 2020 Questions and Comments from Stakeholders at the April 29th workshop

Comment No 1. From Thomas Harder, regarding slides 10 and 44. "Annual Precipitation, is presented in the slide as the mean precipitation across the basin. Is this based on one or more precipitation stations? How is this chart prepared?"

Response: This chart contains annual times series of spatially averaged precipitation over the CVM watershed. The source of data is the 800-meter gridded monthly precipitation estimates provided by the PRISM Climate Group at the University of Oregon. For each year, the spatially averaged monthly precipitation over the CVM watershed is summed to create an annual CVM watershed estimate.

Comment No 2. From Thomas Harder, regarding slide 24. "If we limit ourselves to the 2020-2030 period for setting SY, it is strongly influenced by near-term drought that just occurred. In the spirt of the method, my opinion is that a longer term average would be appropriate to capture a longer term condition. Just a statement."

Response: This comment is noted as a statement. Watermaster disagrees with the use of a longer period. First, the Court ordered Watermaster to follow the proposed methodology in April 2017. That methodology used a 10-year period for prospective cultural conditions; still relying on long-term hydrology. Second, projections of cultural conditions, inclusive of changes in land use, pumping patterns, applied water, regulatory requirements and conservation practices become less reliable and overly speculative when they are extended beyond 10 years for purposes of calculating Safe Yield. A 20-year period may, under some circumstances, be appropriate in the future. However, the variable conditions in the Basin do not support a 20-year forecast at the present time.

Comment No 3. From Eric Fordham, regarding slides 24 and 26. "Re: ETAF values. Does the chart in slide 24 incorporate the ETAF values shown in slide 26? With respect to DIPAW, were the ETAFs considered to compute it?"

Response: The ETAFs for the historical period were derived from the R4 model. For future projections, the ETAFs listed for the period 2020 through 2070 were used.

Comment No 4. From Justin Scott Coe, regarding slide 26. "What legislation are you referring to that applies to the requirement for legacy urban to comply with reduced irrigation? My understanding of the law it will not apply to legacy urban."

Response: The 2020 Safe Yield Recalculation Final Report references AB 1668 and SB 606, collectively referred to as "Making Conservation a California Way of Life." As described in the Report, the eventual outcome of the State's process to develop residential outdoor water use standards, and the manner in which those standards will be implemented, is too speculative to evaluate at this time how that implementation might affect the Basin's net recharge. Moreover, it is possible that mitigation may limit the adverse impact on the Basin. As described in the Report's recommendation, Watermaster will monitor these developments and consider any impacts on net recharge.

Comment No 5. From Geoff Vanden Heuvel, regarding slide 30. " (a) What are we to conclude from Slide 30? Does this mean that the safe yield has been over allocated by 10,000 afy for the 2011 to 2020 period? (b) There is no mechanism to go back and correct if we have been inaccurate in past estimates. The chart shows we over allocated the Safe Yield by 10,000 afy. Am I reading it wrong? (c) This is not an insignificant amount of water. Had we known then what we know now, would we have set it at 125,000 afy?"

Response: (a) No we are not to conclude Safe Yield was overallocated. Simply put the difference is: one instance is a forecast and the other is a hindcast. One conclusion from Slide 30 is that the historical recharge in the period 2011 through 2018 was less than the long-term average recharge. The Safe Yield for the 2011 through 2020 period was calculated in 2013 based on the expected long-term average recharge that was based on the precipitation record of 1921 through 2011 and then-current and projected cultural conditions. The 1921 through 2011 precipitation period contains wet and dry periods. In 2020, using actual precipitation for the period 2011 through 2018 and extrapolating to 2020, the 10-year net recharge for 2011 through 2020 has been estimated at about 125,000 afy. What needs to be understood is that the period 2011 through 2018 is an extremely dry period that includes the driest five-year period in the last 122 years and contains part of the driest 10-year period in the last 122 years (see Figure 3-14 in April 2, 2020 Safe Yield Recalculation report); the period of 2011 through 2018 is considerably drier than the long-term average. Comparing both estimates is comparing apples (long-term average recharge) to oranges (short-term average recharge from a record-setting dry period). In both the 2013 and 2020 Safe Yield recalculation efforts, the estimated long-term average recharge, in the absence of drought effects, appears to be comparable for the periods 2031 to 2040 and 2041 to 2050. As a result, in the fullness of time, the difference between the long-term average based Safe Yield of 135,000 afy and the historical recharge of 125,000 afy will be offset in future years when wet periods occur. The intent in using a prospective long-term average to set the Safe Yield was to acknowledge that variations in annual recharge caused by wet and dry periods will occur, that the Parties could use the storage space in the basin to buffer recharge variations and benefit from the use a long-term recharge-based Safe Yield. The primary benefit being a stable planning environment to manage their water portfolio and to invest in facilities

