

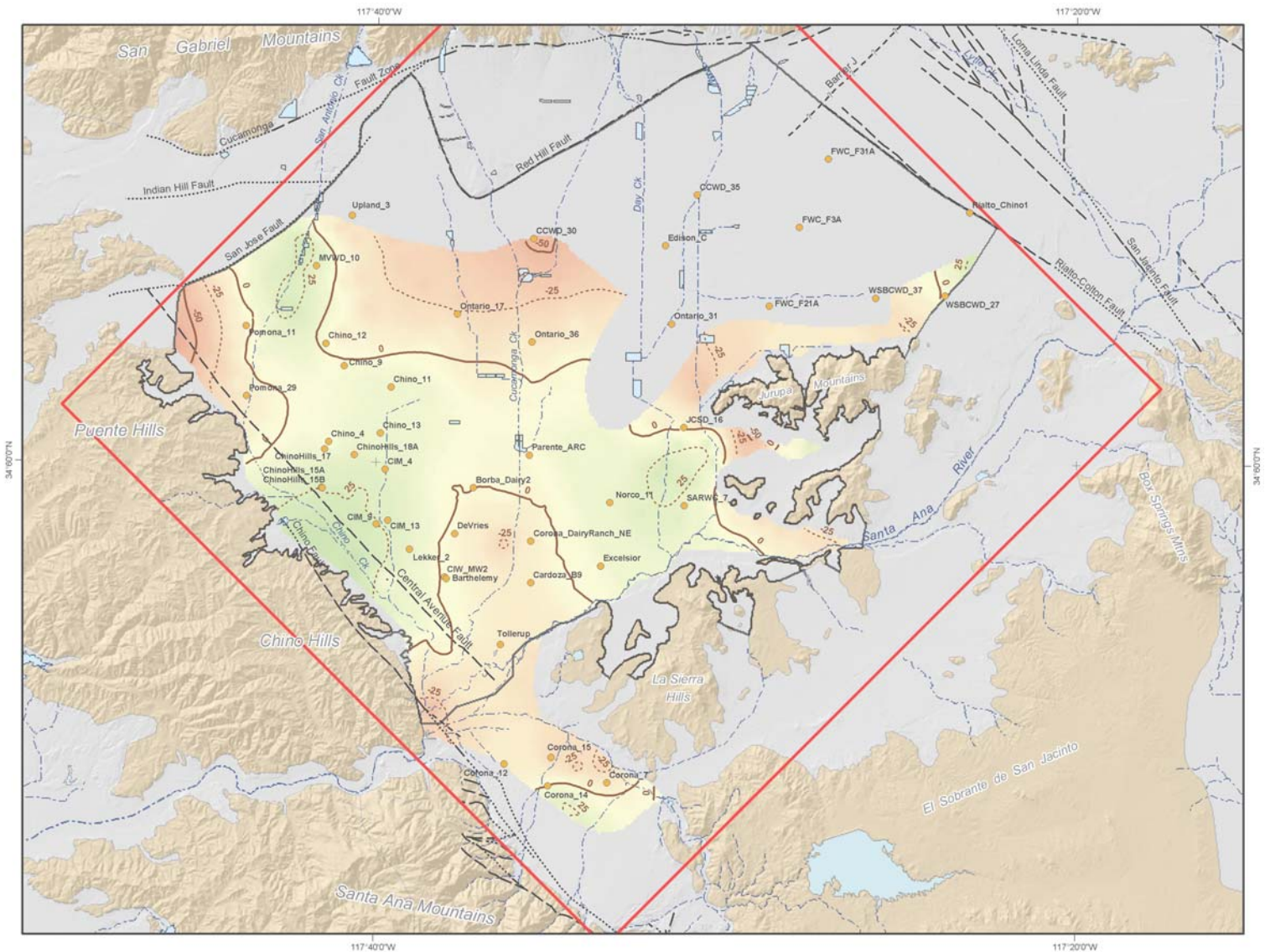
OPTIMUM BASIN MANAGEMENT PROGRAM

ANALYSIS OF SUPPLEMENTAL WATER RECHARGE PURSUANT TO THE PEACE AGREEMENT

ANALYSIS OF OPERATIONAL STORAGE REQUIREMENT, SAFE STORAGE, AND SAFE STORAGE CAPACITY PURSUANT TO THE PEACE AGREEMENT

EVALUATION OF THE CUMULATIVE EFFECTS OF TRANSFERS PURSUANT TO THE PEACE AGREEMENT

Final Technical Memorandum



Prepared for:



**Chino Basin
Watermaster**

September 2003

Prepared by:

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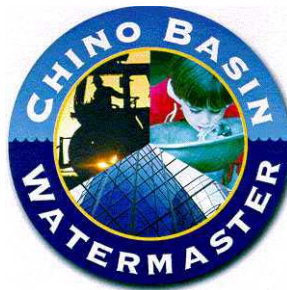
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1. ANALYSIS OF SUPPLEMENTAL WATER RECHARGE PURSUANT TO THE PEACE AGREEMENT

1.1 Background

Section 5.1 (e) of the Peace Agreement contains the Watermaster commitments regarding the recharge of supplemental water in the Chino Basin. This analysis focuses on the Watermaster's implementation of the Peace Agreement Section 5.1 (e) items (i), (iii), (v), (vii), and (viii), that are as follows (see Peace Agreement, pages 20 and 21):

"Watermaster shall exercise Best Efforts to:

- (i) protect and enhance the safe yield of the Chino Basin through Replenishment and Recharge; ...
- (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 in all areas and sub-areas of the Chino Basin; ...
- (v) establish and periodically update criteria for the use of water from different sources for Replenishment purposes; ...
- (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;
- (viii) maintain long-term hydrologic balance between total Recharge and discharge in all areas and sub-areas;"

Maximization of the recharge of storm water is occurring and the related requirements of the Peace Agreement and Watermaster Rules and Regulations are being satisfied.

The *OBMP Implementation Plan* (Exhibit B of the Peace Agreement) contains identical language to the Peace Agreement Section 5.1 (e), but is mostly silent as to the schedule for implementation of the specific commitments listed above (see Exhibit B, paragraph 11 on page 20 and the implementation schedule on pages 22 and 23). Paragraph 9, on page 20 of the Implementation Plan, includes additional recharge guidelines that Watermaster must consider regarding 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 recharge water
 - (v) any other relevant factors"

Section 7 of the Rules and Regulations repeats the commitments of Section 5.1 (e) of the Peace Agreement and adds (see Rules and Regulations, page 37, 7.1 (b) (iv)):

"(b) Watermaster shall exercise Best Efforts to: ...

- (iv) Make its initial report on the then existing state of Hydrologic Balance by July 1, 2003, including any recommendations on Recharge actions which may be necessary under the OBMP. Thereafter, Watermaster shall make written reports on the long term Balance in the Chino Basin every two years; ..."

This technical memorandum was prepared pursuant to the requirements of the Peace Agreement and the Watermaster Rules and Regulations cited above.



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ANALYSIS OF SUPPLEMENTAL WATER RECHARGE PURSUANT TO THE PEACE AGREEMENT

1.2 Analysis

WEI developed a new groundwater model (hereafter, the *2003 Watermaster Model*) for the Chino Basin in support of the Chino Basin Watermaster, Inland Empire Utility Agency (IEUA), and Metropolitan Water District of Southern California (Metropolitan) Dry-Year Yield (DYY) Program. The 2003 Watermaster Model was used to evaluate the magnitude of groundwater level and storage changes throughout Chino Basin, the change in direction and speed of specific known water quality anomalies, and the storage losses from the DYY Program. This was accomplished by first determining a baseline OBMP scenario, second by simulating the baseline OBMP and DYY scenarios, and third by comparing the model results of the baseline OBMP and DYY scenarios. The planning period used in this analysis consisted of a 25-year period ranging from October 2003 through September 2028. This period corresponds to the 25-year period of the DYY Program. The impacts listed above were estimated by:

- Preparing maps that show the maximum differences in groundwater levels at the point of peak storage and at the end of a DYY extraction period. Time histories at the same wells used in the calibration were plotted to show local impacts at each of these wells.
- Preparing maps that show the plume migration tracks for the baseline and DYY scenarios over the planning period. Each plume was modeled as though the contaminant of concern was a conservative (non-sorbing, non-degrading) constituent using MODPATH.
- Preparing time histories of Santa Ana River discharge for the baseline and DYY scenarios and comparing these time histories for the planning period. The total water lost from storage will be estimated by subtracting the baseline time history from the DYY time history.

1.2.1 Baseline OBMP Scenario

The baseline scenario is based on a modified version of the water supply plan from the OBMP Implementation Plan (Table 2 of Exhibit B of the Peace Agreement). The water supply plan from the Implementation Plan contains future groundwater production plans for all producers in the Chino Basin. Black and Veatch modified the water supply plan for the water purveyors that are participating in the DYY Program and WEI used the water supply plan from the Implementation Plan for the remaining producers.

Table 1-1 shows the baseline groundwater production time history. Groundwater production in the Basin ranges from 197,000 acre-ft/yr in 2003/2004 to about 210,000 acre-ft/yr in 2019/2020 and thereafter. Watermaster's replenishment obligation was estimated using the following assumptions pursuant to the Judgment and the Implementation Plan:

- The initial increase in stormwater recharge that is anticipated from the Chino Basin Facilities Improvement Plan is about 12,000 acre-ft/yr with a goal of about 20,000 acre-ft/yr. To be conservative, the increase in stormwater recharge was assumed to be 12,000 acre-ft/yr.
- OBMP desalter capacity is increased from the current level of 8 million gallons per day (mgd) in 2002/2003 to 40 mgd as per the water supply plan from the Implementation Plan. Half of the production from the desalters will come from decreased rising water and new induced recharge from the Santa Ana River.
- The Judgment allows a 5,000 acre-ft/yr overdraft of Chino Basin through 2017.

Table 1-1 contains the replenishment obligation pursuant to the Judgment and the Implementation Plan, which ranges from about 30,000 acre-ft/yr in 2003/2004 to about 34,000 acre-ft/yr in 2019/2020 and is constant thereafter. An analysis of actual recent production in the Chino Basin indicates that the



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production and replenishment estimated in [Table 1-1](#) may be higher than will actually occur in first few years of the baseline scenario. For consistency with the OBMP planning documents, the production and replenishment estimates in [Table 1-1](#) were used.

The locations and magnitude of recharge shown in [Table 1-1](#) were based on the requirements of the Peace Agreement to balance recharge and discharge in every area and sub-area. This requirement must be met over a period of time, which was assumed herein as a long-term requirement. Thus, in an individual season or year there might not be a balance between recharge and discharge in an area, sub-area, or the Basin.

Balancing recharge and discharge may be critical to the management of the subsidence-prone area in MZ1. Watermaster is currently involved in an investigation to develop a management program for this subsidence-prone area. Until that management program is developed, it is assumed that Watermaster replenishment and groundwater production would be managed such that groundwater levels would remain near or above current levels in the southern part of MZ1. Current groundwater levels were assumed to be the groundwater levels at the end of the calibration period of the 2003 Watermaster Model; the groundwater levels were from fall 2001. In the rest of the Basin, replenishment would be managed to maximize desalter replenishment from a combination of reduced rising water to the Santa Ana River and increased streambed recharge from the Santa Ana River.

The 2003 Watermaster Model was used to investigate the recharge requirements for managing groundwater levels in MZ1 and to determine the theoretical potential of induced recharge from the Santa Ana River. The results of this work are summarized in [Table 1-1](#) that shows the location and magnitude of supplemental water recharge. Approximately 75 percent of the recharge will be needed in the College Heights, Upland, Montclair, and Brooks spreading basins to manage groundwater levels in the western part of the Basin. The location of these recharge facilities are shown in [Figure 1-1](#). The remaining 25 percent is shown to occur in the San Sevaine and RP3 spreading facilities; however, there is some flexibility in the selection of facilities that could be used in the eastern part of the Basin. [Figures 1-2a, 1-2b, and 1-2c](#) illustrate the model-estimated change in groundwater levels over the 25-year planning period for the baseline scenario. Throughout the duration of the baseline scenario, groundwater levels in the western part of the Chino Basin remain near or above the Fall 2001 groundwater levels. Groundwater levels in the other parts of Chino Basin declined over the planning period to levels that support decreased rising water to the Santa Ana River and increased streambed recharge from the Santa Ana River. Groundwater levels declined the most in the Fontana area – as much as 30 to 40 feet near the far eastern edge of the Fontana area. In the subsidence-prone area in MZ1, there was almost no change in groundwater levels. In the area north of the subsidence-prone area, there was a slight increase in groundwater levels due to the shifting of Watermaster's replenishment to this area as shown in [Table 1-1](#). The effect of the desalters is evident in the south-central part of Chino Basin where groundwater levels declined in excess of 25 feet.

The total storage in the Chino Basin declined monotonically during the baseline scenario from a high of 5,940,000 acre-ft in Fall 2003 to 5,730,000 acre-ft in Fall 2028 – a decline of about 210,000 acre-ft. [Figure 1-3](#) shows the estimated groundwater storage for the Chino Basin during the planning period. The modeling results suggest that the total storage in the Basin appears to be asymptotically approaching a level near 5,700,000 acre-ft. This decline in storage is necessary to induce the recharge of the Santa Ana River.



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1.2.2 Analysis of Material Physical Injury

Based on the analysis described above, there is no projected material physical injury to a Party to the Judgment or to the Chino Basin from proposed recharge program in the baseline OBMP scenario.

The only location where significant increases in groundwater levels occur is in the vicinity of the recharge basins in Upland and Montclair (College Heights, Upland, Montclair, and Brooks Street Basins) where the depth to water is 300 feet or greater. Under the baseline scenario, groundwater levels are projected to remain almost unchanged in the western third of the Basin. In the center of Chino Basin, groundwater levels are projected to decrease by about 15 to 20 feet, and at the far eastern edge of the Basin, north of the Jurupa Hills, groundwater levels are projected to decrease by as much as 40 feet. In addition, groundwater levels are projected to decline 25 feet or more in the vicinity of the OBMP desalter well fields with most of this drawdown caused by desalter operation. Slight increases in production costs will occur and slight decreases in production capacity might occur in these areas of groundwater level decline. For the members of the Appropriative Pool, the added cost of production will be more than offset by the savings provided by the avoided purchase of supplemental water for desalter replenishment. Production costs could increase about \$3.50 per acre-ft (assuming \$0.10 per kilowatt-hour, 60 percent pumping efficiency, and an average additional lift of 20 feet). The producers that will be impacted by operating the Basin at about 20 feet lower under the baseline scenario are the City of Ontario, Cucamonga County Water District, Fontana Water Company, and Jurupa Community Water District whose combined production averages about 80,000 acre-ft during the baseline scenario. The increased power cost totals about \$240,000 per year. Operating the Basin at this lower level avoids the cost of purchasing about 24,600 acre-ft/yr of supplemental water at a cost of about \$6,000,000 if the replenishment water consists of State Water Project water and about \$2,000,000 if it were recycled water.

A similar analysis was done for the Agricultural Pool producers (see [Appendix A](#)). The results of this analysis suggest that the average increase in power cost to agricultural producers is about \$1.50 per acre-ft over the planning period and that the estimated cumulative increase in power cost over the planning period for all agricultural production is about \$340,000 or about \$14,000 per year.

Under the baseline scenario, the groundwater levels in the subsidence-prone part of MZ1 are projected to remain near or above current levels. This occurs because of the recharge program described in [Table 1-1](#) and because deep groundwater pumping in the subsidence-prone area were adjusted to maintain groundwater levels near or above current levels. This is a minimum necessary condition to minimize subsidence and ground fissuring in this area. Groundwater levels in this area should be managed using this criterion until Watermaster can implement a long-term management program for subsidence; after which groundwater levels in this area would be managed according to the long-term management program.

1.2.3 Limitations of this Analysis

Significant amounts of new information regarding the hydrogeology of the MZ1 area have been developed since the 2003 Watermaster Model was developed and calibrated. This new information seems to suggest that the deeper water bearing units that underlie the subsidence area are recharged much slower than predicted by the model. If this is true, it would imply that the model may exaggerate the benefits from the spreading of water in the northern part of MZ1 on piezometric levels in the subsidence-prone area. By extension, this implies that the management of piezometric levels in the subsidence-prone area in MZ1 will likely be done by reducing groundwater production from the deeper aquifer units, recharge by injection, or a combination of both. Given the limitations of the model and the uncertainty in the contents of the long-term MZ1 management program, the results of this analysis should be used as guidelines for



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planning recharge activities until the long term management plan for MZ1 is implemented. It is likely in the long term that significant quantities of future replenishment by Watermaster will need to occur in MZ1. However, the location and magnitude of future recharge should depend on the actual production by producers in MZ1, which could be different than was assumed in the OBMP and this analysis.

1.3 Recommended Supplemental Recharge Program for the Next Five Years

We recommend the following actions by Watermaster regarding the recharge of supplemental water:

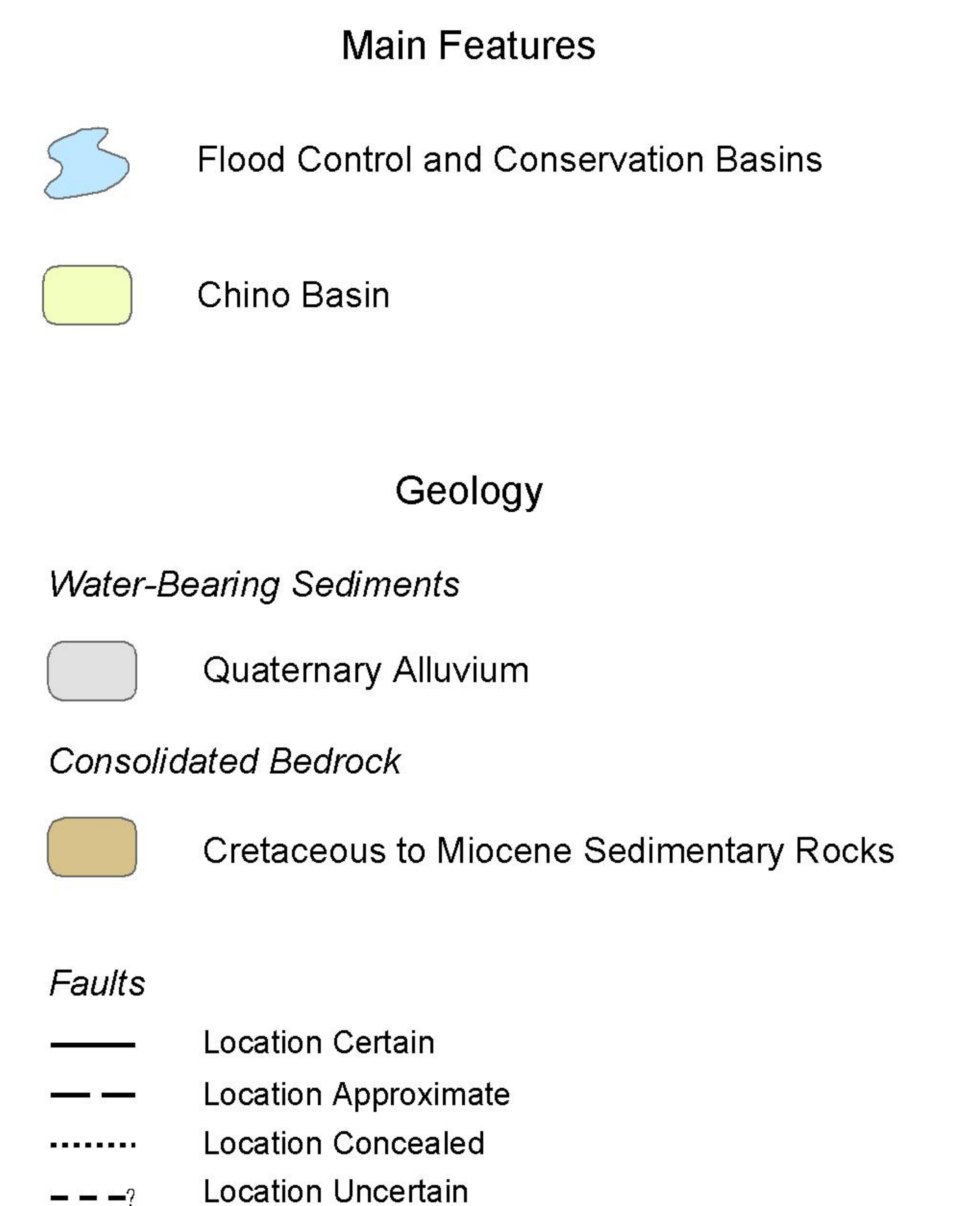
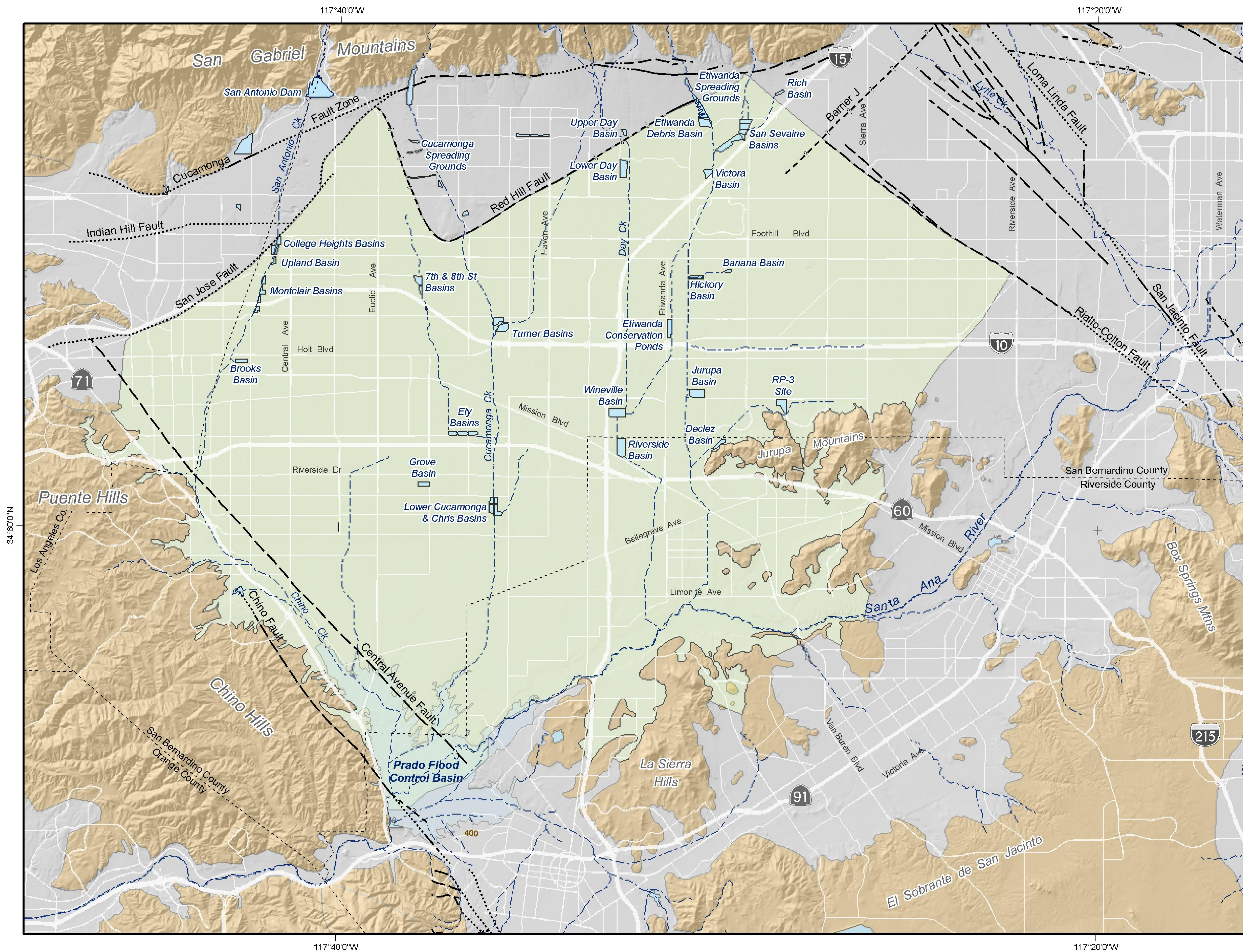
- Continue supplemental water recharge in MZ1 as is currently done (6,500 acre-ft/yr) for two more years. The need to continue this recharge should be determined in the Spring of 2005.
- Should Watermaster need to replenish over-production, the replenishment should be done in MZ1, if possible, up to the amount shown in [Table 1-1](#). Watermaster should monitor groundwater levels in MZ1 to ensure that this level of recharge is sufficient to maintain groundwater levels throughout MZ1 in the short term until the long-term MZ1 management program is implemented.
- The 2003 Watermaster model should be recalibrated prior to the completion of the long-term MZ1 management program. The revised model should be used to assess the viability of the management program and the need for supplemental water recharge in the program.
- For the next five years Watermaster should assume that half of the desalter replenishment obligation will come from reduced rising water outflow to the Santa Ana River and induced inflow from the Santa Ana River. The 2003 Watermaster Model should be recalibrated at the end of this five-year period to verify recharge assumptions regarding the Santa Ana River. This, of course, requires that Watermaster continue to monitor groundwater levels throughout the Basin.
- Per the requirements of the Peace Agreement, Watermaster should review the applicability of these recommendations in the Spring of 2005 and make revisions as appropriate.