(b) The Court-ordered Safe Yield evaluation and reset methodology does not include any mechanism for retroactive adjustments to allocated Safe Yield nor should it. The prior answer explains the differences in estimated yield between the 2013 prospective estimate and the 2020 calibration estimate. As described above, using the Court-ordered prospective methodology, these differences can be reasonably expected to be off-set by future wet periods consistent with the historical record. That is, projections will still be made in accordance with the long-term hydrology and actual recharge will be evaluated and calibrated by the model in arrears.

(c) Please see prior responses.

Comment No 6. From Sorab Panday, regarding slide 14. "Can you please further explain the approach used to compute the average recharge, explaining more specifically how it is not based on average precipitation?"

Response: We selected the years 2018, 2030, 2040, 2070 to estimate the average recharge from 62 years of daily precipitation, applied water and ET specific to the cultural conditions in those years and adjusted for climate change. In each year we use surface water models to estimate the daily response to precipitation, applied water and ET. We calculate recharge on a daily basis. Then we aggregate the daily data to monthly values. There is no expectation of a specific precipitation in the future, just the expected recharge with specific cultural conditions. We use linear interpolation to estimate recharge between the years mentioned above.

Comment No 7. From Sorab Panday. "How does the SYR-1 scenario relate to the storage framework investigation. When you look at maximum storage value in SFI Table 7-3."

Response: The maximum managed storage value projected in the 2018 Storage Framework Investigation report is estimated to be about 695,000 af and the maximum managed storage value projected in the 2020 Safe Yield Recalculation report is estimated to be about 612,000 af. The latter is less because the assumed Safe Yield is less by 80,000 af through the decade.

Comment No 8. From Sorab Panday. "The basin is expected to operate in different storage bands. Shouldn't the SYR be based on expectation of future storage management programs rather than based on a baseline condition?"

Response: The 2020 SYR1 planning scenario used to recalculate Safe Yield includes the projected storage management activities of the Judgment Parties and the existing Dry-Year Yield program. Storage and Recovery Program proponents will submit applications to Watermaster to operate Storage and Recovery Programs in the Chino Basin. The basin response to each proposed Storage and Recovery Program will be evaluated by Watermaster and all potential adverse impacts and MPI identified by Watermaster must be fully mitigated by the

Storage and Recovery Program proponents pursuant to the Peace Agreement. The impact on Safe Yield due to a proposed Storage and Recovery Program will be evaluated by comparing a baseline scenario that includes the storage management activities of the Judgment Parties (and the DYYP if it is still in operation) to an identical scenario with the proposed Storage and Recovery Program. Reductions in net recharge and Safe Yield projected to be caused by the proposed Storage and Recover Program must be fully mitigated by the Storage and Recovery Program proponent for the program to be approved and implemented.

Comment No 9. From Sorab Panday. "The RMPU states that MS4 projects will be considered in the 2020 Safe Yield reset. Were these projects considered?"

Response: Yes. Watermaster conducts an annual information request of the Appropriative Pool Parties to provide information on the number of MS4 projects in their service areas. Based on the last report (WEI, 2018) 114 MS4 compliance projects were identified that relied on groundwater recharge to comply with the MS4 permit. Of these projects only 36 could be verified to have been constructed and of these only 17 had information that demonstrated that some maintenance had occurred. No MS4 project recharge was included in the Safe Yield recalculation due to the uncertainty of their existence, operations and maintenance. Our engineering assessment based on what is knowable is that recharge from the existing MS4 projects is negligible.

Comment No 10. From Sorab Panday. "When we talk about total aggregate managed storage volume, where is this number computed from? Is it from the old or new model?"

Response: The term "managed storage" as used herein refers to water stored by the Parties and other entities and includes Carryover, Local Storage, and Supplemental Water held in storage accounts by the Parties and Storage and Recovery Programs. Local Storage includes Excess Carryover for the Overlying Non-Agricultural Pool Parties and Excess Carryover and Supplemental Waters for the Appropriative Pool and Overlying Non-Agricultural Pool Parties. Watermaster tracks the various types of water stored by the Parties and others and reports them in its annual reports and assessment package.

Comment No 11. From Sorab Panday. "What are the storage thresholds based on? What do they mean and how do we change them?"

Response: The context of the safe storage threshold originated in 2000 in the OBMP. The value was set at 500,000 af for the purpose of being able to store water safely, without causing material physical injury (MPI) to the Basin or any Party. The CEQA analysis for the OBMP was based on this estimation. Amounts could be stored in excess of the safe storage quantity but were required to mitigate any adverse impacts or MPI as a condition of storing water. This became part of the Court order. Subsequently, a CEQA addendum was done to enable temporarily increase in storage from 500,000 af to 600,000 af, based on a demonstration that 600,000 af would not cause adverse impacts or MPI. Then, the 2018 Storage Framework Investigation identified that 800,000 af could be the new storage limit. However, the rules set forth in the Peace Agreement and the OBMP Implementation Plan still remain and control the discretion of Watermaster. The 2020 Storage Management Plan was written to suggest a method for making that space available to the Parties for their Local Storage activities and for the Metropolitan Water District in the existing DYY program.

Comment No 12. From Thomas Harder. "Did you iterate multiple times to arrive at the Safe Yield value of 131,000 afy that causes no Material Physical Injury?

Response: Upon evaluation of basin response to the 2020 SYR1 scenario, we concluded there was no MPI or undesirable results. Therefore, pursuant to the Court-ordered methodology, no iterations were required.

Comment No 13. From Rick Rees and Marilyn Levine. Rick Rees: "My April comment memo for the State requested model files. We did not receive these files." Marilyn Levine: "This is a question. We want to understand the response. Will you be releasing the model files that were requested?

Response: No. Watermaster will not be releasing the model files unless instructed to by the Court. Watermaster has a duty to administer the decree and has a responsibility for recalculating Safe Yield as described in the Judgment and in the Court's Order of April 28, 2017. The CVM is Watermaster's proprietary model. As the administrator of the decree, Watermaster has no specific interest in the application of the model, other than for the assistance to the parties to the Judgment and under the direct oversight of the Court. Maintaining the integrity of the model is paramount to its duties. Release of the model could lead to parties and individuals changing inputs into the model that enable advocacy to be injected into the modeling process. As a result, public confidence in the Judgment may be undermined by Watermaster and the Court having to respond to allegations supported by various and potentially iterations of the model and modeling reports.

The Parties are not disadvantaged by not having the model files. The 2020 CVM and findings from its use have been the subject of three peer review workshops where the Parties and their technical experts participated. Watermaster retained an independent expert to review the Watermaster's hydrologist modeling work and that expert found that the model "does meet or exceed generally accepted industry standards" and that "application of the model and the updated safe yield analysis were consistent with prevailing professional standards in addition to being compliant with the Court-approved methodology for estimating net recharge and associated safe yield." Since the publication of the April 2, 2020 Safe Yield Recalculation report, 120 questions/comments were submitted by the Overlying Agricultural and Appropriative Pools and others and they have been responded to. Watermaster and its professional team will continue to work with the Parties to respond to new questions as they arise. Watermaster's assurances regarding transparency and open access to information are buttressed by the Court's oversight pursuant to its continuing jurisdiction over Safe Yield.