Table 1-1
Total Chino Basin Production, Watermaster Replenishment Requirement and Replenishment Plan that Balances Recharge and Discharge for Baseline Scenario

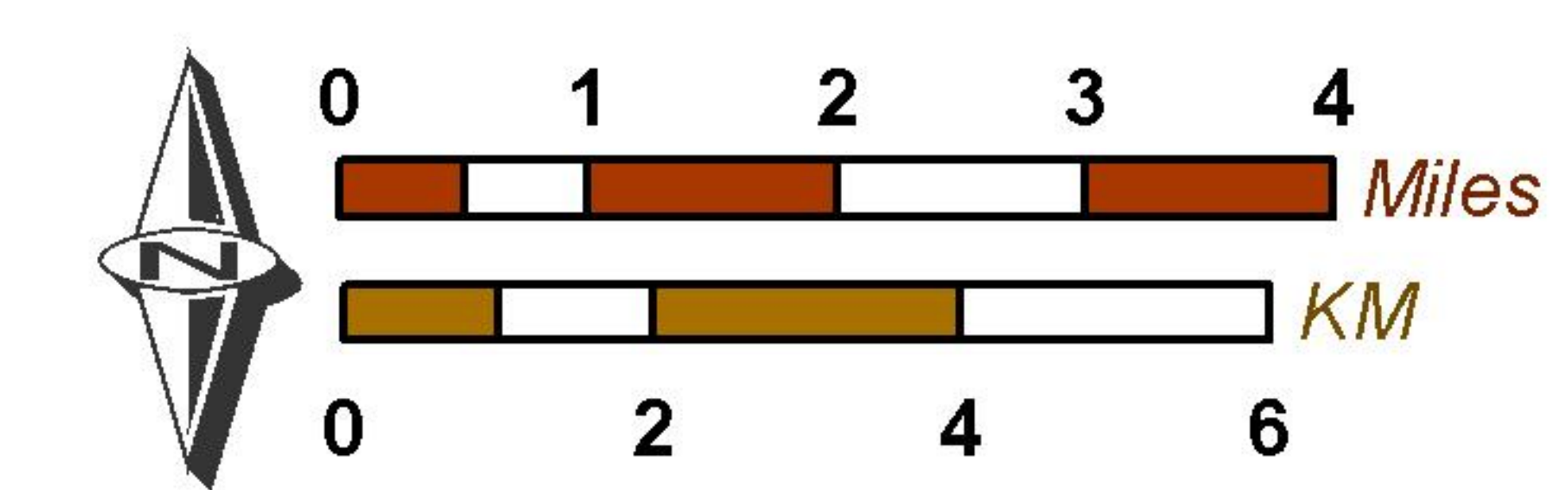
(1) Fiscal Year	(2) Production	(3) Operating Yield	(4) New Stormwater	(5) SAR Inflow	(6) = (2) - (3) - (4) - (5) Replenishment Obligation	(7)	(8)	(9)	(10)	(11)	(12) = Σ(7) to (11)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20) = Σ(13) to (18)	(21) = (12) + (20)
						MZ1 Recharge Basins						Supplemental Water Recharge Plan								Total
						MZ1 Goal	Montclair 1-4 0.25	Upland 0.15	College Hts 0.15	Brooks 0.15	Subtotal	San Sevaine 0.25	Victoria	Banana + Hickory	Etiwanda Cons	Etiwanda Perc	RP3 0.05	Declez	Subtotal	
2004	196,577	145,000	12,000	9,989	29,588	20,712	20,712	0	0	0	20,712	8,876	0	0	0	0	0	0	8,876	29,588
2005	197,542	145,000	12,000	10,710	29,832	20,882	7,458	4,475	4,475	4,475	20,882	7,458	0	0	0	0	1,492	0	8,949	29,832
2006	195,715	145,000	12,000	10,888	27,827	19,479	6,957	4,174	4,174	4,174	19,479	6,957	0	0	0	0	1,391	0	8,348	27,827
2007	197,912	145,000	12,000	13,053	27,858	19,501	6,965	4,179	4,179	4,179	19,501	6,965	0	0	0	0	1,393	0	8,358	27,858
2008	196,068	145,000	12,000	13,231	25,837	18,086	6,459	3,876	3,876	3,876	18,086	6,459	0	0	0	0	1,292	0	7,751	25,837
2009	194,245	145,000	12,000	13,408	23,837	16,686	5,959	3,576	3,576	3,576	16,686	5,959	0	0	0	0	1,192	0	7,151	23,837
2010	206,871	145,000	12,000	20,744	29,127	20,389	7,282	4,369	4,369	4,369	20,389	7,282	0	0	0	0	1,456	0	8,738	29,127
2011	207,484	145,000	12,000	21,130	29,355	20,548	7,339	4,403	4,403	4,403	20,548	7,339	0	0	0	0	1,468	0	8,806	29,355
2012	208,089	145,000	12,000	21,515	29,574	20,702	7,393	4,436	4,436	4,436	20,702	7,393	0	0	0	0	1,479	0	8,872	29,574
2013	208,704	145,000	12,000	21,900	29,804	20,863	7,451	4,471	4,471	4,471	20,863	7,451	0	0	0	0	1,490	0	8,941	29,804
2014	209,311	145,000	12,000	22,285	30,026	21,018	7,507	4,504	4,504	4,504	21,018	7,507	0	0	0	0	1,501	0	9,008	30,026
2015	209,917	145,000	12,000	22,670	30,247	21,173	7,562	4,537	4,537	4,537	21,173	7,562	0	0	0	0	1,512	0	9,074	30,247
2016	210,015	145,000	12,000	23,057	29,958	20,971	7,490	4,494	4,494	4,494	20,971	7,490	0	0	0	0	1,498	0	8,987	29,958
2017	210,126	145,000	12,000	23,443	29,683	20,778	7,421	4,452	4,452	4,452	20,778	7,421	0	0	0	0	1,484	0	8,905	29,683
2018	210,229	140,000	12,000	23,830	34,399	24,079	8,600	5,160	5,160	5,160	24,079	8,600	0	0	0	0	1,720	0	10,320	34,399
2019	210,328	140,000	12,000	24,216	34,112	23,879	8,528	5,117	5,117	5,117	23,879	8,528	0	0	0	0	1,706	0	10,234	34,112
2020	210,423	140,000	12,000	24,602	33,821	23,675	8,455	5,073	5,073	5,073	23,675	8,455	0	0	0	0	1,691	0	10,146	33,821
2021	210,427	140,000	12,000	24,602	33,825	23,677	8,456	5,074	5,074	5,074	23,677	8,456	0	0	0	0	1,691	0	10,147	33,825
2022	210,427	140,000	12,000	24,602	33,825	23,677	8,456	5,074	5,074	5,074	23,677	8,456	0	0	0	0	1,691	0	10,147	33,825
2023	210,427	140,000	12,000	24,602	33,825	23,677	8,456	5,074	5,074	5,074	23,677	8,456	0	0	0	0	1,691	0	10,147	33,825
2024	210,423	140,000	12,000	24,602	33,821	23,675	8,455	5,073	5,073	5,073	23,675	8,455	0	0	0	0	1,691	0	10,146	33,821
2025	210,427	140,000	12,000	24,602	33,825	23,677	8,456	5,074	5,074	5,074	23,677	8,456	0	0	0	0	1,691	0	10,147	33,825
2026	210,427	140,000	12,000	24,602	33,825	23,677	8,456	5,074	5,074	5,074	23,677	8,456	0	0	0	0	1,691	0	10,147	33,825
2027	210,427	140,000	12,000	24,602	33,825	23,677	8,456	5,074	5,074	5,074	23,677	8,456	0	0	0	0	1,691	0	10,147	33,825
2028	210,423	140,000	12,000	24,602	33,821	23,675	8,455	5,073	5,073	5,073	23,675	8,455	0	0	0	0	1,691	0	10,146	33,821

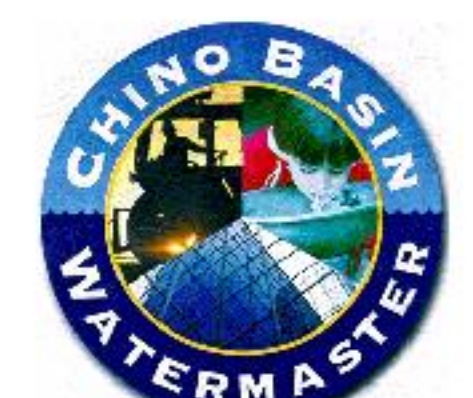

Note -- recharge allocated to facilities that are assured of being on line in 2004



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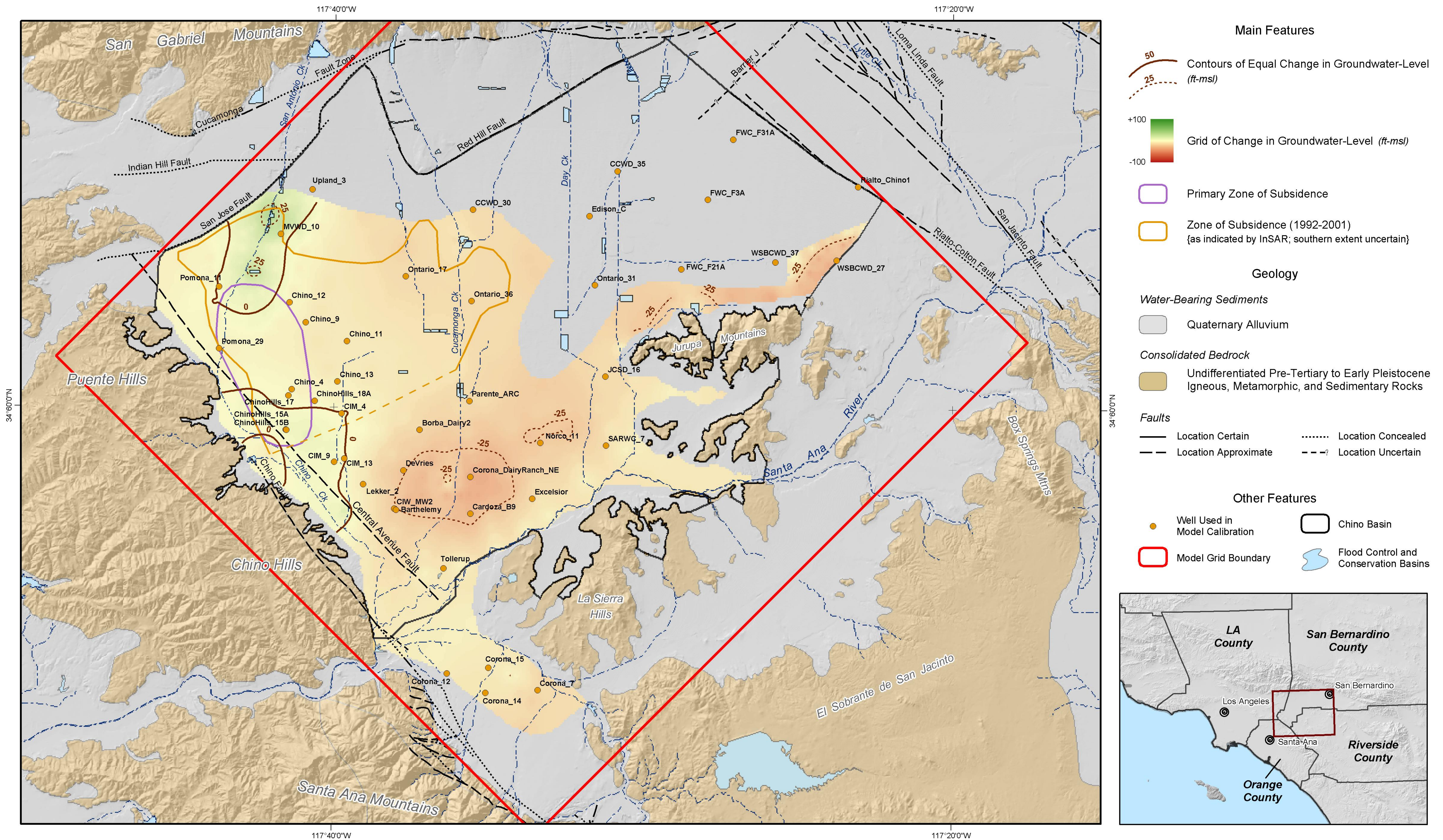
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Chino Basin Dry-Year Yield Program
 Geology and Hydrogeology

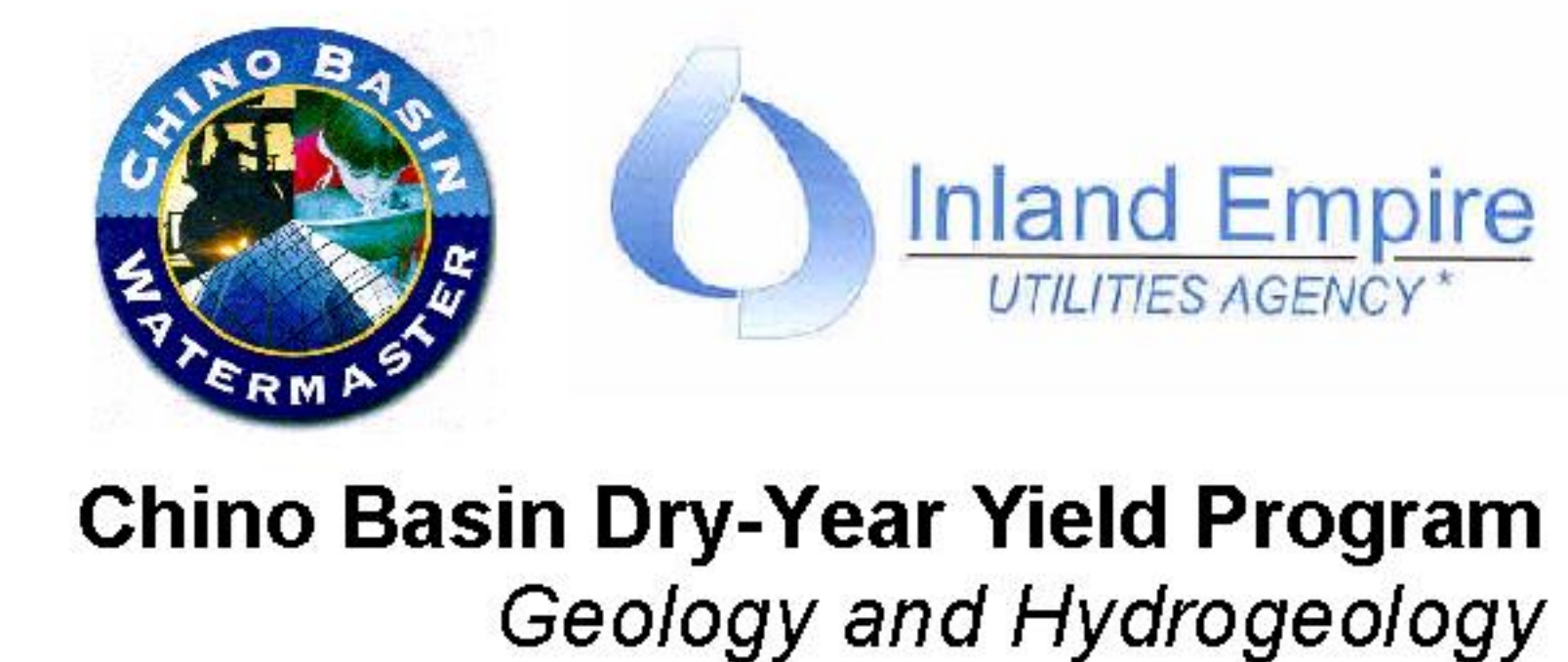
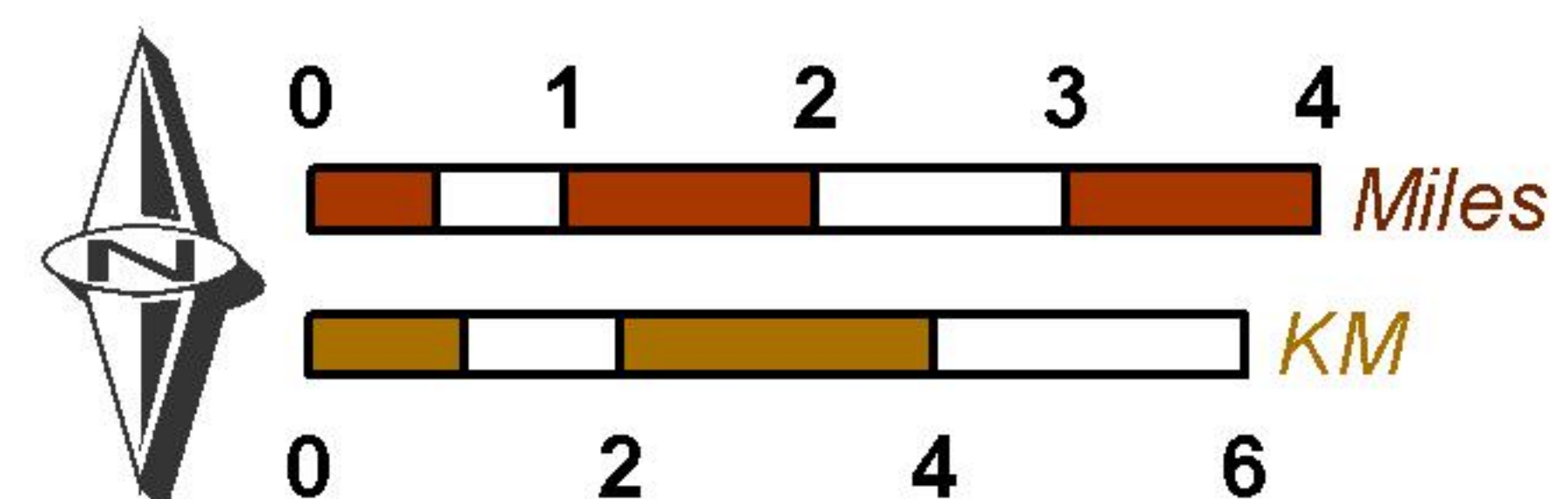
Chino Groundwater Basin and Surface Water Spreading Facilities