Comment No 14. From Rick Rees, Thomas Harder and Sorab Panday. All three requested that groundwater storage change calculations be performed to verify the change in storage estimated in Table 6-3 of the April 2, 2020 Safe Yield Recalculation report.

Response: It has been explained in other Responses to Comments (see response to comment 65 from April 23, 2020 Letter from the Appropriative Pool re: Technical Review of the Models and Methodology Used as a Basis for the 2020 Safe Yield Reset) that verifying model-predicted groundwater storage change calculations through other methods is not effective. Prior to the next scheduled Safe Yield reset, Watermaster will convene a process to review methods for verifying groundwater storage change estimates.

Comment No 15. From Justin Scott Coe. "To re-emphasize a written comment regard the use of the term "recalculation" in the title of the WEI report. We would be more comfortable with a change to the title along the lines of "Safe Yield Reset". Recalculation is not used in the Court Order and there was a reason for that, because the model is a tool use to support the process. The Reset requires use of judgement of information available. Please consider the change."

Response: The process through which the Basin's Safe Yield is estimated and reset is described in various manners throughout the Watermaster guidance documents. Paragraph 15.(a) of the Judgment refers to the Court's retained jurisdiction to undertake a "redetermination" of the Safe Yield. Paragraph 10.(a)(1) of the Appropriative Pool Pooling Plan, Exhibit "H" to the Restated Judgment, refers to a reduction in Safe Yield "by reason of recalculation thereof." The OBMP Implementation Plan, in its discussion of Program Elements 8 and 9, variously refers to the "comput[ation]", "estim[ation]," "re-determination" and "reset" of the Safe Yield. The Court's April 28, 2017 order found that the reset of the Safe Yield to 135,000 afy was a "recalculation" and required Watermaster to conduct a Safe Yield "evaluation and reset process" beginning in 2019. Based on all of these descriptions, it is unclear that the use of one description as opposed to another in WEI's report has any import or effect.

The Court's April 28, 2017 order explains the Safe Yield evaluation and reset process that Watermaster must follow. This includes the Court's adoption of a specified methodology for this process, that includes the methodology in the Reset Technical Memorandum. Step 5 of the Reset Technical Memorandum's methodology includes the qualitative evaluation of groundwater production at the net recharge estimated by the groundwater flow model.

Luhdorff & Scalmanini
Consulting Engineers

April 5, 2020
File No. 20-1-040

Mr. Peter Kavounas, General Manager
Chino Basin Watermaster
9641 San Bernardino Road
Rancho Cucamonga, CA 91730

SUBJECT: REVIEW OF CHINO BASIN UPDATED SAFE YIELD, CHINO BASIN, CALIFORNIA

Dear Mr. Kavounas:

Luhdorff and Scalmanini Consulting Engineers (LSCE) are pleased to provide this letter summarizing LSCE's review of the updated safe yield analysis conducted by Wildermuth and Associates for the Chino Basin. The scope of the review focused on the following three tasks:

1. Does the basin model used to develop the updated safe yield meet or exceed generally accepted industry standards;
2. Were the application of the model and the updated safe yield determination undertaken consistent with the prevailing professional standards?; and
3. Provide recommendations for how to manage the water resources of the basin in the future.

Task 1

The model used to develop the updated safe yield does meet or exceed generally accepted industry standards in my opinion. The model tool is based upon previous versions that were used in the development of safe yield that were vetted by the parties to the Judgement and approved by the Court. Therefore, many elements of the model construction have not changed or have been improved upon based upon additional data collection efforts and corresponding improvements in the conceptual model from which the model tool represents. The Administrative Draft report that was reviewed in this effort did not include the calibrated aquifer parameters for the model. Rather, the Administrative Draft included the degree in which the most sensitive aquifer parameters varied and directing the reader to previous model reports that included the actual aquifer parameter values. Since the approved scope of the LSCE review did not include review of these prior model reports, LSCE was not able to assess how the calibrated model represented the conceptual model aquifer properties. However, there was sufficient information on other aspects of the model and output results (water budget, calibration statistics, etc.) to conclude that the model meets or exceeds those industry standards described by Wildermuth Environmental, Inc. (WEI) in section 6.4.2 and therefore, is more than adequate in developing an updated safe yield estimate.