Figure 1-1



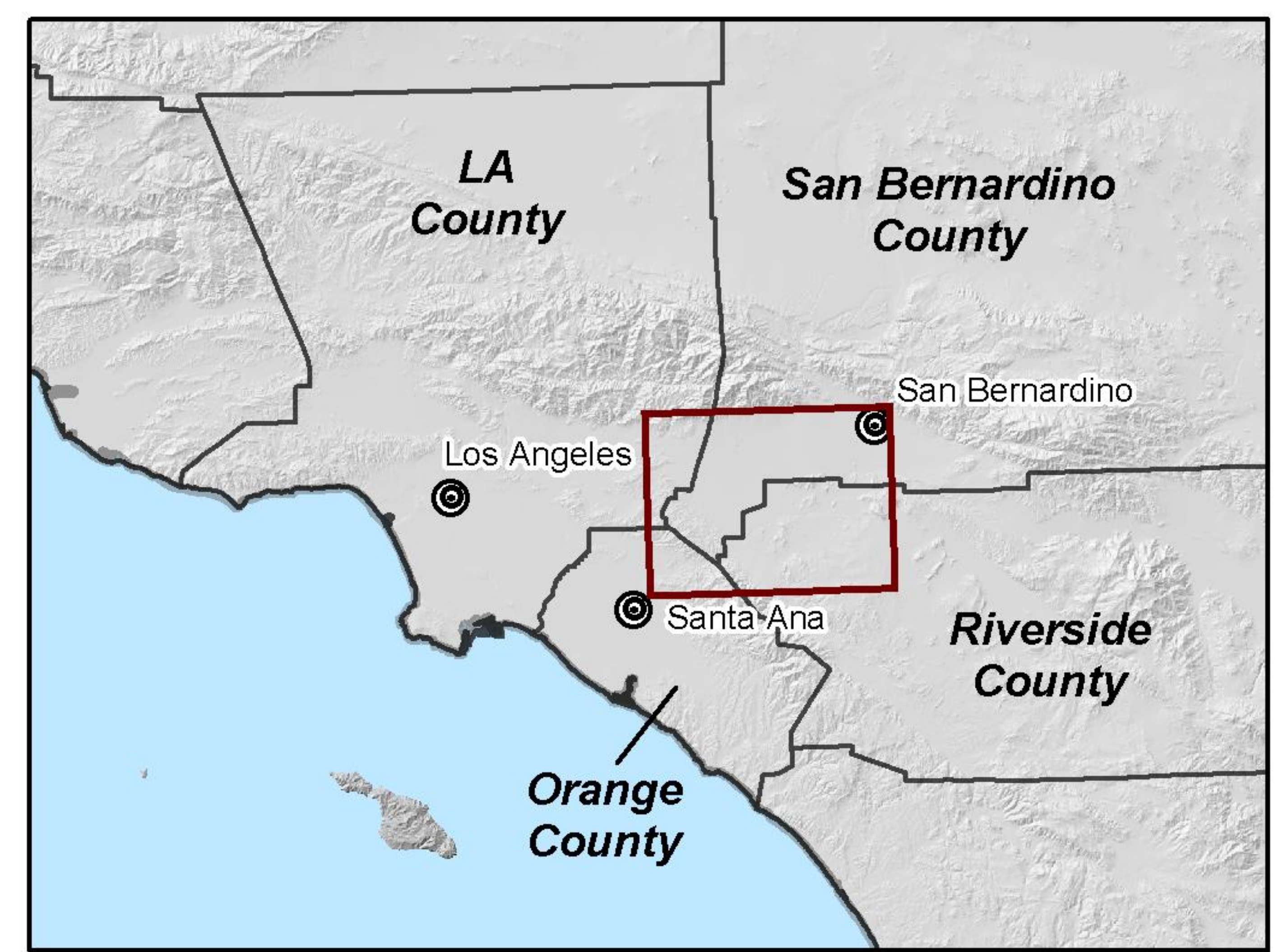
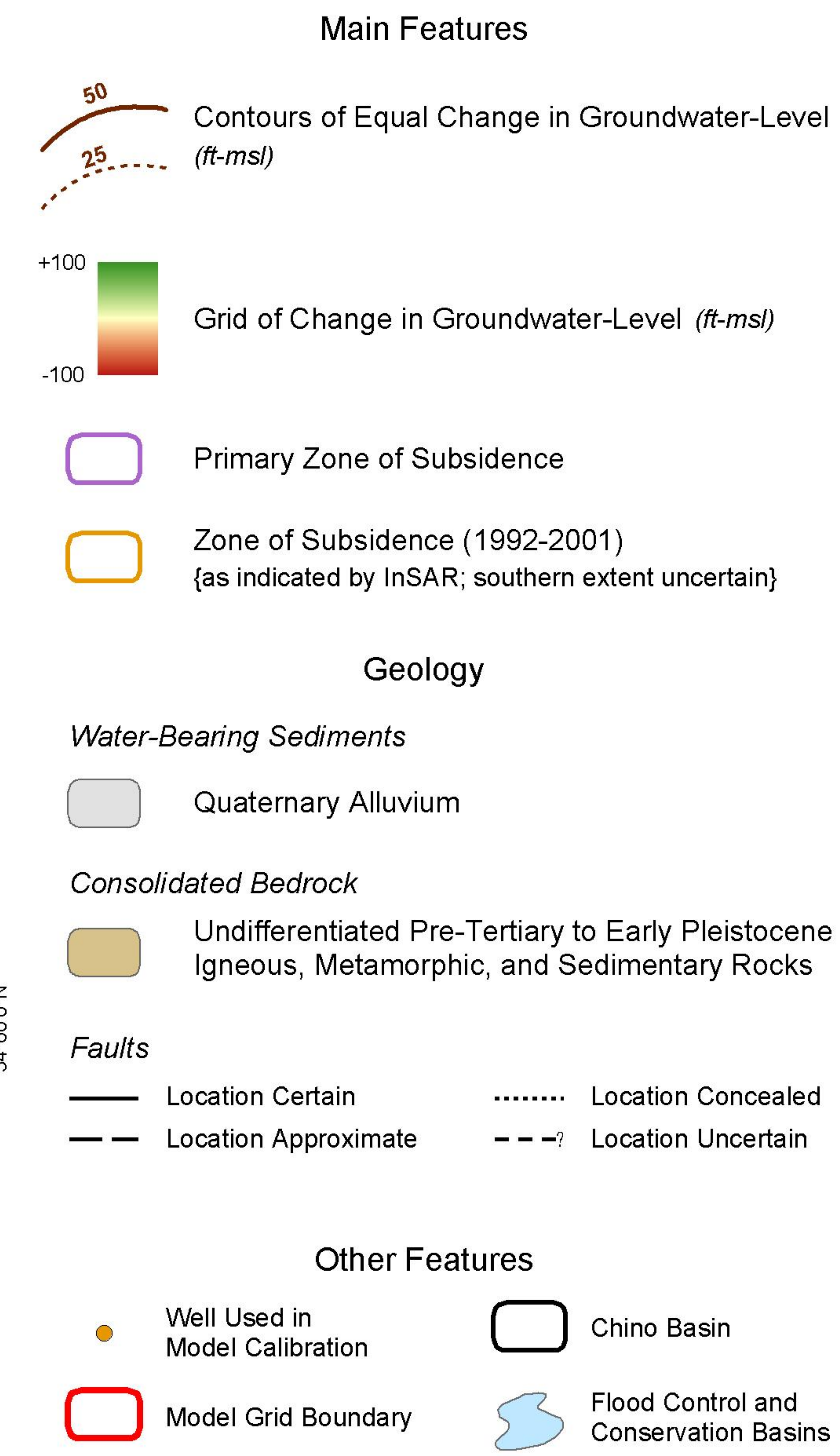
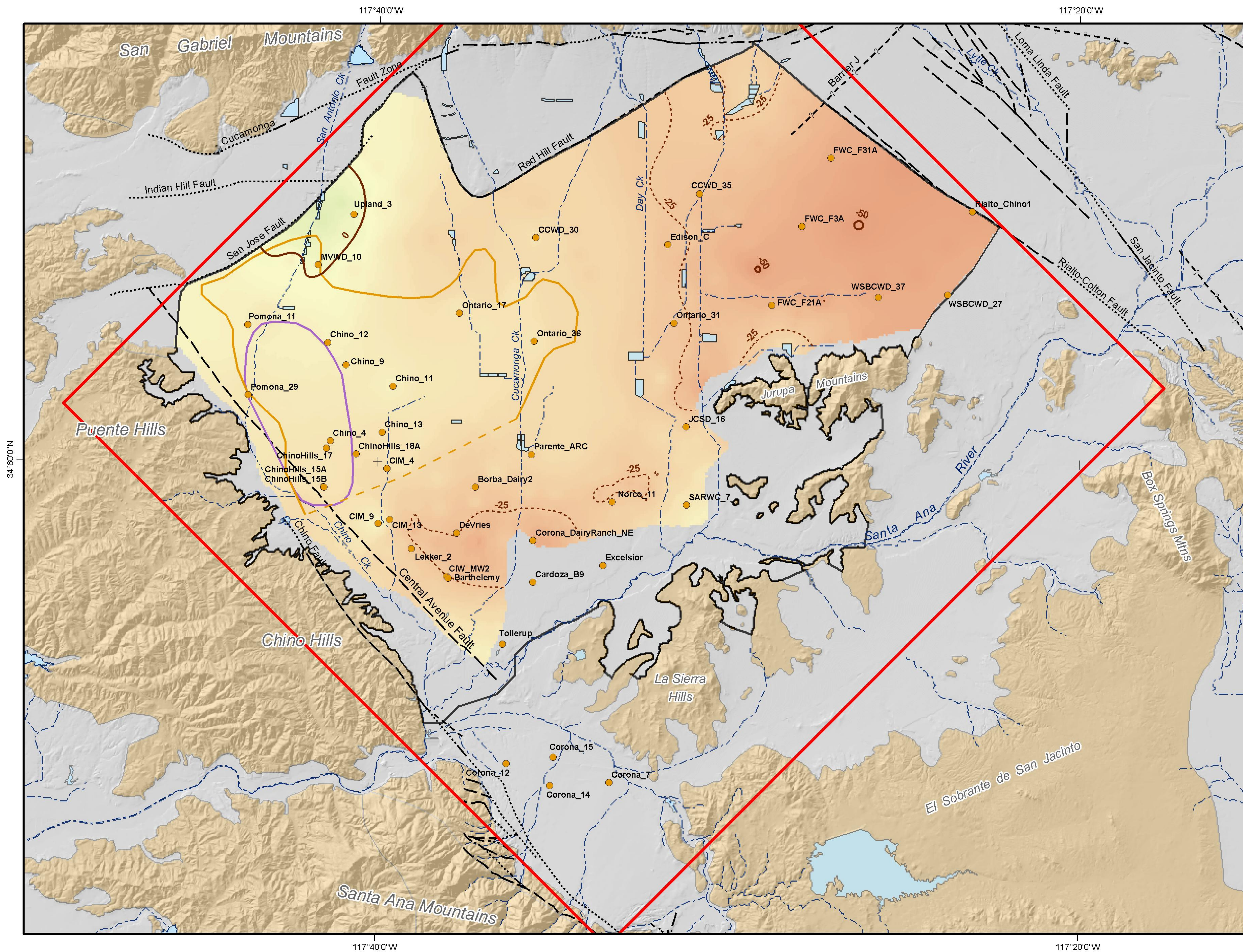
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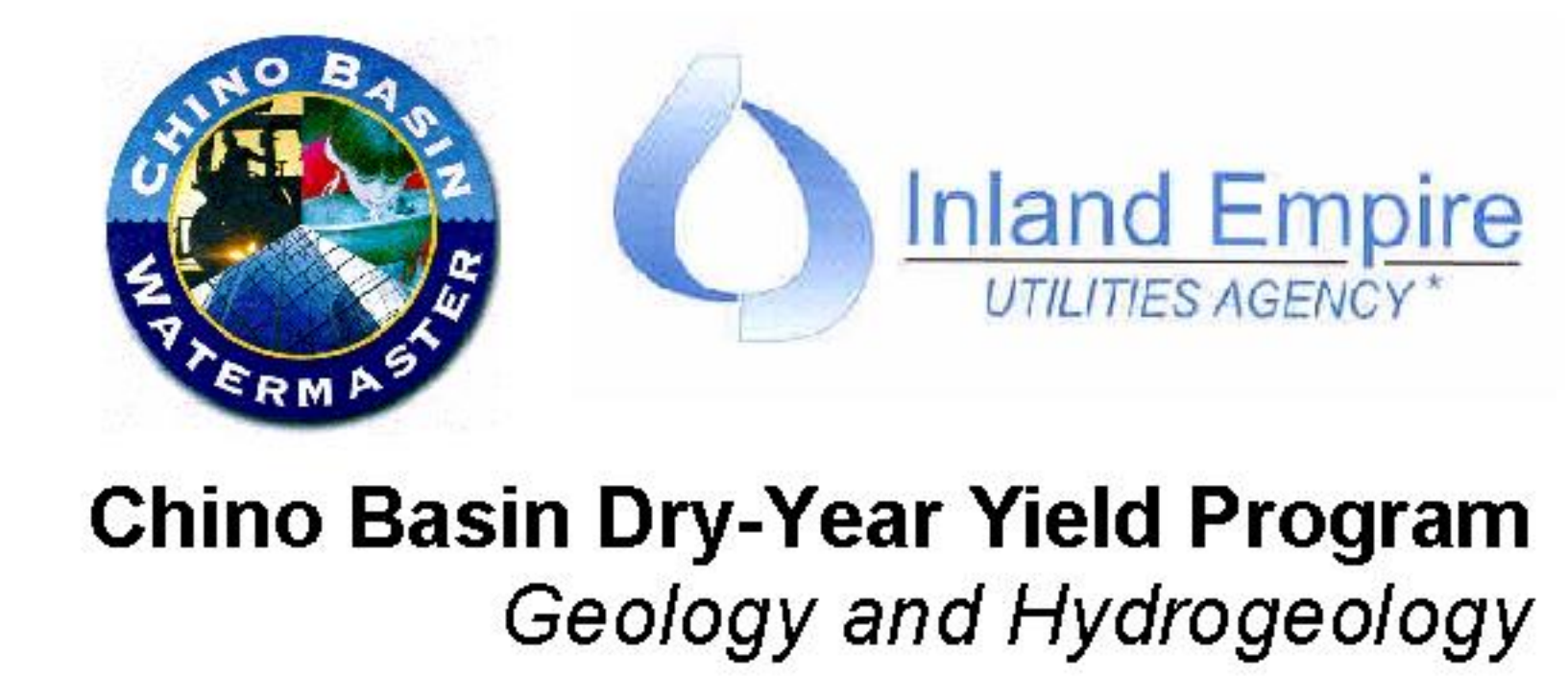
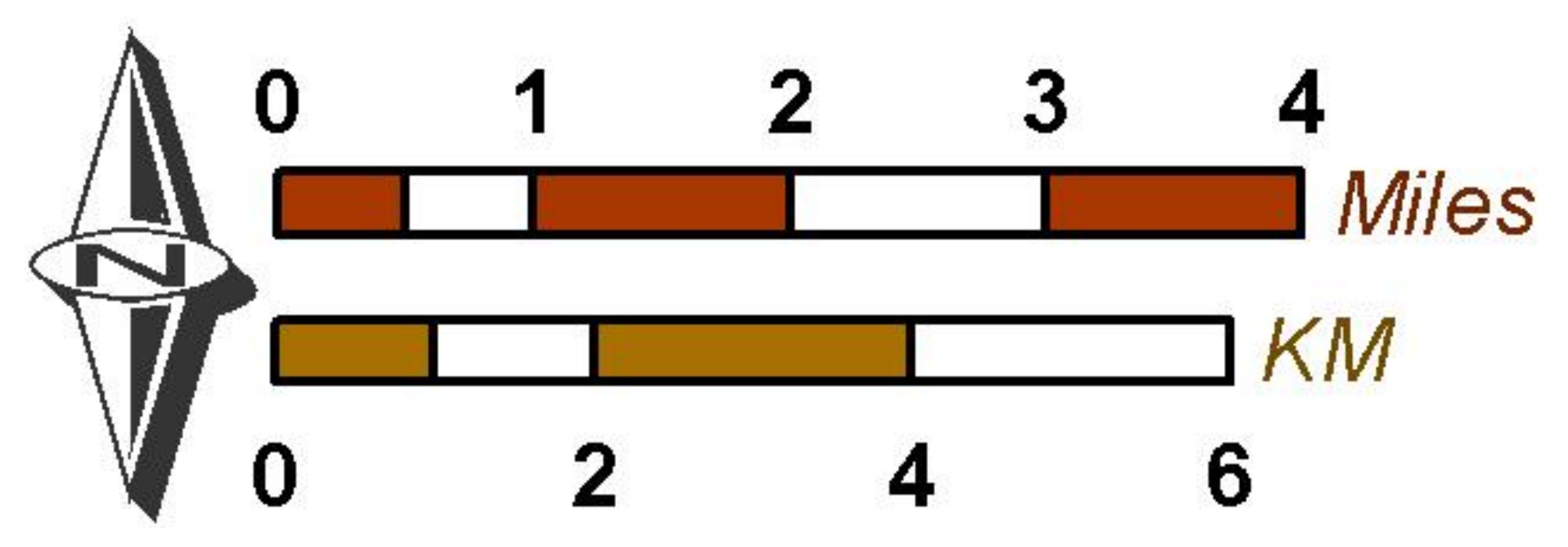
Change in Groundwater Level from Start to End of Baseline Scenario for Layer 1
 2004-2028

Figure 1-2a



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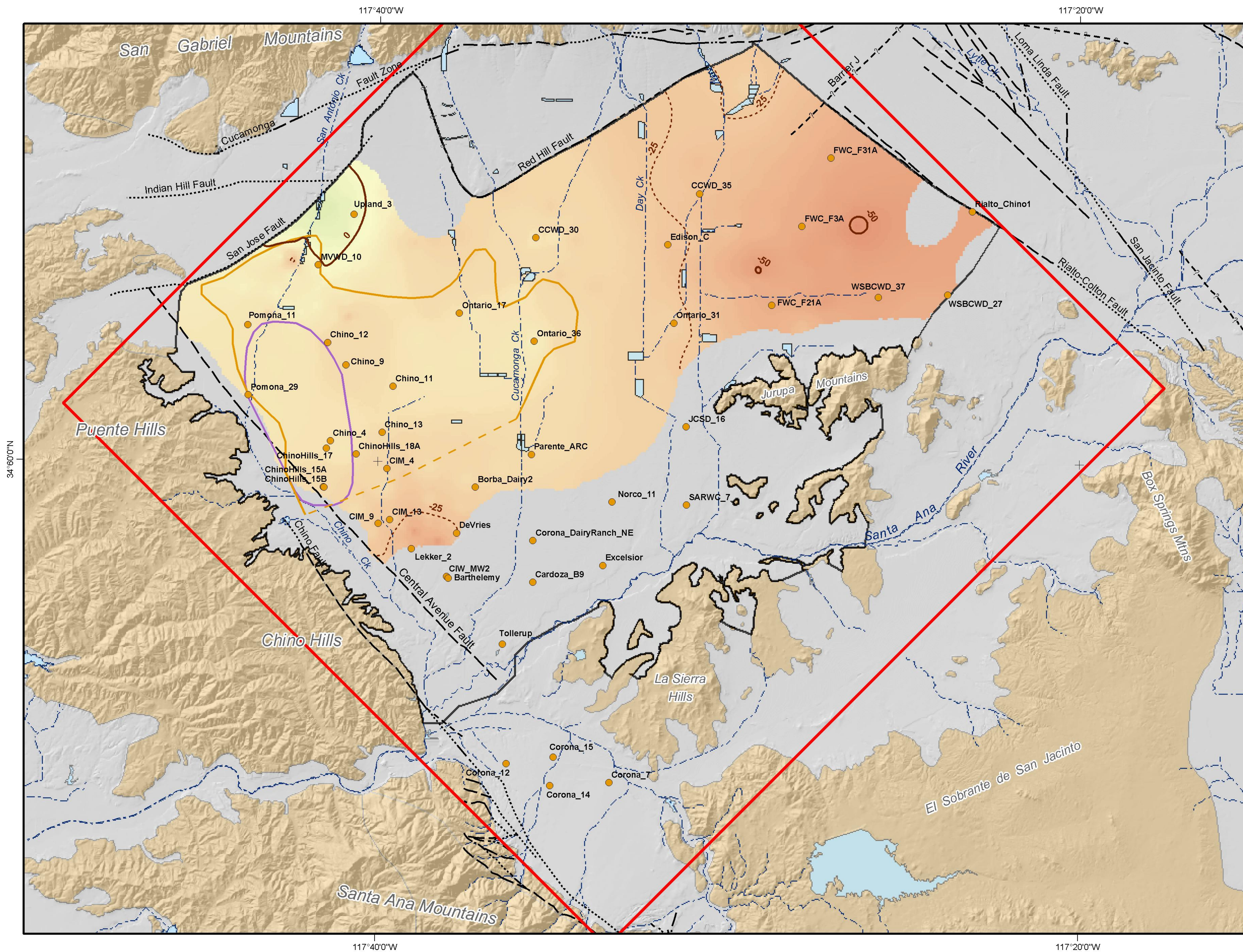
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Date: 20030804
File: figure_1-2b.mxd



Chino Basin Dry-Year Yield Program
Geology and Hydrogeology

Change in Groundwater Level from Start to End of Baseline Scenario for Layer 2
2004-2028

Figure 1-2b



Main Features

- Contours of Equal Change in Groundwater-Level (ft-msl)
- Grid of Change in Groundwater-Level (ft-msl)
- Primary Zone of Subsidence
- Zone of Subsidence (1992-2001) (as indicated by InSAR; southern extent uncertain)

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

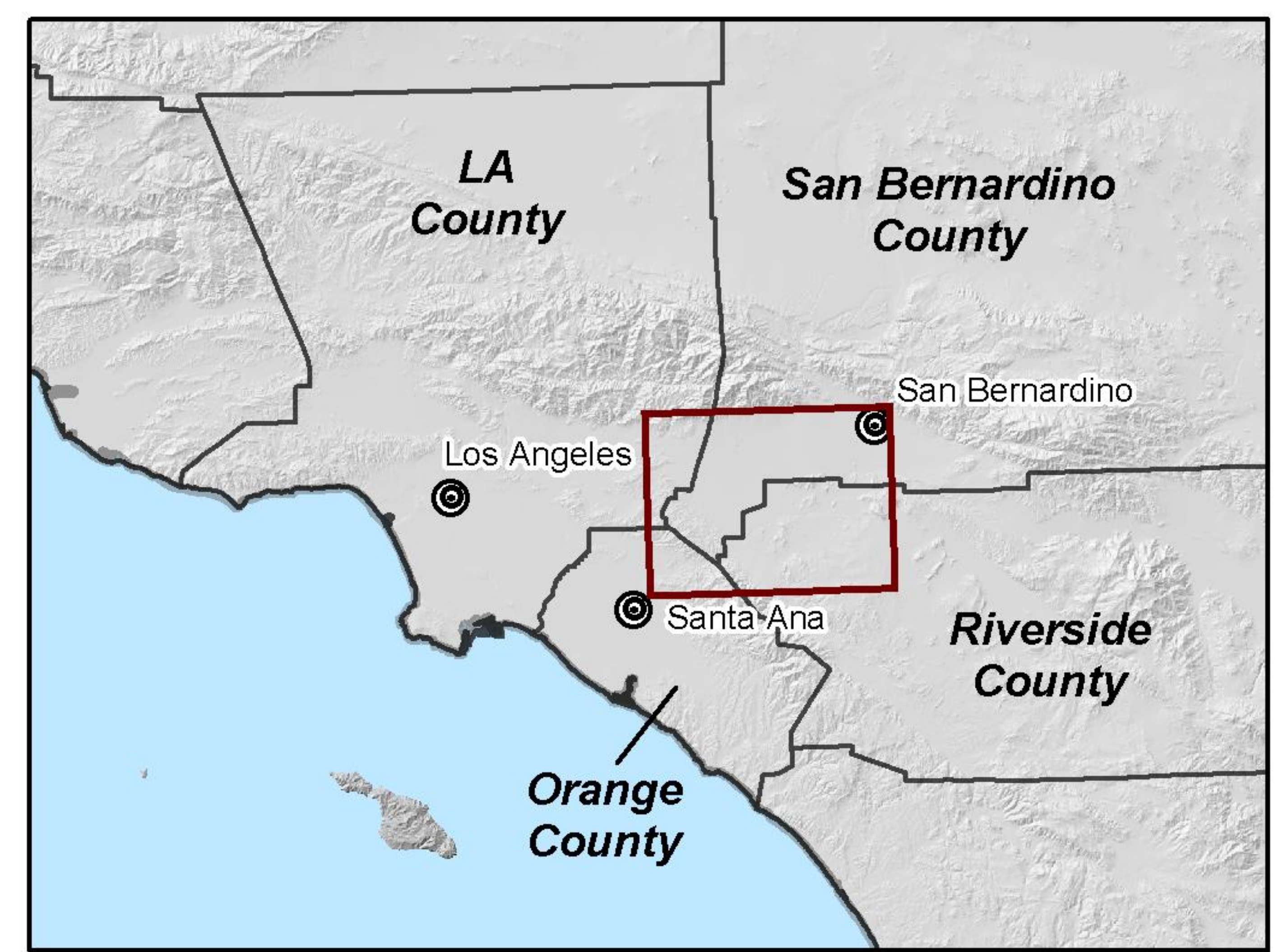
- Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

- Location Certain
- Location Concealed
- Location Approximate
- Location Uncertain

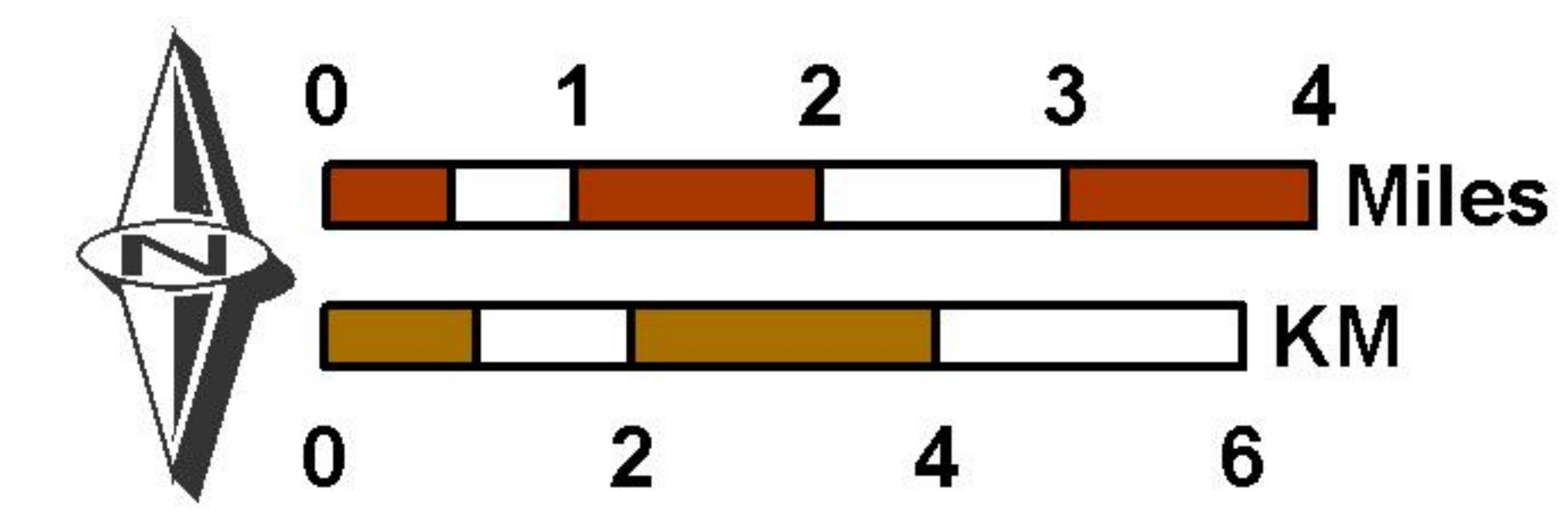
Other Features

- Well Used in Model Calibration
- Model Grid Boundary
- Chino Basin
- Flood Control and Conservation Basins



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Chino Basin Dry-Year Yield Program
 Geology and Hydrogeology

Change in Groundwater Level from Start to End of Baseline Scenario for Layer 3
 2004-2028

Figure 1-2c

Figure 1-3
Projected Time History of Total Storage in the Chino Basin for Baseline
and Dry-Year Yield Scenarios



2. ANALYSIS OF OPERATIONAL STORAGE REQUIREMENT, SAFE STORAGE, AND SAFE STORAGE CAPACITY PURSUANT TO THE PEACE AGREEMENT

2.1 Background

The Implementation Plan defines the *operational storage requirement* as the storage or volume in the Chino Basin that is necessary to maintain safe yield and sets the initial estimate of the operational storage requirement at 5,300,000 acre-ft, which corresponds to the estimated storage for the year 2000. The *safe storage* is defined as the maximum storage in the Basin that will not cause significant water quality and high-groundwater related problems. The *safe storage capacity* is the difference between the operational storage requirement and the safe storage. Watermaster committed to reassess the operational storage requirement and the safe storage in fiscal 2002/03. This technical memorandum contains an assessment of the operational storage requirement and safe storage.

2.2 Analysis

The Implementation Plan defines the *operational storage requirement* as the storage or volume in the Chino Basin that is necessary to maintain safe yield and sets an initial estimate of the *operational storage requirement* at 5,300,000 acre-ft, which corresponds to the estimated storage for the year 2000. The year 2000 estimate of storage developed from the baseline scenario is about 5,980,000 acre-ft. The *safe storage* was defined as the maximum storage in the Basin that will not cause significant water quality and high-groundwater related problems. The *safe storage capacity* is the difference between the operational storage requirement and the safe storage. During the development of the Peace Agreement, safe storage capacity was initially set at 500,000 acre-ft. Thus, safe storage was initially estimated at 5,800,000 acre-ft. Given the revised year 2000 estimate of storage, safe storage is about 6,480,000 acre-ft.

The safe storage capacity in the Peace Agreement was set at 500,000 acre-ft based on the observation that the change in storage during the base period for the determination of the safe yield (1965 through 1974) was at about 400,000 acre-ft and that the storage in the Basin was declining prior to the base period. It seemed reasonable that the Basin could be operated at these prior levels without causing significant water quality and other high-groundwater related problems. This assumption is maintained herein. The recharge and production plans in the OBMP that are represented in the baseline scenario will result in the Basin being operated at lower groundwater levels than that envisioned during the development of the OBMP. Thus, the concept of safe storage is not as relevant for future storage and recovery programs as was initially thought during the development of the OBMP.

WEI recently completed a hydrogeologic assessment of the proposed DYY Program (WEI, 2003). The maximum storage reached during the DYY scenario was estimated to be about 5,950,000 acre-ft (See [Figure 1-3](#)), which is about the storage reached in 2000 (operational storage capacity) and is otherwise less than the storage level of the year 2000. By adopting the supplemental recharge plan recommended above, the storage will always be less than the safe storage capacity of about 6,480,000 acre-ft. Thus, the anticipated future groundwater storage time histories, as projected for the baseline scenario DYY Program, are entirely consistent with the storage management program in the Implementation Plan.



3. EVALUATION OF THE CUMULATIVE EFFECTS OF TRANSFERS PURSUANT TO THE PEACE AGREEMENT

3.1 Background

Portions of Sections 5.1 and 5.3 of the Peace Agreement contain the basic Watermaster commitments to evaluate the transfers of water in storage or water rights that are used in place of the physical recharge of water to Chino Basin. The Peace Agreement and its Implementation Plan commit Watermaster to make an evaluation of transfers and the Watermaster Rules and Regulations further define the evaluation to include the “cumulative impacts of Transfers, if any.” This analysis focuses on the Watermaster’s implementation of the following portions of these documents:

“5.1 (e) Watermaster shall exercise Best Efforts to (see Peace Agreement pages 20 - 21):

- (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 accordance with the provisions of Section 5.3;”

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

5.3 (b) (see Peace Agreement pages 32 and 33)

- (iii) There shall be a rebuttable presumption that the Transfer and the Production by the transferee does not result in Material Physical Injury to a party to the Judgment or the Basin;

- (iv) Watermaster shall base any decision to approve or disapprove any proposed Transfer upon the record after considering potential impacts associated with the individual Transfer alone and without regard to impacts attributable to any other Transfers;

5.3 (c) Watermaster shall allow Producers to lease water rights to make up for the lessee’s over-Production.”

Pursuant to the above and other Sections of the Peace Agreement, transfers of water have been occurring since the Peace Agreement was signed (and occurred since the Judgment was signed). Some of these transfers have resulted in an avoidance of a replenishment obligation, or the physical recharge of water, for the Producer undertaking to lease or purchase the water.

The *Implementation Plan* in Exhibit B to the Peace Agreement contains similar language to the Peace Agreement regarding 5.1 (e), but is mostly silent as to schedule for implementation of the specific commitments above (see Exhibit B, paragraph 11 on page 20 and the implementation schedule on pages 22 and 23). Paragraph 5 (iii) on page 19 of Exhibit B includes additional *guidelines* that Watermaster must consider:

“The need to continue physical recharge under this paragraph [6,500 af/yr of supplemental water in MZ1] 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;”



SECTION 3

EVALUATION OF THE CUMULATIVE EFFECTS OF TRANSFERS PURSUANT TO THE PEACE AGREEMENT

Page 21 of Exhibit B also commits Watermaster to:

- “(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;”

Section 7 of the Watermaster Rules and Regulations repeats the commitments of the Peace Agreement and Implementation Plan and adds Section 9.2 (e) and 9.3 (see Rules and Regulations, page 55):

- “(e) Transfers which occur between the same parties in the same year shall be considered as a single Transfer for the purpose of determining Material Physical Injury.

9.3 Integrated Watermaster Review. In reviewing Transfers under these Rules and Regulations, Watermaster shall exercise reasonable discretion. Watermaster shall review each proposed Transfer based upon the record before it and considering the potential impacts of the proposed Transfer alone. However, Watermaster shall also consider the cumulative impacts of Transfers generally when carrying out its responsibilities to implement the OBMP and Recharge and monitoring programs authorized by these Rules and Regulations or the Judgment.

- (a) Watermaster will evaluate the cumulative physical impact of Transfers on the Basin, if any, by July 1, 2003, and a minimum of once every two years thereafter.
- (b) Watermaster will take the results of its evaluation into account when carrying out its obligations under section 7.1 of these Rules and Regulations.”

This technical memorandum, which is being prepared pursuant to the requirements of the Peace Agreement and the Watermaster Rules and Regulations cited above, contains Watermaster’s first evaluation of the “cumulative” impacts of transfers.

3.2 Analysis

The Peace Agreement defines Transfers as “the assignment, lease, or sale of a right to Produce water to another Producer within the Chino Basin or to another person or entity for use outside the Basin in conformance with the Judgment, whether the Transfer is of a temporary or permanent nature” (Peace Agreement page 11-12). Replenishment water means “Supplemental Water used to Recharge the Basin pursuant to the physical solution, either directly by percolating or injecting the water into the Basin or indirectly by delivering the water for use in lieu of Production and use of Safe Yield or Operating Safe Yield” (Peace Agreement page 10). Based on the Peace Agreement definition (and in actuality), not all transfers that occur replace the physical recharge of water to the Chino Basin. This technical memorandum focuses on an evaluation the cumulative physical impact of Transfers that replaced the physical recharge of water.



SECTION 3

EVALUATION OF THE CUMULATIVE EFFECTS OF TRANSFERS PURSUANT TO THE PEACE AGREEMENT

3.2.1 Historic Assessment of Transfers and Replenishment

In order to determine the cumulative impacts of transfers, if any, the avoided physical recharge due to transfers had to be determined. However, since not all transfers represented avoided physical recharge and since Watermaster does not specifically determine avoided physical recharge each year, the calculation of the actual avoided physical recharge during the study period had to be estimated from historical operations of the Watermaster. First, data regarding historic transfer and replenishment activities were assembled and disaggregated into the “physically recharged” components and the “in-lieu” or “exchanged” components. This was accomplished by reviewing and tabulating transfer, recharge, and replenishment information from the Watermaster Assessment Packages and Annual Reports for Watermaster fiscal years 1989/90 through 2000/01 (see Appendices B & C). This was done for the major producers historically participating in transfers (Cucamonga County Water District, Chino, Chino Hills, Fontana Union Water Company, Fontana Water Company, Jurupa Community Services District, Marygold Mutual Water Company, Cities of Ontario and Pomona, San Antonio Water Company, Santa Ana River Water Company, Southern California, and the City of Upland). In addition, Metropolitan accounts and the ground water replenishment activities were tabulated.

To calculate the avoided replenishment or physical recharge of water that occurred during the study period, the following steps were taken:

1. Develop spreadsheets for the study period that duplicate the Watermaster Assessment Packages for each Producer listed above and check against the Assessment Packages ([Appendix B](#)).
2. Refine spreadsheets to break out water transfer activity, including known transfers from storage, Metropolitan exchanges, etc.
3. Summarize transfers identified in the Assessment Package based on where the transfers originated and went for the same period ([Appendix C](#)).
4. Calculate each producer’s total replenishment obligation without transfers, both including and excluding any Metropolitan exchanges from production.
5. Develop spreadsheets summarizing the total replenishment obligation calculated for each producer by year for both including and excluding any Metropolitan exchanges for the study period. These tables represent what the total obligation would have been, by producer, had the Producers not completed the transfers ([Table 3-1A](#) and [3-2A](#)).
6. Develop a spreadsheet summarizing net over-production from the Assessment Package for each producer ([Table 3-1B](#) and [3-2B](#)).
7. Develop summary spreadsheets subtracting the net over-production from the Assessment Package from the total replenishment obligation by producer, both for including and excluding Metropolitan exchanges. These tables represent the avoided physical recharge or replenishment by producer ([Table 3-1C](#) and [3-2C](#)).
8. Develop spreadsheets summarizing actual groundwater replenishment, including the total unmet replenishment obligation from the Assessment Packages, and indicating how Watermaster satisfied the obligation each year (i.e. sources of water) ([Table 3-3](#)).
9. Develop spreadsheet summarizing Metropolitan cyclic account activity during the study period. Calculate the percentage of cyclic water used for replenishment that was delivered by exchange or physically recharged ([Table 3-4](#)).
10. Evaluate the results both including and excluding Metropolitan exchange.



SECTION 3

EVALUATION OF THE CUMULATIVE EFFECTS OF TRANSFERS PURSUANT TO THE PEACE AGREEMENT

The tables in [Appendix B](#) show the historic water transfer activity and net replenishment obligation for each producer. These tables duplicate the results of the Watermaster Assessment Package. Because exchanges with Metropolitan are included in the assessment packages as part of production, the effect of exchanges that did not avoid the physical recharge of water had to be accounted for in the calculation (See [Table 3-5](#), Calculation of Avoided Physical Recharge).

Based on an evaluation of the information above, approximately 225,000 acre-feet of avoided physical recharge occurred between 1989 and 2001.

3.2.2 Analysis of Material Physical Injury

Based on the analysis herein it is concluded that there has been no material physical injury to the basin or a Party to the Judgment due to transfers.

Had the transfers not occurred Watermaster would have recharged about 225,000 acre-ft of supplemental water into the basin and the volume of water in storage would increased due to this recharge. With this recharge the following impacts would have occurred:

- Groundwater levels and storage would have increased
- Outflow to the Santa Ana River would have increased
- Safe yield of the Basin would have declined
- Nitrate concentrations would be lower in the immediate area of physical recharge

The cumulative impact of the transfers are the opposite of the above. For the most part the cumulative impact of the transfers is positive. The 2003 Watermaster Model was not used to estimate the impact of the cumulative effect of transfers because it is not possible to predict how the Watermaster Parties water supply plans would have changed in the absence of transfers, and because the current version of the model does not have a solute transport modeling capability suitable for analyzing nitrate impacts.

[Table 3-6](#) shows the distribution of transfers that occurred between MZ1, MZ2 and MZ3. Some Watermaster Parties have expressed concerns that some transfers that result in reduced physical recharge could contribute to the subsidence problem in Management Zone 1. Review of [Table 3-6](#) shows that historically there have been about 7,400 acre-ft of water transferred to producers in MZ1 from producers in MZ2 and MZ3. The table shows that about 126,000 acre-ft was transferred to producers in MZ2 and MZ3 from producers in MZ2 and MZ1. In total about 119,000 acre-ft of production was transferred out of MZ1 which is beneficial to the management of subsidence in MZ1.



Table 3-1

A. Total Replenishment Obligation Without Transfers & Including MWD Exchange in Production

FY	CCWD	Chino	Chino Hills	FUWC	FWC	JCSD	Marygold	MVWD	Ontario	Pomona	San Antonio	Santa Ana	SoCal Wtr	Upland	Total Repl Obligation
1989-90	11,270.8	2,822.7	0.0	2,330.5	0.0	9,624.4	0.0	0.0	9,237.9	0.0	0.0	0.0	0.0	0.0	35,286.3
1990-91	0.0	2,753.0	0.0	7,349.6	1,406.9	7,710.3	0.0	0.0	6,155.2	0.0	0.0	0.0	0.0	0.0	25,374.8
1991-92	0.0	2,084.7	0.0	2,514.8	2,902.8	8,600.5	0.0	0.0	10,491.1	0.0	0.0	0.0	0.0	0.0	26,593.9
1992-93	0.0	304.6	0.0	739.7	2,676.9	8,689.1	0.0	0.0	3,456.5	0.0	0.0	0.0	0.0	0.0	15,866.8
1993-94	0.0	0.0	0.0	0.0	6,277.2	8,126.6	0.0	0.0	2,264.6	0.0	0.0	0.0	0.0	0.0	16,668.5
1994-95	0.0	0.0	0.0	0.0	6,537.6	4,534.5	0.0	0.0	998.9	0.0	0.0	0.0	0.0	0.0	12,071.0
1995-96	0.0	356.0	0.0	0.0	6,530.3	5,284.4	0.0	0.0	13,745.4	0.0	0.0	0.0	0.0	0.0	25,916.1
1996-97	0.0	1,368.9	0.0	0.0	11,631.6	7,530.3	0.0	0.0	15,114.3	0.0	0.0	0.0	0.0	0.0	35,645.2
1997-98	0.0	0.0	0.0	0.0	10,973.7	5,075.1	0.0	0.0	14,658.7	0.0	0.0	0.0	0.0	0.0	30,707.4
1998-99	0.0	1,683.6	0.0	0.0	10,373.6	6,183.8	0.0	122.6	15,915.6	0.0	0.0	0.0	0.0	0.0	34,279.2
1999-00	0.0	0.0	0.0	0.0	20,946.8	5,419.6	0.0	0.0	10,839.2	0.0	0.0	0.0	0.0	0.0	37,205.5
2000-01	0.0	0.0	0.0	0.0	17,066.0	0.0	0.0	227.0	8,943.0	300.8	0.0	0.0	0.0	0.0	26,536.8
2001-02	0.0	0.0	0.0	0.0	19,595.7	0.0	0.0	5,497.4	13,984.5	483.3	0.0	0.0	0.0	0.0	39,561.0
TOTALS	11,270.8	11,373.4	0.0	12,934.5	116,919.1	76,778.7	0.0	5,847.0	125,805.0	784.1	0.0	0.0	0.0	0.0	361,712.5

B. Net Overproduction from Assessment Package by Producer

FY	CCWD	Chino	Chino Hills	FUWC	FWC	JCSD	Marygold	MVWD	Ontario	Pomona	San Antonio	Santa Ana	SoCal Wtr	Upland	Total Repl Obligation
1989-90	0.0	2,565.6	0.0	6,146.0	0.0	8,324.4	0.0	0.0	9,237.9	0.0	0.0	0.0	0.0	0.0	26,273.9
1990-91	0.0	2,389.2	0.0	13,746.3	0.0	5,910.3	0.0	0.0	6,155.2	0.0	0.0	0.0	0.0	0.0	28,200.9
1991-92	0.0	404.7	0.0	6,699.1	664.5	5,320.5	0.0	0.0	8,811.1	0.0	0.0	0.0	0.0	0.0	21,899.9
1992-93	0.0	0.0	0.0	2,564.5	2,676.9	1,978.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7,219.9
1993-94	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1994-95	0.0	0.0	0.0	0.0	2,797.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,797.6
1995-96	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11,745.4	0.0	0.0	0.0	0.0	0.0	11,745.4
1996-97	0.0	135.9	0.0	0.0	10,931.6	3,759.5	0.0	0.0	5,037.6	0.0	0.0	0.0	0.0	0.0	19,864.7
1997-98	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
1998-99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1999-00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2001-02	0.0	0.0	0.0	0.0	4,891.7	0.0	0.0	0.0	851.4	0.0	0.0	0.0	0.0	0.0	5,743.1
TOTALS	0.0	5,495.3	0.0	29,155.9	21,962.4	25,293.3	0.0	0.0	41,838.6	0.0	0.0	0.0	0.0	0.0	123,745.5

C. Avoided Physical Recharge - Including MWD Exchange in Production

FY	CCWD	Chino	Chino Hills	FUWC	FWC	JCSD	Marygold	MVWD	Ontario	Pomona	San Antonio	Santa Ana	SoCal Wtr	Upland	Avoided Phys. Recharge
1989-90	11,270.8	257.1	0.0	-3,815.5	0.0	1,300.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9,012.5
1990-91	0.0	363.8	0.0	-6,396.7	1,406.9	1,800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-2,826.0
1991-92	0.0	1,680.0	0.0	-4,184.3	2,238.3	3,280.0	0.0	0.0	1,680.0	0.0	0.0	0.0	0.0	0.0	4,694.0
1992-93	0.0	304.6	0.0	-1,824.8	0.0	6,710.6	0.0	0.0	3,456.5	0.0	0.0	0.0	0.0	0.0	8,646.8
1993-94	0.0	0.0	0.0	0.0	6,277.2	8,126.6	0.0	0.0	2,264.6	0.0	0.0	0.0	0.0	0.0	16,668.5
1994-95	0.0	0.0	0.0	0.0	3,740.0	4,534.5	0.0	0.0	998.9	0.0	0.0	0.0	0.0	0.0	9,273.3
1995-96	0.0	356.0	0.0	0.0	6,530.3	5,284.4	0.0	0.0	2,000.0	0.0	0.0	0.0	0.0	0.0	14,170.7
1996-97	0.0	1,233.0	0.0	0.0	700.0	3,770.8	0.0	0.0	10,076.7	0.0	0.0	0.0	0.0	0.0	15,780.4
1997-98	0.0	0.0	0.0	0.0	10,973.7	5,075.0	0.0	0.0	14,658.7	0.0	0.0	0.0	0.0	0.0	30,707.4
1998-99	0.0	1,683.6	0.0	0.0	10,373.6	6,183.8	0.0	122.6	15,915.6	0.0	0.0	0.0	0.0	0.0	34,279.2
1999-00	0.0	0.0	0.0	0.0	20,946.8	5,419.6	0.0	0.0	10,839.2	0.0	0.0	0.0	0.0	0.0	37,205.5
2000-01	0.0	0.0	0.0	0.0	17,066.0	0.0	0.0	227.0	8,943.0	300.8	0.0	0.0	0.0	0.0	26,536.8
2001-02	0.0	0.0	0.0	0.0	14,704.0	0.0	0.0	5,497.4	13,133.1	483.3	0.0	0.0	0.0	0.0	33,817.9
TOTALS	11,270.8	5,878.0	0.0	-16,221.4	94,956.7	51,485.3	0.0	5,847.0	83,966.4	784.1	0.0	0.0	0.0	0.0	237,967.0