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Task 2

The application of the model and the updated safe yield analysis were consistent with prevailing professional standards in addition to being compliant with the Court-approved methodology for estimating net recharge and associated safe yield. WEI accounted for all known recharge and discharge water budget components in developing the net recharge for the 2021 through 2030 time frame for the updated safe yield analysis and also for the period that extends out to 2050. WEI also described some limitations that could impact the updated safe yield in the form of future State of California water conservation measures. The scope of these water conservation measures are not currently quantifiable at the time of the updated safe yield analysis.

Task 3

Recommendations for managing water resources in the basin moving forward are described below.

- Tracking and verifying the use of imported water supplies from Met and how variations in actual year to year deliveries correlate to projected estimates is recommended to ensure that the updated safe yield projection is based on verifiable data. The increase in projected imported supplies from Met, compared to 2015 levels, is significant during the 2021 through 2030 safe yield period, thereby allowing for a corresponding decrease in groundwater pumping. If the projected amounts of imported water fall short of projections and is offset by increases in groundwater pumping, then the projected safe yield estimate reported in the Administrative Draft report will overestimate of the actual safe yield and potentially result in overdraft.
- The utilization of water (rising groundwater, increased runoff from impervious surfaces to the Santa Ana River, etc.) resulting from changes in cultural conditions in the Basin should be considered for future projects to enhance safe yield or as a source of replenishment water (assuming acceptable water quality). However, with the passage of the Sustainable Groundwater Management Act (SGMA) any capture of "tributary" inflow to the Santa Ana River from such projects would need to consider whether such projects would result in significant and unreasonable impacts to beneficial uses of surface water.
- Uniform monitoring and reporting procedures that are implemented by all parties in the Basin would address some data gaps and reduce uncertainty in future estimates of safe yield and also provide a more complete datasets for the evaluation of the effectiveness of water management programs and accounting of the groundwater resources in the Basin.

If you have any questions, please let us know.

Sincerely,
LUHDORFF & SCALMANINI
CONSULTING ENGINEERS

William L. Halligan

William L. Halligan, P.G.
Senior Principal Hydrogeolgist

LSCE

EXHIBIT E

WEST YOST
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Safe Yield Reset Methodology Update

Watermaster Board Meeting

September 22, 2022

Background – April 28, 2017 Court Order

- April 28, 2017 Court Order
  - The Order was all about setting the Safe Yield for the 2011-2020 period;
  - Considered the 2015 Safe Yield Reset Agreement (a.k.a. SYRA) and ordered Article 4 of that agreement. Article 4 related to the Safe Yield for the period and also the Safe Yield methodology.