Table 3-2

A. Total Replenishment Obligation Without Transfers & Excluding MWD Exchange from Production

FY	CCWD	Chino	Chino Hills	FUWC	FWC	JCSD	Marygold	MVWD	Ontario	Pomona	San Antonio	Santa Ana	SoCal Wtr	Upland	Total Repl Obligation
1989-90	0.0	2,822.7	0.0	2,330.5	0.0	9,624.4	0.0	0.0	4,362.0	0.0	0.0	0.0	0.0	0.0	19,139.6
1990-91	0.0	2,753.0	0.0	7,349.6	1,406.9	7,710.3	0.0	0.0	2,576.1	0.0	0.0	0.0	0.0	0.0	21,795.7
1991-92	0.0	2,011.0	0.0	2,514.8	2,902.8	8,600.5	0.0	0.0	8,586.2	0.0	0.0	0.0	0.0	0.0	24,615.3
1992-93	0.0	0.0	0.0	739.7	2,676.9	8,689.1	0.0	0.0	2,345.7	0.0	0.0	0.0	0.0	0.0	14,451.4
1993-94	0.0	0.0	0.0	0.0	6,277.2	8,126.6	0.0	0.0	2,264.6	0.0	0.0	0.0	0.0	0.0	16,668.5
1994-95	0.0	0.0	0.0	0.0	6,537.6	4,534.5	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	11,074.2
1995-96	0.0	356.0	0.0	0.0	6,530.3	5,284.4	0.0	0.0	12,232.7	0.0	0.0	0.0	0.0	0.0	24,403.4
1996-97	0.0	1,368.9	0.0	0.0	11,631.6	7,530.3	0.0	0.0	15,114.3	0.0	0.0	0.0	0.0	0.0	35,645.2
1997-98	0.0	0.0	0.0	0.0	10,973.7	5,075.1	0.0	0.0	14,658.7	0.0	0.0	0.0	0.0	0.0	30,707.4
1998-99	0.0	1,683.6	0.0	0.0	10,373.6	6,183.8	0.0	122.6	15,915.6	0.0	0.0	0.0	0.0	0.0	34,279.2
1999-00	0.0	0.0	0.0	0.0	20,946.8	5,419.6	0.0	0.0	10,839.2	0.0	0.0	0.0	0.0	0.0	37,205.5
2000-01	0.0	0.0	0.0	0.0	17,066.0	0.0	0.0	227.0	8,943.0	300.8	0.0	0.0	0.0	0.0	26,536.8
2001-02	0.0	0.0	0.0	0.0	19,595.7	0.0	0.0	5,497.4	13,984.5	483.3	0.0	0.0	0.0	0.0	39,561.0
TOTALS	0.0	10,995.1	0.0	12,934.5	116,919.1	76,778.7	0.0	5,847.0	111,824.8	784.1	0.0	0.0	0.0	0.0	336,083.2

B. Net Overproduction from Assessment Package by Producer

FY	CCWD	Chino	Chino Hills	FUWC	FWC	JCSD	Marygold	MVWD	Ontario	Pomona	San Antonio	Santa Ana	SoCal Wtr	Upland	Total Repl Obligation
1989-90	0.0	2,565.6	0.0	6,146.0	0.0	8,324.4	0.0	0.0	9,237.9	0.0	0.0	0.0	0.0	0.0	26,273.9
1990-91	0.0	2,389.2	0.0	13,746.3	0.0	5,910.3	0.0	0.0	6,155.2	0.0	0.0	0.0	0.0	0.0	28,200.9
1991-92	0.0	404.7	0.0	6,699.1	664.5	5,320.5	0.0	0.0	8,811.1	0.0	0.0	0.0	0.0	0.0	21,899.9
1992-93	0.0	0.0	0.0	2,564.5	2,676.9	1,978.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7,219.9
1993-94	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1994-95	0.0	0.0	0.0	0.0	2,797.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,797.6
1995-96	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11,745.4	0.0	0.0	0.0	0.0	0.0	11,745.4
1996-97	0.0	135.9	0.0	0.0	10,931.6	3,759.5	0.0	0.0	5,037.6	0.0	0.0	0.0	0.0	0.0	19,864.7
1997-98	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
1998-99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1999-00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2001-02	0.0	0.0	0.0	0.0	4,891.7	0.0	0.0	0.0	851.4	0.0	0.0	0.0	0.0	0.0	5,743.1
TOTALS	0.0	5,495.3	0.0	29,155.9	21,962.4	25,293.3	0.0	0.0	41,838.6	0.0	0.0	0.0	0.0	0.0	123,745.5

C. Avoided Physical Recharge - Excluding MWD Exchange from Production

FY	CCWD	Chino	Chino Hills	FUWC	FWC	JCSD	Marygold	MVWD	Ontario	Pomona	San Antonio	Santa Ana	SoCal Wtr	Upland	Avoided Phys. Recharge
1989-90	0.0	257.1	0.0	-3,815.5	0.0	1,300.0	0.0	0.0	-4,875.9	0.0	0.0	0.0	0.0	0.0	-7,134.3
1990-91	0.0	363.8	0.0	-6,396.7	1,406.9	1,800.0	0.0	0.0	-3,579.1	0.0	0.0	0.0	0.0	0.0	-6,405.1
1991-92	0.0	1,606.3	0.0	-4,184.3	2,238.3	3,280.0	0.0	0.0	-224.9	0.0	0.0	0.0	0.0	0.0	2,715.4
1992-93	0.0	0.0	0.0	-1,824.8	0.0	6,710.6	0.0	0.0	2,345.7	0.0	0.0	0.0	0.0	0.0	7,231.5
1993-94	0.0	0.0	0.0	0.0	6,277.2	8,126.6	0.0	0.0	2,264.6	0.0	0.0	0.0	0.0	0.0	16,668.5
1994-95	0.0	0.0	0.0	0.0	3,740.0	4,534.5	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	8,276.5
1995-96	0.0	356.0	0.0	0.0	6,530.3	5,284.4	0.0	0.0	487.3	0.0	0.0	0.0	0.0	0.0	12,658.0
1996-97	0.0	1,233.0	0.0	0.0	700.0	3,770.8	0.0	0.0	10,076.7	0.0	0.0	0.0	0.0	0.0	15,780.4
1997-98	0.0	0.0	0.0	0.0	10,973.7	5,075.0	0.0	0.0	14,658.7	0.0	0.0	0.0	0.0	0.0	30,707.4
1998-99	0.0	1,683.6	0.0	0.0	10,373.6	6,183.8	0.0	122.6	15,915.6	0.0	0.0	0.0	0.0	0.0	34,279.2
1999-00	0.0	0.0	0.0	0.0	20,946.8	5,419.6	0.0	0.0	10,839.2	0.0	0.0	0.0	0.0	0.0	37,205.5
2000-01	0.0	0.0	0.0	0.0	17,066.0	0.0	0.0	227.0	8,943.0	300.8	0.0	0.0	0.0	0.0	26,536.8
2001-02	0.0	0.0	0.0	0.0	14,704.0	0.0	0.0	5,497.4	13,133.1	483.3	0.0	0.0	0.0	0.0	33,817.9
TOTALS	0.0	5,499.8	0.0	-16,221.4	94,956.7	51,485.3	0.0	5,847.0	69,986.2	784.1	0.0	0.0	0.0	0.0	212,337.7

**Table 3-3
Groundwater Replenishment**

FY	Total Unmet Replenishment Obligation From Assessment Package	Spreading						Net to be Met From Non-Wet Sources	Indirect		Balance Replenishment	Other Accounts		
		CB-13T San Sevaïne	CB-59T Montclair	Day	CB-14T Etiwanda	Deer Turner	Total Spread		In Lieu Exchange	Cyclic Purchase		Trust	Co Op	Mini Conj Use
1989-90	30,344.5	0.0	0.0	0.0	0.0	0.0	0.0	30,344.5	0.0	19,324.2	5,679.7	14,098.8		
1990-91	31,814.9	0.0	1,987.6	475.1	828.0	0.0	3,290.7	28,524.2	0.0	0.0	16,700.0	16,377.1	0.0	0.0
1991-92	23,870.4	0.0	2,583.0	501.4	705.1	0.0	3,789.5	20,080.9	5,387.1	17,726.0	42,192.0	14,929.1	0.0	0.0
1992-93	7,501.5	3,181.6	6,443.9	0.0	2,909.3	0.0	12,534.8	-5,033.3	8,794.7	21,883.5	6,480.5	-45,405.0	0.0	0.0
1993-94	432.0	2,688.0	4,885.9	0.0	1,284.9	0.0	8,858.8	-8,426.8	8,984.5	0.0	-10,930.9	0.0	0.0	-61.1
1994-95	3,060.9	0.0	0.0	0.0	0.0	0.0	0.0	3,060.9	432.1	0.0	-8,302.0	0.0	3,170.8	-1.5
1995-96	12,903.7	82.4	0.0	0.0	0.0	0.0	82.4	12,821.3	4,701.0	0.0	-181.8	0.0	2,611.9	-0.4
1996-97	20,578.2	0.0	0.0	0.0	0.0	0.0	0.0	20,578.2	4,672.7	0.0	15,723.8	0.0	-4,672.7	-0.6
1997-98	770.9	0.0	8,322.6	0.0	0.0	0.0	8,322.6	-7,551.7	0.0	0.0	8,172.1	0.0	0.0	-0.4
1998-99	657.5	1,513.3	2,960.6	0.0	1,223.4	0.0	5,697.3	-5,039.8	0.0	1,473.9	1,658.4	0.0	0.0	-1.3
1999-00	579.3		1,000.8	0.0	0.0	0.0	1,000.8	-421.5	0.0	657.5	579.4	0.0	0.0	0.0
2000-01	198.7	0.0	29.7	0.0	0.0	0.0	29.7	169.0	0.0	748.3	0.1	0.0	-1,110.0	-0.2
2001-02	5,872.9	0.0	0.1	0.0	0.0	0.0	0.1	5,872.8	0.0	0.0	5,872.8	0.0	0.0	-1.1
TOTALS	138,585.3	7,465.3	28,214.2	976.5	6,950.7	0.0	43,606.7		32,972.1	61,813.4		0.0	0.0	4,739.5

Table 3-4
Cyclic Activities¹

FY	Beginning Balance	Puts										Takes							Bal in Ann Rept	Diff
		CB-13T San Sevaire	CB-59T Montclair	Spreading Day	CB-14T Etiwanda	Deer Turner	Total Puts Spread	Balance Spread	Other Del by Exchange	Total Exchange	Balance Exchange	Total Puts Spread & Other	% Total Spread	% Total Exchange	Pur for Repl	Total Spread af	Total Exchange af	Ending Balance		
1989-90	47,808.3	0.0	0.0	0.0	0.0	0.0	0.0	28,484.1	0.0	0.0	0.0	0.0	100.0%	0.0%	-19,324.2	-19,324.2	0.0	47,808.3	28,462.9	21.2
1990-91	28,484.1	0.0	0.0	129.2	373.5	0.0	502.7	28,986.8	0.0	0.0	0.0	502.7	100.0%	0.0%	0.0	0.0	0.0	28,986.8	28,965.6	21.2
1991-92	28,986.8	0.0	1,270.3	0.0	490.8	0.0	1,761.1	13,021.9	7,205.7	7,205.7	7,205.7	8,966.8	64.4%	35.6%	-17,726.0	-17,726.0	0.0	20,227.6	20,206.4	21.2
1992-93	20,227.6	0.0	945.3	0.0	731.8	0.0	1,677.1	611.1	0.0	0.0	-589.9	1,677.1	2884.6%	-2784.6%	-21,883.5	-14,087.9	-7,795.6	21.2	0.0	21.2
1993-94	21.2	516.6	5,466.8	0.0	1,650.8	0.0	7,634.2	8,245.3	11,210.2	11,210.2	10,620.3	18,844.4	43.7%	56.3%	0.0	0.0	0.0	18,865.6	18,844.5	21.1
1994-95	18,865.6	6,942.7	716.1	0.0	2,641.2	0.0	10,300.0	18,545.3	1,051.1	1,051.1	11,671.4	11,351.1	61.4%	38.6%	0.0	0.0	0.0	30,216.7	30,193.8	22.9
1995-96	30,216.7	0.0	0.0	0.0	0.0	0.0	0.0	18,545.3	3,555.3	3,555.3	15,226.7	3,555.3	54.9%	45.1%	0.0	0.0	0.0	33,772.0	33,749.1	22.9
1996-97	33,772.0	0.0	16.5	0.0	0.0	0.0	16.5	18,561.8	0.0	0.0	15,226.7	16.5	54.9%	45.1%	0.0	0.0	0.0	33,788.5	33,765.6	22.9
1997-98	33,788.5	0.0	0.0	0.0	0.0	0.0	0.0	18,561.8	4,491.9	4,491.9	19,718.6	4,491.9	48.5%	51.5%	0.0	0.0	0.0	38,280.4	38,257.5	22.9
1998-99	38,280.4	0.0	0.0	0.0	0.0	0.0	0.0	17,847.1	0.0	0.0	18,959.4	0.0	48.5%	51.5%	-1,473.9	-714.7	-759.2	36,806.5	36,796.1	10.4
1999-00	36,806.5	0.0	0.0	0.0	0.0	0.0	0.0	17,528.3	0.0	0.0	18,620.7	0.0	48.5%	51.5%	-657.5	-318.8	-338.7	36,149.0	36,126.1	22.9
2000-01	36,149.0	0.0	0.0	0.0	0.0	0.0	0.0	17,165.4	0.0	0.0	18,235.2	0.0	48.5%	51.5%	-748.3	-362.8	-385.5	35,400.7	35,546.8	-146.1
2001-02	35,400.7	0.0	0.0	0.0	0.0	0.0	0.0	17,165.4	0.0	0.0	18,235.2	0.0	48.5%	51.5%	0.0	0.0	0.0	35,400.7	35,543.6	-142.9
TOTALS		7,459.3	8,415.0	129.2	5,888.1	0.0	21,891.6		27,514.2	27,514.2		49,405.8	36.1	-23.1	-61,813.4	-52,534.4	-9,279.0			

¹ From Watermaster Annual Reports and Assessment Packages

Table 3-5

Calculation of Avoided Physical Recharge

	Including MWD Exchange	Excluding MWD Exchange	Average
Total Replenishment Obligation	361,712.5	336,083.2	
Less Net Obligation from Pkg.	123,745.5	123,745.5	
Gross Avoided Physical Recharge	<u>237,967.0</u>	<u>212,337.7</u>	
Plus Effect of Exchange/In Lieu*	<u>-14,646.7</u>	<u>14,646.7</u>	
Net Avoided Physical Recharge	<u><u>223,320.3</u></u>	<u><u>226,984.4</u></u>	225,152.4
* See Below			
Groundwater In Lieu for Replenishment	32,972.1		
Plus Cyclic In Lieu for Replenishment	<u>9,279.0</u>		
Total Exchange/In Lieu for Replenishment		42,251.1	
Net Groundwater Replenishment			
Required from Assessment Package	123,745.5		
Less Direct Spread for Repl	43,606.7		
Less Cyclic Spread for Repl	<u>52,534.4</u>		
Groundwater Replenishment by Exchange/In Lieu		<u>-27,604.4</u>	
Net Additional Avoided Physical Recharge due to Exchange/In Lieu		14,646.7	

Table 3-6
Water Transfers¹ by Zone (acre-ft)

Transfers To	Transfers From			Total
	Zone 1	Zone 2	Zone 3	
Zone 1	28,222	1,233	6,155	35,610
Zone 2	102,582	136,902	14,808	254,292
Zone 3	23,616	20,866	20,100	64,582
Total	154,420	159,001	41,063	354,484

¹Not exhaustive - transfers involving only storage may not be included; does not include MWD related transfers

4. REFERENCES

Chino Basin Watermaster, *Peace Agreement*, June 2000.

Chino Basin Watermaster, *Rules and Regulations*, June 2001.

Chino Basin Watermaster *Assessment Packages*, 1978 to 2002.

Wildermuth Environmental, Inc., *Optimum Basin Management Program, Chino Basin Dry-Year Yield Program, Final Modeling Report*, July 2003.



APPENDIX A

APPENDIX A IMPACT OF PROPOSED SUPPLEMENTAL RECHARGE PROGRAM ON AGRICULTURAL PUMPING COST

A.1 Introduction

In the modeling report for Chino Basin Dry-Year Yield Program by Wildermuth Environmental, Inc. (WEI, 2003), it was assumed that half of the replenishment obligation of the desalters would come from reduced groundwater outflow to the Santa Ana River near Prado dam and from an increase in streambed recharge in the Santa Ana River. To achieve this new recharge the groundwater levels in the eastern two-thirds of the Basin will have to be operated at lower levels – on the order of about 20 feet. Members of the Agricultural pool expressed concerns at their August Pool meeting regarding the increased power cost from operating at this lower level. The analysis described herein was performed to estimate the power impact on Agricultural Pool producers from operating the Basin at lower levels as suggested in [Section 1](#)

A.2 The Impact of Reduced Recharge

The water supply plan in the baseline scenario described in the Modeling Report for the Chino Basin Dry-Year Yield Program is based on a modified version of water supply plan from the Implementation Plan in the OBMP Peace Agreement. It was assumed that OBMP desalter capacity would be increased from the current level of 8 million gallons per day (mgd) in 2002/2003 to 40 mgd by 2020. About half of the production from the desalter wells is assumed to come from decreased rising water and increased stream bed recharge in the Santa Ana River report. The supplemental water recharge plan associated with the baseline is shown in [Section 1](#) as [Table 1-1](#). [Figure A-1](#) shows the quarterly groundwater production during the planning period. Groundwater production in the basin will increase from 196,000 acre-ft/yr in 2003 to about 210,000 acre-ft/yr in 2020 and remain constant thereafter. Agricultural pumping is projected to decrease from about 40,000 acre-ft/yr to about 10,000 acre-ft/yr during the same period.

To estimate the increased cost of agricultural production from operating the Basin at lower levels a revised recharge plan was created that provided for full supplemental water recharge of all desalter production. This new recharge plan is shown in [Table A-1](#). The 2003 Watermaster Model was used to simulate the groundwater level response of this revised recharge plan. The incremental power cost at each agricultural well was computed by comparing the model estimated groundwater-level time histories at each well and estimating a time history groundwater level differences. The increased power cost for each agricultural well was computed for each year from the formula below:

$$dC_i = f * P_i * dH_i * EC / e$$

where dC_i = incremental pumping cost (\$/yr) for i^{th} well
 f = unit conversion factor
 P_i = pumping rate (acre-ft/yr) for i^{th} well
 dH_i = groundwater level change (ft) for i^{th} well
 e = overall pumping efficiency, assumed to be 0.6
 EC = cost of energy, assumed to be \$0.15/kw-h



APPENDIX A

IMPACT OF PROPOSED SUPPLEMENTAL RECHARGE PROGRAM ON AGRICULTURAL PUMPING COST

The unit conversion factor is:

$$\begin{aligned} f &= 43560 \text{ ft}^2/\text{acre} * 62.4 \text{ lbs/ft}^3 / 2655000 \text{ ft-lbs/kw-h} \\ &= 1.024 \text{ kw-h} / (\text{acre-ft of water} * 1 \text{ ft change}) \end{aligned}$$

Total pumping cost change is calculated by summing cost change for all agricultural wells. The change of annual agricultural pumping cost change is shown in [Figure A-3](#).

Since total agricultural pumping decreases almost linearly from year 2004 to 2020 and water level drop steadily increases during the period, the product of two variable exhibits the characteristics of a quadratic equation, peaking at year 2016. After year 2020, as agricultural pumping remains constant until year 2028, the pumping cost steadily increases with the decreasing water level. Annual pumping cost change increases to maximum of about \$22,000 per year in year 2028 with total increase of about \$340,000 in 25 years.

[Figure A-4](#) shows the estimated annual agricultural pumping cost increase per acre-foot of production. It takes about 13 years for the average power cost increase to reach \$1.00 per acre-foot and it steadily increases with the increasing water level difference to a maximum of about \$2.20 per acre-foot of water in year 2028.



Table A-1
Total Chino Basin Production, Watermaster Replenishment Requirement and Replenishment Plan for Baseline Scenario without SAR Inflow

(1) Fiscal Year	(2) Production	(3) Operating Yield	(4) New Stormwater	(5) SAR Inflow	(6) = (2) - (3) - (4) - (5) Replenishment Obligation	(7)	(8)	(9)	(10)	(11)	(12) = Σ(7) to (11)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20) = Σ(13) to (18)	(21) = (12) + (20)	
						Supplemental Water Recharge Plan															
						MZ1 Recharge Basins						MZ2 and MZ3 Recharge Basins					Total				
MZ1 Goal	Montclair 1-4 0.36	Upland 0.21	College Hts 0.21	Brooks 0.21	Subtotal	San Sevaine 0.25	Victoria 0.1	Banana + Hickory 0.25	Etiwanda Cons	Etiwanda Perc 0.1	RP3 0.25	Declez 0.05	Subtotal								
2004	196,577	145,000	12,000	0	39,577	29,588	10,567	6,340	6,340	6,340	29,588	2,497	999	2,497	0	999	2,497	499	9,989	39,577	
2005	197,542	145,000	12,000	0	40,542	29,832	10,654	6,392	6,392	6,392	29,832	2,678	1,071	2,678	0	1,071	2,678	536	10,710	40,542	
2006	195,715	145,000	12,000	0	38,715	27,827	9,938	5,963	5,963	5,963	27,827	2,722	1,089	2,722	0	1,089	2,722	544	10,888	38,715	
2007	197,912	145,000	12,000	0	40,912	27,858	9,949	5,970	5,970	5,970	27,858	3,263	1,305	3,263	0	1,305	3,263	653	13,053	40,912	
2008	196,068	145,000	12,000	0	39,068	25,837	9,228	5,537	5,537	5,537	25,837	3,308	1,323	3,308	0	1,323	3,308	662	13,231	39,068	
2009	194,245	145,000	12,000	0	37,245	23,837	8,513	5,108	5,108	5,108	23,837	3,352	1,341	3,352	0	1,341	3,352	670	13,408	37,245	
2010	206,871	145,000	12,000	0	49,871	29,127	10,402	6,241	6,241	6,241	29,127	5,186	2,074	5,186	0	2,074	5,186	1,037	20,744	49,871	
2011	207,484	145,000	12,000	0	50,484	29,355	10,484	6,290	6,290	6,290	29,355	5,282	2,113	5,282	0	2,113	5,282	1,056	21,130	50,484	
2012	208,089	145,000	12,000	0	51,089	29,574	10,562	6,337	6,337	6,337	29,574	5,379	2,151	5,379	0	2,151	5,379	1,076	21,515	51,089	
2013	208,704	145,000	12,000	0	51,704	29,804	10,644	6,387	6,387	6,387	29,804	5,475	2,190	5,475	0	2,190	5,475	1,095	21,900	51,704	
2014	209,311	145,000	12,000	0	52,311	30,026	10,724	6,434	6,434	6,434	30,026	5,571	2,229	5,571	0	2,229	5,571	1,114	22,285	52,311	
2015	209,917	145,000	12,000	0	52,917	30,247	10,802	6,481	6,481	6,481	30,247	5,668	2,267	5,668	0	2,267	5,668	1,134	22,670	52,917	
2016	210,015	145,000	12,000	0	53,015	29,958	10,699	6,420	6,420	6,420	29,958	5,764	2,306	5,764	0	2,306	5,764	1,153	23,057	53,015	
2017	210,126	145,000	12,000	0	53,126	29,683	10,601	6,361	6,361	6,361	29,683	5,861	2,344	5,861	0	2,344	5,861	1,172	23,443	53,126	
2018	210,229	140,000	12,000	0	58,229	34,399	12,285	7,371	7,371	7,371	34,399	5,957	2,383	5,957	0	2,383	5,957	1,191	23,830	58,229	
2019	210,328	140,000	12,000	0	58,328	34,112	12,183	7,310	7,310	7,310	34,112	6,054	2,422	6,054	0	2,422	6,054	1,211	24,216	58,328	
2020	210,423	140,000	12,000	0	58,423	33,821	12,079	7,247	7,247	7,247	33,821	6,151	2,460	6,151	0	2,460	6,151	1,230	24,602	58,423	
2021	210,427	140,000	12,000	0	58,427	33,825	12,080	7,248	7,248	7,248	33,825	6,151	2,460	6,151	0	2,460	6,151	1,230	24,602	58,427	
2022	210,427	140,000	12,000	0	58,427	33,825	12,080	7,248	7,248	7,248	33,825	6,151	2,460	6,151	0	2,460	6,151	1,230	24,602	58,427	
2023	210,427	140,000	12,000	0	58,427	33,825	12,080	7,248	7,248	7,248	33,825	6,151	2,460	6,151	0	2,460	6,151	1,230	24,602	58,427	
2024	210,423	140,000	12,000	0	58,423	33,821	12,079	7,247	7,247	7,247	33,821	6,151	2,460	6,151	0	2,460	6,151	1,230	24,602	58,423	
2025	210,427	140,000	12,000	0	58,427	33,825	12,080	7,248	7,248	7,248	33,825	6,151	2,460	6,151	0	2,460	6,151	1,230	24,602	58,427	
2026	210,427	140,000	12,000	0	58,427	33,825	12,080	7,248	7,248	7,248	33,825	6,151	2,460	6,151	0	2,460	6,151	1,230	24,602	58,427	
2027	210,427	140,000	12,000	0	58,427	33,825	12,080	7,248	7,248	7,248	33,825	6,151	2,460	6,151	0	2,460	6,151	1,230	24,602	58,427	
2028	210,423	140,000	12,000	0	58,423	33,821	12,079	7,247	7,247	7,247	33,821	6,151	2,460	6,151	0	2,460	6,151	1,230	24,602	58,423	

Figure A-1
Total Quarterly Pumping by Pool - Baseline Scenario

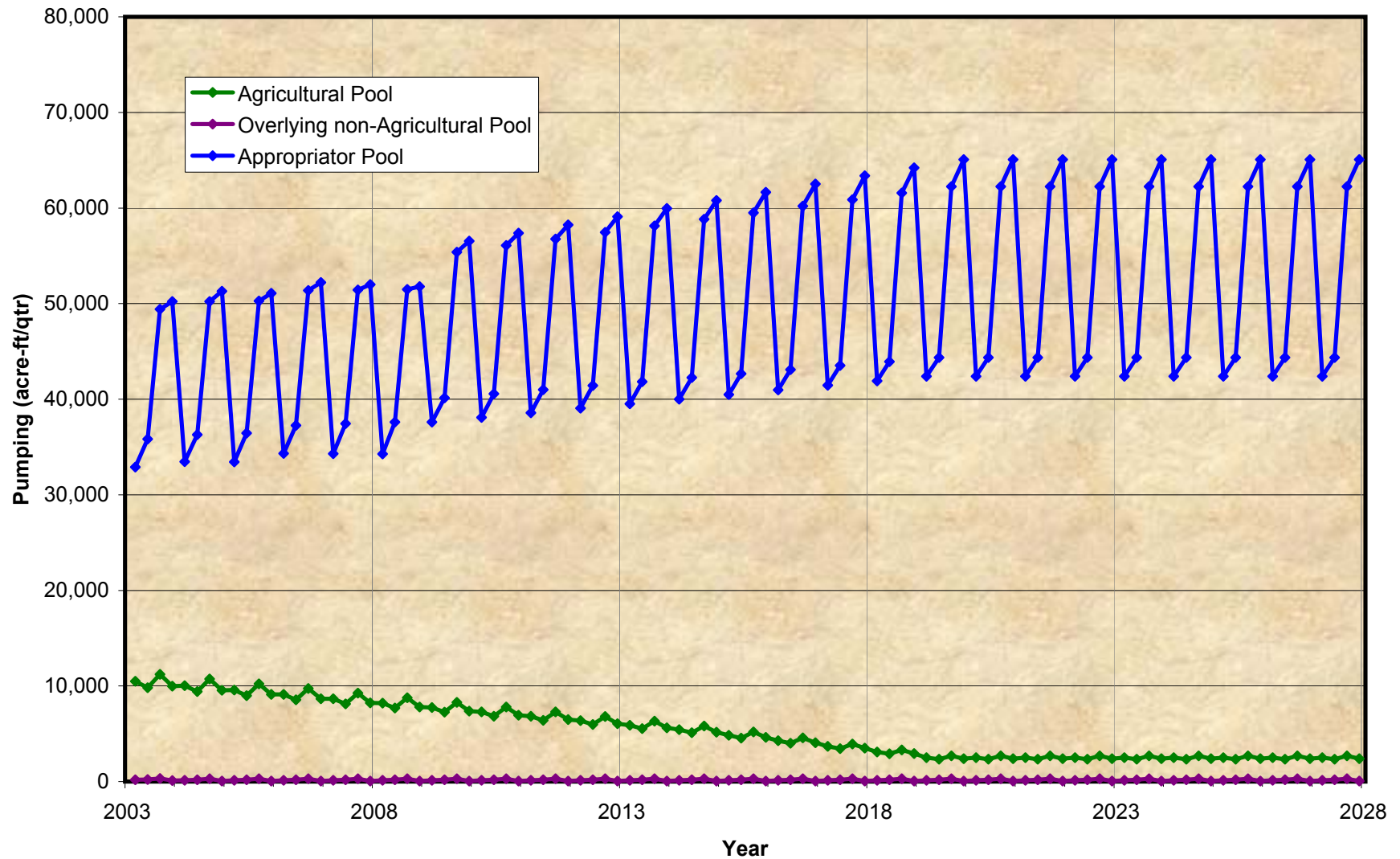


Figure A-2
Average Groundwater Level Change for Agricultural Pumping Wells

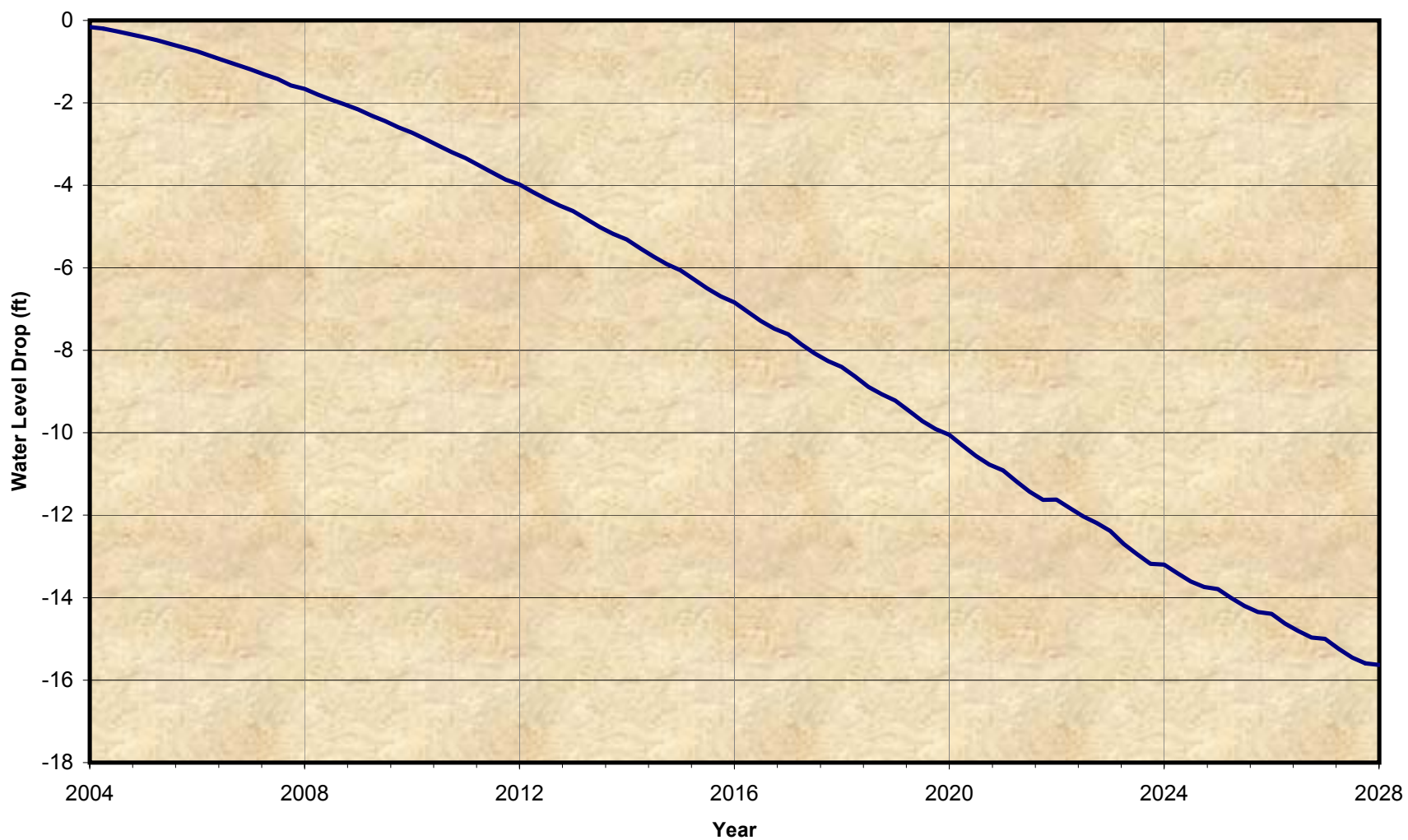


Figure A-3
Total Annual Pumping Cost Increase for Agricultural Pumping Wells

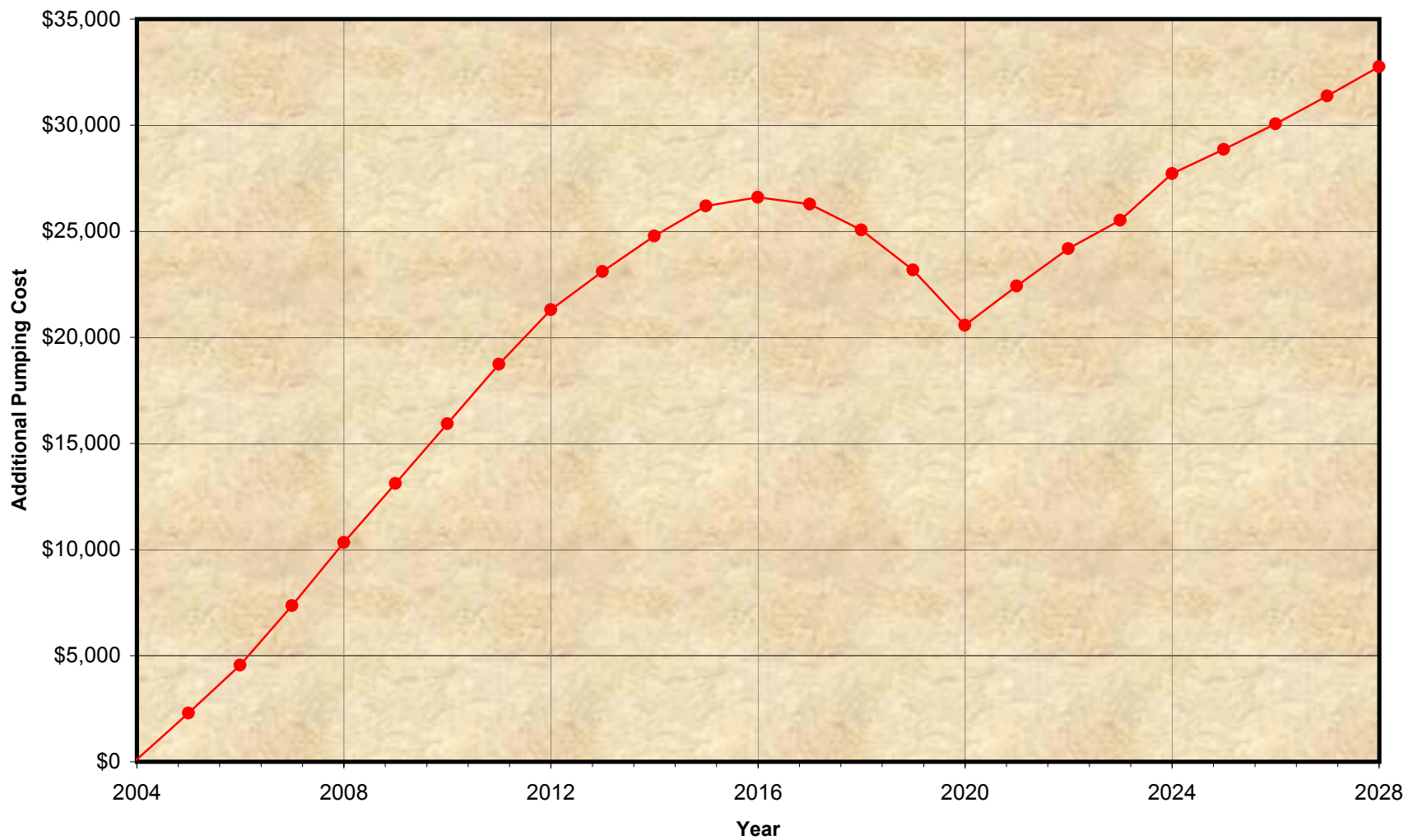
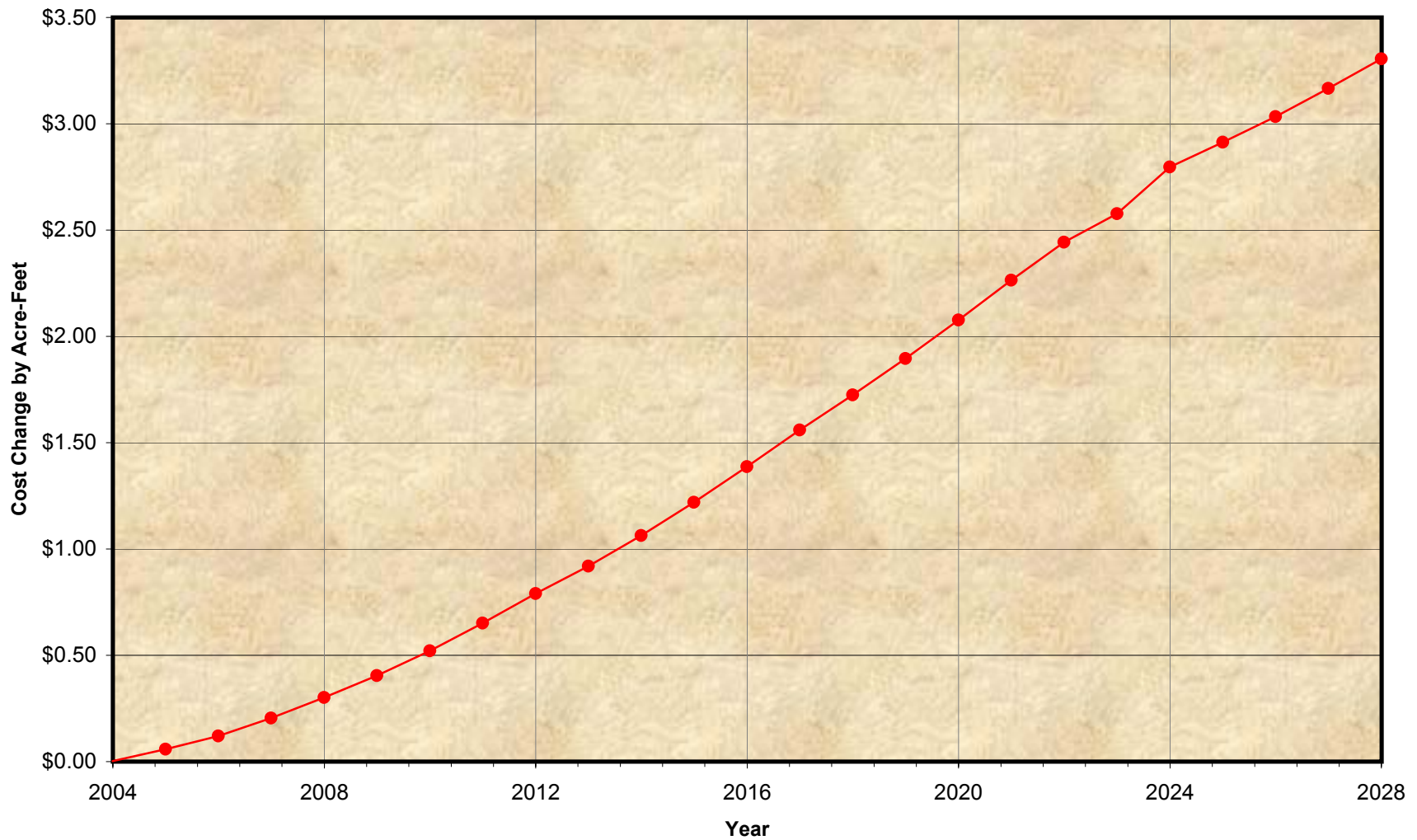


Figure A-4
Change of Agricultural Pumping Cost per Unit Production



APPENDIX B

Appendix B

CCWD History of Operations

FY	Carry-Over From Prior Year Operations	Assigned Share of Safe Yield	FUWC Safe Yield	Water Transfer Activity		Ag Pool		Annual Production Right	Under Production Balances				Local Storage		Supplemental Storage		Replenishment Obligations			Replenishment Obligations								
				Non-Wet	Wet Water	From FUWC	Safe Yield Reallocation		-----Applications-----				Withdrawals From Storage	Storage Account Balance	Deposit to Storage	Withdrawal From Storage	Storage Account Balance	WO Transfers & Excluding MWD Exchg	Equal to Net OverProd	Difference	WO Transfers & Including MWD Exchg	Equal to Net OverProd	Difference					
									Production	MWD Exchanges	Net Over-Production 15%/85% 100%	Total Under- Produced												Carry-Over to Next Year	Deposit to Storage			
1989-90		3,619,454	3,619,454	14,890,270			2,351,976	24,481,154	9,360,500	11,501,200	0.000	0.000	3,619,454	3,619,454	0.000	10,574,719	43,915,188			0.000	0.000	0.000	11,270,816	0.000	11,270,816			
1990-91	1	3,619,454	3,619,454	6,396,736	11,350,000		511,481	2,242,582	27,739,707	3,717,900	11,350,000	0.000	0.000	12,671,807	3,619,454	9,052,353	11,350,040	31,042,782			0.000	0.000	0.000	0.000	0.000	0.000		
1991-92		3,619,454	3,619,454	6,396,736	0.000		3,430,921	2,264,655	19,331,220	5,634,300	6,548,800	0.000	0.000	7,148,120	3,619,454	3,528,666		34,571,448			0.000	0.000	0.000	0.000	0.000	0.000		
1992-93		3,619,454	3,619,454	6,396,736	0.000	826,919	4,002,372	2,489,311	20,954,246	6,529,000	9,127,800	0.000	0.000	5,297,446	3,619,454	1,677,992	36,249,440			0.000	0.000	0.000	0.000	0.000	0.000			
1993-94		3,619,454	3,619,454	6,396,736	0.000		4,468,157	2,528,210	20,632,011	8,359,700	10,137,900	0.000	0.000	2,134,411	2,134,411	0.000	36,249,440			0.000	0.000	0.000	0.000	0.000	0.000			
1994-95		2,134,411	3,619,454	6,396,736	0.000	200,000	4,112,822	2,327,151	18,790,574	6,615,500	0.000	0.000	0.000	12,175,074	3,619,454	8,555,620	10,542,960	34,262,100			0.000	0.000	0.000	0.000	0.000	0.000		
1995-96		3,619,454	3,619,454	6,396,736	(3,060,948)		2,557,439	2,045,471	15,177,606	7,160,170	75,300	0.000	0.000	7,942,136	3,619,454	4,322,682	38,584,782			0.000	0.000	0.000	0.000	0.000	0.000			
1996-97		3,619,454	3,619,454	6,396,736	(2,136,664)		3,832,323	2,766,801	18,098,104	7,949,900	0.000	0.000	0.000	10,148,204	3,619,454	6,528,750	45,113,532			0.000	0.000	0.000	0.000	0.000	0.000			
1997-98		3,619,454	3,619,454	6,396,736	0.000	122,750	3,590,435	2,629,934	19,978,763	5,087,280	0.000	0.000	0.000	14,891,483	3,619,454	11,272,029	16,721,190	39,664,371			0.000	0.000	0.000	0.000	0.000	0.000		
1998-99		3,619,454	3,619,454	6,396,736	0.000		3,609,838	2,640,913	19,886,395	6,082,950	0.000	0.000	0.000	13,803,445	3,619,454	10,183,991	16,839,197	33,009,165			0.000	0.000	0.000	0.000	0.000	0.000		
1999-00		3,619,454	3,619,454	6,396,736	0.000	125,300	7,371,770	4,769,550	25,902,264	7,249,720	0.000	0.000	0.000	18,652,544	3,619,454	15,033,090	24,746,752	23,295,503			0.000	0.000	0.000	0.000	0.000	0.000		
2000-01		3,619,454	3,619,454	6,396,736	(12,832,036)	79,100	3,374,479	2,507,753	6,764,940	6,764,940	0.000	0.000	0.000	0.000	0.000	0.000	24,482,858	667,964	23,814,894			0.000	0.000	0.000	0.000	0.000	0.000	
2001-02		0.000	3,619,454	6,391,736	(7,751,315)	101,500	3,400,667	2,524,058	8,286,100	8,281,750	0.000	0.000	0.000	4,350	4,350	0.000	0.000	1,186,762	1748,685	23,252,971			0.000	0.000	0.000	0.000	0.000	0.000
TOTALS		0.000	47,052,902	76,755,832	459,307	1,455,569	44,262,704	34,088,365	246,023,084	88,793,610	48,741,000	0.000	0.000	106,488,474	38,333,301	70,155,173	114,070,361				0.000	0.000	0.000	11,270,816	0.000	11,270,816		