Background – April 28, 2017 Court Order

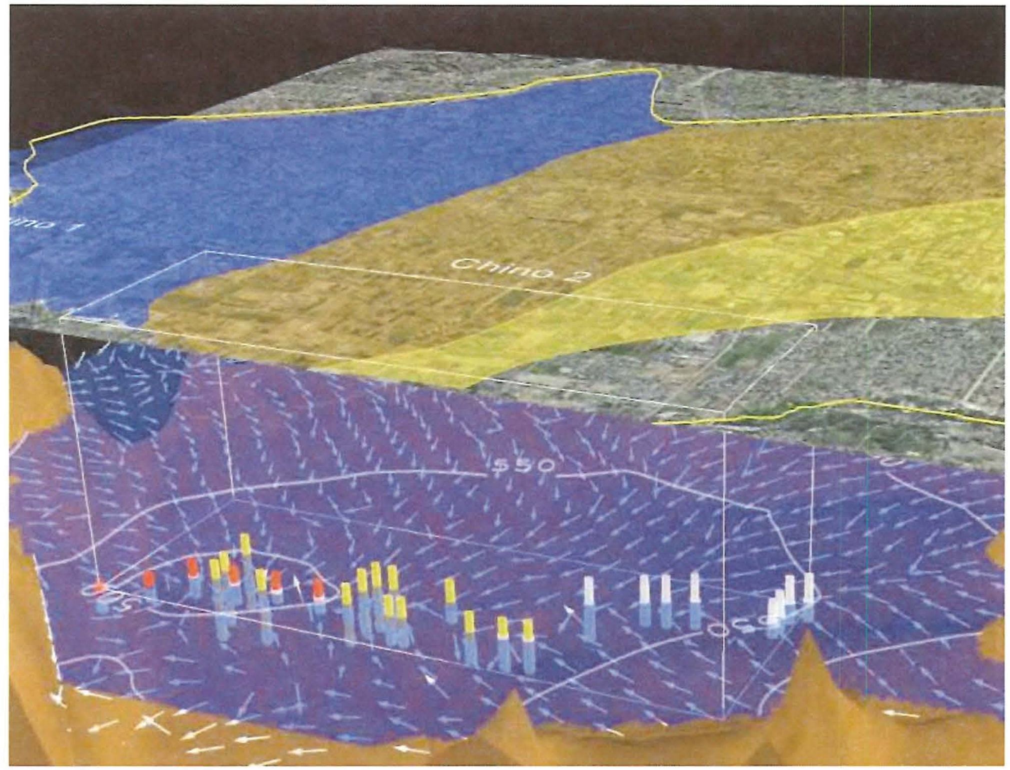
- April 28, 2017 Court Order
  - Set the Safe Yield at 135kafy through 2020 (no retroactive accounting prior to 7/1/14)
  - Directs Watermaster to reset the Safe Yield in 2020
  - Provides for an interim correction if Safe Yield is +/- 2.5% different
  - Directs Watermaster to incorporate future advances in best management practices and hydrologic science
  - Directs Watermaster to update the model and complete a Safe Yield evaluation by 6/30/25
  - Directs annual collection and evaluation of data

Background – 2020 Safe Yield Recalculation

- Used Court-approved 2015 SYRM to reset the Safe Yield to 131kafy for FY 2021 through 2030.
- Peer review comments recommended that the SY reset methodology should include uncertainty analysis as a widely accepted Best Management Practice, described what it would look like, and listed several benefits to the parties.
- One party claimed in Court that uncertainty analysis is "standard engineering practice", that "...it is necessary to complete... an uncertainty analysis", and that "without ...a plausible range of Safe Yield estimates...cannot confidently ascertain what the Safe Yield...should be."

What is Uncertainty?

- Difference between the model and the physical system that it represents
- Inherent and unavoidable in <u>all</u> models



What uncertainties exist in a well-constrained and well-calibrated model such as the CVM?

- Model parameter uncertainty
  - Hydraulic conductivity, boundary inflows, etc.
- Predictive uncertainty
  - Demand and supply plans
  - Climate/hydrology

Process to develop 2022 Safe Yield Reset Methodology Update (2022 SYRMU)

- Scope and budget were included in FY 2021/22 budget
- Scope and budget changed as a result of 8/4/21 meeting with AP reps
- Revised scope and budget reviewed at Special AP meeting in August, and Pools/AC/Board in September 2021
- Initial TM released in October 2021; workshop with stakeholders; input helped to refine future scope
- Supplemental scope and budget presented and approved November 2021

Process to develop 2022 Safe Yield Reset Methodology Update (2022 SYRMU)

- Meeting with AP rep Feb 2022
- Scope for FY 2022/23 work included in budget presentations
- TM#1 released in May 2022; workshop(s); input
- TM#2 released July 2022; workshop; input
- Several phone calls with Tom Harder on disposition of specific comments
- All comments have been considered and responded to; Q&A included as Appendix

How is the 2022 SYRMU different than the 2015 SYRM?