¹ CCWD begins receiving all FUWC OSY & Ag SY Reallocation yrlly

Appendix B

Chino History of Operations																												
FY	Carry-Over From Prior Year Operations	Assigned Share of Safe Yield	Water Non-Wet	Transaction Activity Wet Water	Ag Pool Safe Yield Reallocation	Annual Production Right	Under Production Balances													Supplemental Storage			Replenishment Obligations			WO Transfers & Including MWD Exchg	Equal to Net OverProd	Difference
							Production	MWD Exchanges	Net Over-Production 15%/85%	100%	Total Under- Produced	Carry-Over to Next Year	Deposit to Storage	Local Storage		Deposit to Storage	Storage Account Balance	WO Transfers & Excluding MWD Exchg	Equal to Net OverProd	Difference								
														Withdrawals From Storage	Account Balance													
1989-90	0.000	3,670.067	257.145		2,581.100	6,508.312	9,073.990	0.000	2,565.588	0.000	0.000	0.000	0.000	0.000	0.000	2,822.733	2,565.588	257.145	2,822.733	2,565.588	257.145	2,822.733	2,565.588	257.145				
1990-91	1	3,670.067	363.790		2,470.176	6,504.033	8,993.200	0.000	2,389.167	0.000	0.000	0.000	0.000	0.000	0.000	75.327	2,752.957	2,389.167	363.790	2,752.957	2,389.167	363.790	2,752.957	2,389.167				
1991-92	0.000	4,033.857	1,680.000		2,720.177	8,434.034	8,765.000	73.700	404.666	0.000	0.000	0.000	1,000.000	0.000	1,075.327	2,010.966	404.666	1,606.300	2,084.666	404.666	1,680.000	2,084.666	404.666					
1992-93	0.000	4,033.857	1,810.588	333.028	2,970.555	9,148.028	7,285.900	356.100	0.000	0.000	1,506.028	1,506.028	1,000.000	0.000	2,075.327	0.000	0.000	0.000	304.560	0.000	304.560	304.560	0.000					
1993-94	1,506.028	4,033.857	0.000		3,013.907	8,553.792	5,718.600	0.000	0.000	0.000	2,835.192	2,835.192	700.000	0.000	2,775.327	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
1994-95	2,835.192	4,033.857	0.000	101.000	3,464.528	10,434.577	8,530.100	0.000	0.000	0.000	1,904.477	1,904.477	0.000	0.000	2,775.327	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
1995-96	1,904.477	4,033.857	1,048.000		3,079.086	10,065.420	9,373.370	0.000	0.000	0.000	692.050	692.050	0.000	0.000	2,775.327	355.950	0.000	355.950	355.950	0.000	355.950	355.950	0.000					
1996-97	692.050	4,033.857	1,232.982		4,136.543	10,095.432	10,231.351	0.000	135.919	0.000	0.000	0.000	0.000	0.000	2,775.327	1,368.901	135.919	1,232.982	1,368.901	135.919	1,232.982	1,368.901	135.919					
1997-98	692.050	4,033.857	0.000	49.436	4,055.506	8,830.849	8,821.135	0.000	0.000	0.000	9.714	9.714	0.000	682.336	2,092.991	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
1998-99	0.000	4,033.857	1,683.608		4,363.817	10,081.282	10,081.282	0.000	0.000	0.000	0.000	0.000	0.000	0.000	183.608	1,909.383	1,683.608	0.000	1,683.608	0.000	1,683.608	1,683.608	0.000					
1999-00	0.000	4,033.857	2,000.000	1.500	7,017.314	13,052.671	10,200.825	0.000	0.000	0.000	2,851.846	2,851.846	0.000	602.870	1,306.513	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
2000-01	2,851.846	4,033.857	2,700.000	104.000	5,124.578	14,814.281	7,147.209	0.000	0.000	0.000	7,667.072	4,033.857	3,633.215	1,306.513	3,633.215	1,784.718	1,784.718	0.000	0.000	0.000	0.000	0.000	0.000					
2001-02	4,033.857	4,033.857	0.000	51.500	5,199.149	13,318.363	5,612.931	0.000	0.000	0.000	7,705.432	4,033.857	3,671.575		7,304.790	478.205	2,262.923	0.000	0.000	0.000	0.000	0.000	0.000					
TOTALS	0.000	51,712.561	12,776.113	640.464	50,196.436	129,841.074	109,734.803	429.800	5,495.340	0.000	25,171.811	17,867.021	10,004.790	2,775.327				10,995.115	5,495.340	5,499.775	11,373.375	5,495.340	5,878.035					

Appendix B

Chino Hills History of Operations

FY	Carry-Over From Prior Year Operations	Assigned Share of Safe Yield	Water Non-Wet	Transaction Activity Wet Water	Ag Pool Safe Yield Reallocation	Annual Production Right	Under Production Balances										Local Storage		Supplemental Storage			Replenishment Obligations			WO Transfers & Including MWD Exchg		WO Transfers & Excluding MWD Exchg	
							Production	MWD Exchanges	Net Over-Production 15%/85%	100%	Total Under- Produced	Carry-Over to Next Year	Deposit to Storage	Withdrawals From Storage	Storage Account Balance	Deposit to Storage	Withdrawa From Storage	Storage Account Balance	WO Transfers & Excluding MWD Exchg	Equal to Net OverProd	Difference	WO Transfers & Including MWD Exchg	Equal to Net OverProd	Difference				
																									-----Applications-----			
1989-90	3,150.822	3,150.822	(734.700)		2,047.452	7,614.396	2,578.300	0.000	0.000	0.000	5,036.096	3,150.822	1,885.274		12,925.559				0.000	0.000	0.000		0.000	0.000	0.000			
1990-91	3,150.822	3,150.822	(1,039.400)		1,952.221	7,214.465	3,700.900	0.000	0.000	0.000	3,513.565	3,150.822	362.743		15,173.576				0.000	0.000	0.000		0.000	0.000	0.000			
1991-92	3,150.822	2,111.422	0.000		1,321.095	6,583.339	2,066.200	0.000	0.000	0.000	4,517.139	2,111.422	2,405.717	1,105.400	16,473.893				0.000	0.000	0.000		0.000	0.000	0.000			
1992-93	2,111.422	2,111.422	0.000	174.315	1,452.149	5,849.308	3,299.300	188.800	0.000	0.000	2,361.208	2,111.422	249.786		16,723.679				0.000	0.000	0.000		0.000	0.000	0.000			
1993-94	2,111.422	2,111.422	0.000		1,474.840	5,697.684	3,225.700	0.000	0.000	0.000	2,471.984	2,111.422	360.562		17,084.241				0.000	0.000	0.000		0.000	0.000	0.000			
1994-95	2,111.422	2,111.422	0.000	54.900	1,357.552	5,635.296	3,430.200	0.000	0.000	0.000	2,205.096	2,111.422	93.674		17,177.915				0.000	0.000	0.000		0.000	0.000	0.000			
1995-96	2,111.422	2,111.422	0.000		1,374.437	5,597.281	4,058.940	284.900	0.000	0.000	1,253.441	1,253.441	0.000		17,177.915				0.000	0.000	0.000		0.000	0.000	0.000			
1996-97	1,253.441	2,111.422	0.000		1,890.690	5,255.553	2,201.905	0.000	0.000	0.000	3,053.648	2,111.422	942.226		18,120.141				0.000	0.000	0.000		0.000	0.000	0.000			
1997-98	2,111.422	2,111.422	0.000	25.876	1,904.111	6,152.831	2,908.949	0.000	0.000	0.000	3,243.882	2,111.422	1,132.460		19,252.601				0.000	0.000	0.000		0.000	0.000	0.000			
1998-99	2,111.422	2,111.422	0.000		2,062.874	6,285.718	4,342.653	0.000	0.000	0.000	1,943.065	1,943.065	0.000	9,000.000	10,252.601				0.000	0.000	0.000		0.000	0.000	0.000			
1999-00	1,943.065	2,111.422	0.000		3,350.321	7,404.808	4,263.569	0.000	0.000	0.000	3,141.239	2,111.422	1,029.817	1,868.340	9,414.078		9,414.078		0.000	0.000	0.000		0.000	0.000	0.000			
2000-01	2,111.422	2,111.422	(2,289.315)	99.000	2,030.797	4,063.326	4,063.326	0.000	0.000	0.000	0.000	0.000	0.000	9,414.078	0.000	250.315	2210.685	7,453.708	0.000	0.000	0.000		0.000	0.000	0.000			
2001-02	0.000	2,111.422	0.000	49.800	2,040.189	4,201.411	3,398.021	0.000	0.000	0.000	803.390	803.390	0.000		0.000	250.315	7,704.023		0.000	0.000	0.000		0.000	0.000	0.000			
TOTALS	0.000	29,527.286	(4,063.415)	403.891	24,258.728	77,555.416	43,537.963	473.700	0.000	0.000	33,543.753	25,081.494	8,462.259	21,387.818					0.000	0.000	0.000		0.000	0.000	0.000			

¹ = City of Chino Hills

Appendix B

FUWC History of Operations

FY	Carry-Over From Prior Year Operations	Assigned Share of Safe Yield	Water Transaction Non-Wet	Activity Wet Water	Ag Pool Safe Yield Reallocation	Annual Production Right	Production	MWD Exchanges	Net Over-Production 15%/85%	100%	Under Production Balances			Withdrawals From Storage	Storage Account Balance	Supplemental Storage			Replenishment Obligations			WO Transfers & Including MWD Exchg	Equal to Net OverProd	Difference
											Total Under- Produced	Carry-Over to Next Year	Deposit to Storage			Deposit to Storage	Withdrawa From Storage	Storage Account Balance	WO Transfers & Excluding MWD Exchg	Equal to Net OverProd	Difference			
1989-90	¹ 4,909.879	6,396.736	(3,815.511)		0.000	7,491.104	13,637.100	0.000	6,145.996	0.000	0.000	0.000	0.000		1,869.072				2,330.485	6,145.996	(3,815.511)	2,330.485	6,145.996	(3,815.511)
1990-91	¹ 0.000	6,396.736	(6,396.736)		0.000	0.000	13,746.300	0.000	13,746.300	0.000	0.000	0.000	0.000	1,869.072	0.000				7,349.564	13,746.300	(6,396.736)	7,349.564	13,746.300	(6,396.736)
1991-92	0.000	6,396.736	(4,184.295)		0.000	2,212.441	8,911.500	0.000	6,699.059	0.000	0.000	0.000	0.000		0.000				2,514.764	6,699.059	(4,184.295)	2,514.764	6,699.059	(4,184.295)
1992-93	0.000	6,396.736	(1,824.839)	528.103	0.000	5,100.000	7,664.500	0.000	2,564.500	0.000	0.000	0.000	0.000		0.000				739.661	2,564.500	(1,824.839)	739.661	2,564.500	(1,824.839)
1993-94	0.000	6,396.736	(6,396.736)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000				0.000	0.000	0.000	0.000	0.000	0.000
1994-95	0.000	6,396.736	(6,396.736)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000				0.000	0.000	0.000	0.000	0.000	0.000
1995-96	0.000	6,396.736	(6,396.736)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000				0.000	0.000	0.000	0.000	0.000	0.000
1996-97	0.000	6,396.736	(6,396.736)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000				0.000	0.000	0.000	0.000	0.000	0.000
1997-98	0.000	6,396.736	(6,475.129)	78.393	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000				0.000	0.000	0.000	0.000	0.000	0.000
1998-99	0.000	6,396.736	(6,396.736)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000				0.000	0.000	0.000	0.000	0.000	0.000
1999-00	0.000	6,396.736	(6,396.736)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000			0.000	0.000	0.000	0.000	0.000	0.000	0.000
2000-01	0.000	6,396.736	(6,396.736)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000			0.000	0.000	0.000	0.000	0.000	0.000	0.000
2001-02	0.000	6,396.736	(6,396.736)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000			0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTALS	0.000	83,157.568	(73,870.398)	606.496	0.000	14,803.545	43,959.400	0.000	29,155.855	0.000	0.000	0.000	0.000	1,869.072					12,934.474	29,155.855	(16,221.381)	12,934.474	29,155.855	(16,221.381)

¹ to CCWD

Appendix B

FWC History of Operations																											
FY	Carry-Over From Prior Year Operations	Assigned Share of Safe Yield	Water Transaction Non-Wet	Activity Wet Water	Ag Pool Safe Yield Reallocation	Annual Production Right	Under Production Balances										Supplemental Storage			Replenishment Obligations			WO Transfers				
							Production	MWD Exchanges	Net Over-Production 15%/85%	100%	Total Under- Produced	-----Applications-----		Local Storage		Deposit to Storage	Withdrawal From Storage	Storage Account Balance	Deposit to Storage	Withdrawal From Storage	Storage Account Balance	WO Transfers & Excluding MWD Exchg	Equal to Net OverProd	Difference	WO Transfers & Including MWD Exchg	Equal to Net OverProd	Difference
												Carry-Over to Next Year	Deposit to Storage	Withdrawals From Storage	Storage Account Balance												
1989-90	0.000	0.000	341.145		0.000	341.145	0.000	0.000	0.000	0.000	341.145	0.000	341.145	341.145	0.000				0.000	0.000	0.000	0.000	0.000	0.000			
1990-91	0.000	0.000	3,645.215		0.000	3,645.215	1,406.900	0.000	0.000	0.000	2,238.315	0.000	2,238.315	2,238.315	0.000				1,406.900	0.000	1,406.900	1,406.900	0.000	1,406.900			
1991-92	0.000	0.000	2,238.315		0.000	2,238.315	2,902.800	0.000	664.485	0.000	0.000	0.000	0.000	0.000	0.000				2,902.800	664.485	2,238.315	2,902.800	664.485	2,238.315			
1992-93	0.000	0.000	0.000		0.000	0.000	2,676.900	0.000	2,676.900	0.000	0.000	0.000	0.000	0.000	0.000				2,676.900	2,676.900	0.000	2,676.900	2,676.900	0.000			
1993-94	0.000	0.000	8,592.000		0.000	8,592.000	6,277.200	0.000	0.000	0.000	2,314.800	0.000	2,314.800	2,314.800	0.000				6,277.200	0.000	6,277.200	6,277.200	0.000	6,277.200			
1994-95	2,314.800	0.000	3,740.000	54.500	0.000	6,109.300	8,906.937	0.000	2,797.637	0.000	0.000	0.000	0.000	0.000	0.000				6,537.637	2,797.637	3,740.000	6,537.637	2,797.637	3,740.000			
1995-96	0.000	0.000	6,662.970		0.000	6,662.970	6,530.300	0.000	0.000	0.000	132.670	0.000	132.670	132.670	0.000				6,530.300	0.000	6,530.300	6,530.300	0.000	6,530.300			
1996-97	132.670	0.000	700.000		0.000	832.670	11,764.301	0.000	10,931.631	0.000	0.000	0.000	0.000	0.000	0.000				11,631.631	10,931.631	700.000	11,631.631	10,931.631	700.000			
1997-98	0.000	0.000	10,973.690		0.000	10,973.690	10,973.676	0.000	0.000	0.000	0.014	0.000	0.014	0.014	0.000				10,973.676	0.000	10,973.676	10,973.676	0.000	10,973.676			
1998-99	0.014	0.000	10,373.565		0.000	10,373.579	10,373.579	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				10,373.565	0.000	10,373.565	10,373.565	0.000	10,373.565			
1999-00	0.000	0.000	20,946.752		0.000	20,946.752	20,946.752	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				20,946.752	0.000	20,946.752	20,946.752	0.000	20,946.752			
2000-01	0.000	0.000	20,200.000		834.000	21,034.000	17,900.029	0.000	0.000	0.000	3,133.971	0.000	3,133.971	3,133.971	0.000				17,066.029	0.000	17,066.029	17,066.029	0.000	17,066.029			
2001-02	3,133.971	1.000	14,704.000		834.583	18,673.554	23,565.281	0.000	4,891.727	0.000	0.000	0.000	0.000	0.000	0.000	0.119		0.119	19,595.727	4,891.727	14,704.000	19,595.727	4,891.727	14,704.000			
TOTALS	0.000	1.000	103,117.652	54.500	1,668.583	110,423.190	124,224.655	0.000	21,962.380	0.000	8,160.915	0.000	8,160.915	8,160.915				116,919.117	21,962.380	94,956.737	116,919.117	21,962.380	94,956.737				

Appendix B

JCSD History of Operations

FY	Carry-Over From Prior Year Operations	Assigned Share of Safe Yield	Water Transaction Activity		Ag Pool Safe Yield Reallocation	Annual Production Right	Production	MWD Exchanges	Net Over-Production			Under Production Balances			Local Storage		Supplemental Storage		Replenishment Obligations			WO Transfers		
			Non-Wet	Wet Water					15%/85%	100%	Total Under- Produced	Carry-Over to Next Year	Deposit to Storage	Withdrawals From Storage	Storage Account Balance	Deposit to Storage	Withdrawals From Storage	Storage Account Balance	WO Transfers & Excluding MWD Exchg	Equal to Net OverProd	Difference	WO Transfers & Including MWD Exchg	Equal to Net OverProd	Difference
															0.000									
1989-90		0.000	1,593.144	1,300.000		1,035.249	3,928.393	12,252.800	0.000	8,324.407	0.000	0.000	0.000	0.000	0.000				9,624.407	8,324.407	1,300.000	9,624.407	8,324.407	1,300.000
1990-91	¹	0.000	1,593.144	1,800.000		987.098	4,380.242	10,290.500	0.000	5,910.258	0.000	0.000	0.000	0.000	0.000				7,710.258	5,910.258	1,800.000	7,710.258	5,910.258	1,800.000
1991-92		0.000	1,593.144	3,280.000		996.813	5,989.957	11,190.500	0.000	5,320.543	0.000	0.000	0.000	0.000	0.000				8,600.543	5,320.543	3,280.000	8,600.543	5,320.543	3,280.000
1992-93		0.000	1,593.144	6,710.588	131.527	1,095.699	9,530.958	11,509.500	0.000	1,978.542	0.000	0.000	0.000	0.000	0.000				8,689.130	1,978.542	6,710.588	8,689.130	1,978.542	6,710.588
1993-94		0.000	1,593.144	9,275.000		1,112.820	11,980.964	10,832.600	0.000	0.000	0.000	1,148.364	1,148.364	2,694.363	2,694.363				8,126.636	0.000	8,126.636	8,126.636	0.000	8,126.636
1994-95		1,148.364	1,593.144	7,200.000	114.400	2,434.822	12,490.730	9,825.200	0.000	0.000	0.000	2,665.530	1,593.144	4,172.386	6,866.749				4,534.470	0.000	4,534.470	4,534.470	0.000	4,534.470
1995-96		1,593.144	1,593.144	5,300.000	82.400	3,143.445	11,712.133	11,696.570	0.000	0.000	0.000	15.563	15.563	6,000.000	12,866.749				5,284.437	0.000	5,284.437	5,284.437	0.000	5,284.437
1996-97	¹	26.820	2,061.118	3,770.800		3,771.076	9,629.814	13,389.363	0.000	3,759.549	0.000	0.000	0.000	4,555.000	8,311.749				7,530.349	3,759.549	3,770.800	7,530.349	3,759.549	3,770.800
1997-98		26.820	2,061.118	5,075.000	25.259	4,354.641	11,542.838	11,542.888	0.000	0.050	0.000	0.000	298.181	8,609.930					5,075.050	0.050	5,075.000	5,075.050	0.050	5,075.000
1998-99		0.000	2,061.118	6,183.805		5,185.991	13,430.914	13,430.914	0.000	0.000	0.000	0.000	0.000	1,658.805	6,951.125				6,183.805	0.000	6,183.805	6,183.805	0.000	6,183.805
1999-00		0.000	2,061.118	7,150.000		8,031.870	17,242.988	15,512.558	0.000	0.000	0.000	1,730.430	1,730.430	0.000				0.000	5,419.570	0.000	5,419.570	5,419.570	0.000	5,419.570
2000-01		1,730.430	2,061.118	2,650.000		8,634.029	15,075.577	11,436.426	0.000	0.000	0.000	3,639.151	2,061.118	1,578.033				244.335	0.000	0.000	0.000	0.000	0.000	0.000
2001-02		2,061.118	2,061.118	2,650.000		8,799.674	15,571.910	12,586.389	0.000	0.000	0.000	2,985.521	2,061.118	924.403	2,500.000	6,953.561			244.335	0.000	0.000	0.000	0.000	0.000
TOTALS		0.000	23,518.716	62,345.193	353.586	49,583.227	142,387.418	155,496.208	0.000	25,293.349	0.000	12,184.559	8,609.737	15,667.366	8,713.805				76,778.655	25,293.349	51,485.306	76,778.655	25,293.349	51,485.306