- Requires consideration of parameter and predictive uncertainty
- Requires an uncertainty analysis during the model calibration process to identify a plausible range of calibrated models
- Safe Yield must be reset based on the simulation results of an ensemble of multiple projection scenarios
  - Unique combinations of parameters, water demands/supply plans, and climate/hydrology

Has the Peer review process resulted in cost savings?

- Peer reviewers have offered helpful comments on the overall approach and the specific chosen approach.
- Comments have resulted in a technically sound modeling approach with a projected cost that is much lower than initial estimates.
- Watermaster's Engineer will perform the next Safe Yield Reset calculation prudently and as cost effectively as possible, as with all Watermaster efforts.

What are the benefits of a model that includes uncertainty? - 4/23/20 AP letter

- "… This would provide the basin managers with a sense as to potential variability in the Safe Yield estimate, for use in making decisions."
- The ability to study scenarios:
  - Appropriators' behavior with respect to replenishment
  - Effect of using stored water rather than replenishment water to augment net recharge
  - Possible alternative pumping scenarios

What are the benefits of a model that includes uncertainty? - West Yost

- Develop projects and management strategies to maximize net recharge
- Develop projects and management strategies to avoid or mitigate MPI/undesirable results at lowest cost
- Identify and address monitoring gaps to reduce uncertainty in future Safe Yield recalculations or other uses of the model

What activities are in the future?

- Annual data collection and evaluation
- 2025 Safe Yield calculation
- 2030 Safe Yield recalculation and reset (if necessary)

Next Steps

- Watermaster Board consideration (9/22/22)
  - Recommendation to move the Court to approve the 2022 SYRMU Reset TM
- Filing with Court for approval
- Incorporating into 2025 Safe Yield evaluation, expected to begin in 2023

April 2017 Court Order

for short-term climatic variations, wet and dry. Based on the best information practicably available to Watermaster, the Reset Technical Memorandum sets forth a prudent and reasonable professional methodology to evaluate the then prevailing Safe Yield in a manner consistent with the Judgment, the Peace Agreements, and the OBMP Implementation Plan. In furtherance of the goal of maximizing the beneficial use of the waters of the Chino Basin, Watermaster, with the recommendation and advice of the Pools and Advisory Committee, may supplement the Reset Technical Memorandum's methodology to incorporate future advances in best management practices and hydrologic science as they evolve over the term of this order.

<u>CHINO BASIN WATERMASTER</u>
Case No. RCVRS 51010
Chino Basin Municipal Water District v. City of Chino, et al.

PROOF OF SERVICE

I declare that:

I am employed in the County of San Bernardino, California. I am over the age of 18 years and not a party to the within action. My business address is Chino Basin Watermaster, 9641 San Bernardino Road, Rancho Cucamonga, California 91730; telephone (909) 484-3888.

On November 15, 2022, I served the following:

1. DECLARATION OF PETER KAVOUNAS IN SUPPORT OF CHINO BASIN WATERMASTER'S MOTION FOR COURT APPROVAL OF UPDATE TO WATERMASTER SAFE YIELD RESET METHODOLOGY

/ X / BY MAIL: in said cause, by placing a true copy thereof enclosed with postage thereon fully prepaid, for delivery by the United States Postal Service mail at Rancho Cucamonga, California, addresses as follows:
See attached service list: Mailing List 1

/___/ BY PERSONAL SERVICE: I caused such envelope to be delivered by hand to the addressee.

/___/ BY FACSIMILE: I transmitted said document by fax transmission from (909) 484-3890 to the fax number(s) indicated. The transmission was reported as complete on the transmission report, which was properly issued by the transmitting fax machine.

/ X / BY ELECTRONIC MAIL: I transmitted notice of availability of electronic documents by electronic transmission to the email address indicated. The transmission was reported as complete on the transmission report, which was properly issued by the transmitting electronic mail device.
See attached service list: Master Email Distribution List

I declare under penalty of perjury under the laws of the State of California that the above is true and correct.

Executed on November 15, 2022 in Rancho Cucamonga, California.

By: Ruby Favela Quintero
Chino Basin Watermaster

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