¹ JCSD acquires 467.974af of OSY from Mutual Water Co of Glen Avon

Appendix B

Marygold History of Operations

FY	Under Production Balances												Local Storage			Supplemental Storage			Replenishment Obligations			WO Transfers		
	Carry-Over From Prior Year Operations	Assigned Share of Safe Yield	Water Non-Wet	Transaction Activity Wet Water	Ag Pool Safe Yield Reallocation	Annual Production Right	Production	MWD Exchanges	Net Over-Production 15%/85%	100%	Total Under- Produced	Carry-Over to Next Year	Deposit to Storage	Withdrawals From Storage	Storage Account Balance	Deposit to Storage	Withdrawa From Storage	Storage Account Balance	WO Transfers & Excluding MWD Exchg	Equal to Net OverProd	Difference	WO Transfers & Including MWD Exchg	Equal to Net OverProd	Difference
1989-90	655.317	655.317	(800.000)		425.835	936.469	134.800	0.000	0.000	0.000	801.669	655.317	146.352		1,033.515				0.000	0.000	0.000	0.000	0.000	0.000
1990-91	¹ 655.317	655.317	0.000		406.029	1,716.663	291.800	0.000	0.000	0.000	1,424.863	655.317	769.546		1,949.413				0.000	0.000	0.000	0.000	0.000	0.000
1991-92	655.317	655.317	0.000		410.025	1,720.659	73.300	0.000	0.000	0.000	1,647.359	655.317	992.042		2,941.455				0.000	0.000	0.000	0.000	0.000	0.000
1992-93	655.317	655.317	0.000	54.102	450.700	1,815.436	16.800	0.000	0.000	0.000	1,798.636	655.317	1,143.319		4,084.774				0.000	0.000	0.000	0.000	0.000	0.000
1993-94	655.317	655.317	0.000		457.743	1,768.377	0.000	0.000	0.000	0.000	1,768.377	655.317	1,113.060	3,000.000	2,197.834				0.000	0.000	0.000	0.000	0.000	0.000
1994-95	¹ 655.317	655.317	0.000	8.300	421.340	1,740.274	9.800	0.000	0.000	0.000	1,730.474	655.317	1,075.157		3,272.991				0.000	0.000	0.000	0.000	0.000	0.000
1995-96	655.317	655.317	0.000		261.998	1,572.632	0.000	0.000	0.000	0.000	1,572.632	655.317	917.315	2,500.000	1,690.306				0.000	0.000	0.000	0.000	0.000	0.000
1996-97	655.317	655.317	0.000		392.605	1,703.239	0.000	0.000	0.000	0.000	1,703.239	655.317	1,047.922	700.000	2,038.228				0.000	0.000	0.000	0.000	0.000	0.000
1997-98	655.317	655.317	0.000	8.031	367.824	1,686.489	0.000	0.000	0.000	0.000	1,686.489	655.317	1,031.172	1,200.000	1,869.400				0.000	0.000	0.000	0.000	0.000	0.000
1998-99	655.317	655.317	0.000		369.812	1,680.446	0.148	0.000	0.000	0.000	1,680.298	655.317	1,024.981	1,200.000	1,694.381				0.000	0.000	0.000	0.000	0.000	0.000
1999-00	655.317	655.317	0.000		755.123	2,065.757	0.000	0.000	0.000	0.000	2,065.757	655.317	1,410.440	1,200.000	1,904.821			0.000	0.000	0.000	0.000	0.000	0.000	0.000
2000-01	655.317	655.317	(1,200.000)		345.663	456.297	0.633	0.000	0.000	0.000	455.664	455.664	0.000	1,888.490	16.331	1,896.521	(77.675)	1,974.196	0.000	0.000	0.000	0.000	0.000	0.000
2001-02	455.664	655.317	(1,200.000)		348.614	259.595	0.030	0.000	0.000	0.000	259.565	259.565	0.000		16.331	77.675	2,051.871		0.000	0.000	0.000	0.000	0.000	0.000
TOTALS	0.000	8,519.121	(3,200.000)	70.433	5,413.311	19,122.333	527.311	0.000	0.000	0.000	18,595.022	7,923.716	10,671.306	11,688.490				0.000	0.000	0.000	0.000	0.000	0.000	0.000

¹ Wet Water credit not received

Appendix B

MVWD History of Operations

Carry-Over From Prior Year Operations		Assigned Share of Safe Yield	Water Transaction Activity Non-Wet Wet Water	Ag Pool Safe Yield Reallocation	Annual Production Right	Production	MWD Exchanges	Under Production Balances		Local Storage		Supplemental Storage		Replenishment Obligations			WO Transfers & Including MWD Exchg																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
								15%/85%	100%	Carry-Over to Next Year	Deposit to Storage	Withdrawals From Storage	Storage Account Balance	Deposit to Storage	Withdrawa From Storage	Storage Account Balance	WO Transfers & Excluding MWD Exchg	Equal to Net OverProd	Difference	WO Transfers & Including MWD Exchg	Equal to Net OverProd	Difference																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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Appendix B

Ontario History of Operations

										Under Production Balances										Local Storage			Supplemental Storage			Replenishment Obligations		
										-----Applications-----																		
FY	Carry-Over From Prior Year Operations	Assigned Share of Safe Yield	Water Transaction Non-Wet	Activity Wet Water	Ag Pool Safe Yield Reallocation	Annual Production Right	Production	MWD Exchanges	Net Over-Production 15%/85%	100%	Total Under- Produced	Carry-Over to Next Year	Deposit to Storage	Withdrawals From Storage	Storage Account Balance	Deposit to Storage	Withdrawals From Storage	Storage Account Balance	WO Transfers & Excluding MWD Exchg	Equal to Net OverProd	Difference	WO Transfers & Including MWD Exchg	Equal to Net OverProd	Difference				
1989-90	0.000	11,373.816	0.000		7,600.278	18,974.094	23,336.100	4,875.900	9,237.906	0.000	0.000	0.000	0.000		10,000.000				4,362.006	9,237.906	(4,875.900)	9,237.906	9,237.906	0.000				
1990-91	1	0.000	11,373.816	0.000	7,256.517	18,630.333	21,206.400	3,579.100	6,155.167	0.000	0.000	0.000	0.000		10,000.000				2,576.067	6,155.167	(3,579.100)	6,155.167	6,155.167	0.000				
1991-92	0.000	11,373.816	1,680.000		7,325.879	20,379.695	27,285.900	1,904.900	8,811.105	0.000	0.000	0.000	0.000		10,000.000				8,586.205	8,811.105	(224.900)	10,491.105	8,811.105	1,680.000				
1992-93	0.000	11,373.816	3,457.000	939.003	8,031.842	23,801.661	22,690.400	1,110.800	0.000	0.000	0.000	0.000	0.000		10,000.000				2,345.739	0.000	2,345.739	3,456.539	0.000	3,456.539				
1993-94	0.461	11,373.816	11,681.300		8,154.076	31,209.653	21,793.000	0.000	0.000	0.000	9,416.653	9,416.653	0.000		10,000.000				2,264.647	0.000	2,264.647	2,264.647	0.000	2,264.647				
1994-95	9,416.653	11,373.816	5,000.000	334.100	8,277.567	34,402.136	29,404.200	996.800	0.000	0.000	4,001.136	4,001.136	0.000		10,000.000				2.064	0.000	2.064	998.864	0.000	998.864				
1995-96	4,001.136	11,373.816	2,000.000		5,301.240	22,676.192	32,908.870	1,512.700	11,745.378	0.000	0.000	0.000	0.000		10,000.000				12,232.678	11,745.378	487.300	13,745.378	11,745.378	2,000.000				
1996-97	0.000	11,373.816	10,076.665		7,607.403	29,057.884	34,095.507	0.000	5,037.623	0.000	0.000	0.000	0.000		10,000.000				15,114.288	5,037.623	10,076.665	15,114.288	5,037.623	10,076.665				
1997-98	0.000	11,373.816	14,658.705	139.388	7,253.756	33,425.665	33,425.665	0.000	0.000	0.000	0.000	0.000	0.000		10,000.000				14,658.705	0.000	14,658.705	14,658.705	0.000	14,658.705				
1998-99	0.000	11,373.816	15,915.632		7,313.086	34,802.534	34,802.534	0.000	0.000	0.000	0.000	0.000	0.000		10,000.000				15,915.632	0.000	15,915.632	15,915.632	0.000	15,915.632				
1999-00	0.000	11,373.816	17,413.000	308.800	14,001.470	43,097.086	36,523.255	0.000	0.000	0.000	6,573.831	6,573.831	0.000		10,000.000			0.000	10,839.169	0.000	10,839.169	10,839.169	0.000	10,839.169				
2000-01	6,573.831	11,373.816	8,943.007	124.400	6,972.518	33,987.572	33,987.572	0.000	0.000	0.000	0.000	0.000	0.000	10,000.000	0.000	11,348.230	143.007	11,205.223	8,943.007	0.000	8,943.007	8,943.007	0.000	8,943.007				
2001-02	0.000	11,373.816	13,133.133	219.300	7,023.749	31,749.998	32,601.410	0.000	851.412	0.000	0.000	0.000	0.000		0.000		1,348.230		13,133.133			13,984.545	851.412	13,133.133				
TOTALS	0.000	147,859.608	103,958.442	2,064.991	102,119.381	375,994.503	383,860.813	13,980.200	41,838.591	0.000	19,992.081	19,992.081	0.000	10,000.000					111,824.752	41,838.591	69,986.161	125,804.952	41,838.591	83,966.361				

Appendix B

Pomona History of Operations

Under Production Balances										Local Storage			Supplemental Storage			Replenishment Obligations			WO Transfers & Including MWD Exchg					
FY	Carry-Over From Prior Year Operations	Assigned Share of Safe Yield	Water Transaction Activity Non-Wet	Water Transaction Activity Wet Water	Ag Pool Safe Yield Reallocation	Annual Production Right	Applications				Total Under-Produced	Carry-Over to Next Year	Deposit to Storage	Withdrawals From Storage	Storage Account Balance	Deposit to Storage	Withdrawals From Storage	Storage Account Balance	WO Transfers & Excluding MWD Exchg	Equal to Net OverProd	Difference	WO Transfers & Including MWD Exchg	Equal to Net OverProd	Difference
							Production	MWD Exchanges	Net Over-Production 15%/85%	100%														
1989-90	11,215,852	11,215,852	0.000		7,288,231	29,719,935	14,306,500	0.000	0.000	0.000	15,413,435	11,215,852	4,197,583		25,869,956			0.000	0.000	0.000	0.000	0.000	0.000	0.000
1990-91	11,215,852	11,215,852	0.000		6,949,243	29,380,947	8,700,900	0.000	0.000	0.000	20,680,047	11,215,852	9,484,195		39,531,734			0.000	0.000	0.000	0.000	0.000	0.000	0.000
1991-92	11,215,852	11,215,852	0.000		7,017,642	29,449,346	7,974,300	2,004,000	0.000	0.000	19,471,046	11,215,852	8,255,194	608,200	47,178,728			0.000	0.000	0.000	0.000	0.000	0.000	0.000
1992-93	11,215,852	11,215,852	0.000	925,961	7,713,801	31,071,466	8,736,400	1,593,000	0.000	0.000	20,742,066	11,215,852	9,526,214		56,704,942			0.000	0.000	0.000	0.000	0.000	0.000	0.000
1993-94	11,215,852	11,215,852	0.000		7,834,337	30,266,041	10,052,300	6,360,700	0.000	0.000	13,853,041	11,215,852	2,637,189	20,000,000	39,342,131			0.000	0.000	0.000	0.000	0.000	0.000	0.000
1994-95	11,215,852	11,215,852	0.000	230,100	7,211,302	29,873,106	12,860,600	3,225,100	0.000	0.000	13,787,406	11,215,852	2,571,554	9,131,987	32,781,698			0.000	0.000	0.000	0.000	0.000	0.000	0.000
1995-96	11,215,852	11,215,852	0.000		4,484,139	28,915,843	16,516,920	0.000	0.000	0.000	10,398,923	10,398,923	0.000	2,976,000	29,805,698			0.000	0.000	0.000	0.000	0.000	0.000	0.000
1996-97	10,398,923	11,215,852	0.000		6,719,484	28,334,259	16,731,673	0.000	0.000	0.000	11,602,586	11,215,852	386,734		30,192,432			0.000	0.000	0.000	0.000	0.000	0.000	0.000
1997-98	10,398,923	11,215,852	(12,082,328)	137,452	6,295,367	15,965,266	14,124,166	1,841,100	0.000	0.000	0.000	0.000	0.000	576,377	29,616,055			0.000	0.000	0.000	0.000	0.000	0.000	0.000
1998-99	816,928	11,215,852	(1,500,000)		6,329,385	16,862,165	16,564,043	0.000	0.000	0.000	298,122	298,122	0.000	1,000,000	28,616,055			0.000	0.000	0.000	0.000	0.000	0.000	0.000
1999-00	298,122	11,215,852	(5,453,190)		12,924,925	18,985,710	18,966,264	0.000	0.000	0.000	19,446	19,446	0.000	4,946,810	23,669,245		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2000-01	19,446	11,215,852	300,794		5,916,475	17,452,567	17,452,567	0.000	0.000	0.000	0.000	0.000	0.000	23,669,245	0.000	24,998,745	4,300,794	20,697,951	300,794	0.000	300,794	300,794	0.000	300,794
2001-02	0.000	11,215,852	488,211		5,966,994	17,671,057	17,666,185	0.000	0.000	0.000	4,872	4,872	4,988,210	4,988,210	0.000	1,329,510	4,988,211	17,039,250	483,339	0.000	483,339	483,339	0.000	483,339
TOTALS	0.000	145,806,076	(18,246,513)	1,293,513	92,651,326	321,947,708	180,652,818	15,023,900	0.000	0.000	126,270,990	89,232,327	42,026,873	67,896,829				784,133	0.000	784,133	784,133	0.000	784,133	

Appendix B

San Antonio History of Operations

Under Production Balances										Replenishment Obligations															
FY	Carry-Over From Prior Year Operations	Assigned Share of Safe Yield	Water Transaction Non-Wet	Activity Wet Water	Ag Pool Safe Yield Reallocator	Annual Production Right	Production	MWD Exchanges	Net Over-Production 15%/85%	100%	Total Under- Produced	-----Applications-----		Local Storage		Supplemental Storage		Replenishment Obligations			WO Transfers		WO Transfers		
												Carry-Over to Next Year	Deposit to Storage	Withdrawals From Storage	Storage Account Balance	Deposit to Storage	Withdrawals From Storage	Storage Account Balance	& Excluding MWD Exchg	Equal to Net OverProd	Difference	& Including MWD Exchg	Equal to Net OverProd	Difference	
1989-90		1,506,888	1,506,888	0.000		979,198	3,992,974	684,000	0.000	0.000	0.000	3,308,974	1,506,888	1,802,086		8,242,259				0.000	0.000		0.000	0.000	0.000
1990-91	1	1,506,888	1,506,888	0.000		933,654	3,947,430	453,300	0.000	0.000	0.000	3,494,130	1,506,888	1,987,242		10,044,345				0.000	0.000		0.000	0.000	0.000
1991-92		1,506,888	1,506,888	0.000		942,844	3,956,620	942,400	0.000	0.000	0.000	3,014,220	1,506,888	1,507,332		12,031,587				0.000	0.000		0.000	0.000	0.000
1992-93		1,506,888	1,506,888	0.000	124,406	1,036,375	4,174,557	1,060,900	0.000	0.000	0.000	3,113,657	1,506,888	1,606,769		13,538,919				0.000	0.000		0.000	0.000	0.000
1993-94		1,506,888	1,506,888	0.000		1,052,570	4,066,346	768,100	0.000	0.000	0.000	3,298,246	1,506,888	1,791,358		15,145,688				0.000	0.000		0.000	0.000	0.000
1994-95		1,506,888	1,506,888	0.000	25,900	968,863	4,006,539	84,000	0.000	0.000	0.000	3,924,539	1,506,888	2,417,651		16,937,046				0.000	0.000		0.000	0.000	0.000
1995-96		1,506,888	1,506,888	0.000		602,459	3,616,235	0.000	0.000	0.000	0.000	3,616,235	1,506,888	2,109,347	6,000,000	15,464,044				0.000	0.000		0.000	0.000	0.000
1996-97		1,506,888	1,506,888	0.000		902,786	3,916,562	234,471	0.000	0.000	0.000	3,682,091	1,506,888	2,175,203	(2,055,000)	19,694,247				0.000	0.000		0.000	0.000	0.000
1997-98		1,506,888	1,506,888	(2,500,000)	18,467	845,804	1,378,047	97,675	0.000	0.000	0.000	1,280,372	1,280,372	0.000	325,000	19,369,247				0.000	0.000		0.000	0.000	0.000
1998-99		1,280,372	1,506,888	(2,500,000)		850,374	1,137,634	52,183	0.000	0.000	0.000	1,085,451	1,085,451	0.000	1,825,000	17,422,385				0.000	0.000		0.000	0.000	0.000
1999-00		1,085,451	1,506,888	0.000		1,736,467	4,328,806	293,780	0.000	0.000	0.000	4,035,026	1,506,888	2,528,138	2,650,000	17,447,247			0.000	0.000		0.000	0.000	0.000	0.000
2000-01		1,506,888	1,506,888	(3,736,401)		794,880	72,255	72,255	0.000	0.000	0.000	0.000	0.000	4,913,599	12,508,786	178,620			178,620	0.000	0.000		0.000	0.000	0.000
2001-02		0.000	1,506,888	0.000		801,667	2,308,555	931,929	0.000	0.000	0.000	1,376,626	1,376,626	0.000	4,650,000	7,858,786	178,620	357,240		0.000	0.000		0.000	0.000	0.000
TOTALS		0.000	19,589,544	(8,736,401)	168,773	12,447,941	40,904,560	5,674,993	0.000	0.000	0.000	35,229,567	17,304,441	17,925,126	18,308,599					0.000	0.000		0.000	0.000	0.000

Appendix B

Santa Ana River History of Operations

FY		Carry-Over From Prior Year Operations	Assigned Share of Safe Yield	Water Transaction Non-Wet	Activity Wet Water	Ag Pool Safe Yield Reallocation	Annual Production Right	Under Production Balances										Local Storage			Supplemental Storage			Replenishment Obligations			WO Transfers			WO Transfers																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
								Production	Exchanges	MWD	Net Over-Production		Total Under- Produced	Carry-Over to Next Year	Deposit to Storage	Withdrawals From Storage	Storage Account Balance	Deposit to Storage	Withdrawals From Storage	Storage Account Balance	WO Transfers & Excluding MWD Exchg	Equal to Net OverProd	Difference	WO Transfers & Including MWD Exchg	Equal to Net OverProd	Difference																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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Appendix B

SoCal Water History of Operations

Carry-Over				Under Production Balances										Local Storage		Supplemental Storage		Replenishment Obligations			WO Transfers			WO Transfers		
	From Prior Year Operations	Assigned Share of Safe Yield	Water Transaction Activity Non-Wet Wet Water	Ag Pool Safe Yield Reallocator	Annual Production Right	Production	MWD Exchanges	Net Over-Production 15%/85% 100%	Total Under-Produced	Carry-Over to Next Year	Deposit to Storage	Withdrawals From Storage	Storage Account Balance	Deposit to Storage	Withdrawals From Storage	Storage Account Balance	WO Transfers & Excluding MWD Exchg	Equal to Net OverProd	Difference	WO Transfers & Including MWD Exchg	Equal to Net OverProd	Difference				
FY																										
1989-90		380.221	411.476	0.000	267.383	1,059.080	513.800	0.000	0.000	545.280	411.476	133.804	35.122			168.926		0.000	0.000	0.000	0.000	0.000	0.000			
1990-91	1	411.476	411.476	0.000	254.947	1,077.899	585.300	0.000	0.000	492.599	411.476	81.123	250.049			250.049		0.000	0.000	0.000	0.000	0.000	0.000			
1991-92		411.476	411.476	0.000	257.456	1,080.408	440.600	144.600	0.000	0.000	495.208	411.476	83.733	250.049		250.049		0.000	0.000	0.000	0.000	0.000	0.000			
1992-93		411.476	411.476	0.000	282.996	1,139.919	366.500	56.430	0.000	0.000	716.989	411.476	305.513	639.294		639.294		0.000	0.000	0.000	0.000	0.000	0.000			
1993-94		411.476	411.476	0.000	287.418	1,110.370	199.400	19.550	0.000	0.000	891.420	411.476	479.944	1,119.238		1,119.238		0.000	0.000	0.000	0.000	0.000	0.000			
1994-95		411.476	411.476	0.000	264.561	1,094.513	250.900	0.000	0.000	0.000	843.613	411.476	432.137	1,551.375		1,551.375		0.000	0.000	0.000	0.000	0.000	0.000			
1995-96		411.476	411.476	0.000	164.510	987.462	305.710	0.000	0.000	0.000	681.752	411.476	270.276	500.000	1,321.651	1,321.651		0.000	0.000	0.000	0.000	0.000	0.000			
1996-97		411.476	411.476	0.000	246.518	1,069.470	575.861	0.000	0.000	0.000	493.609	411.476	82.133 (373.200)	1,776.984		1,776.984		0.000	0.000	0.000	0.000	0.000	0.000			
1997-98		411.476	411.476	0.000	5.043	230.958	1,058.953	379.849	0.000	0.000	679.104	411.476	267.628	750.000	1,294.612	1,294.612		0.000	0.000	0.000	0.000	0.000	0.000			
1998-99		411.476	411.476	0.000	232.206	1,055.158	242.821	0.000	0.000	0.000	812.337	411.476	400.861	1,695.473		1,695.473		0.000	0.000	0.000	0.000	0.000	0.000			
1999-00		411.476	411.476	0.000	473.927	1,296.879	482.052	0.000	0.000	0.000	814.827	411.476	403.351	2,098.824		2,098.824	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
2000-01		411.476	411.476	0.000	216.943	1,039.895	372.027	0.000	0.000	0.000	667.868	411.476	256.392	256.392	2,098.825 (48.750)	2,147.575		0.000	0.000	0.000	0.000	0.000	0.000			
2001-02		411.476	411.476	0.000	218.796	1,041.748	224.846	0.000	0.000	0.000	816.902	411.476	405.426	661.818	48.750	2,196.325		0.000	0.000	0.000	0.000	0.000	0.000			
TOTALS		0.000	5,349.188	0.000	46.014	3,398.619	14,111.754	4,939.666	220.580	0.000	8,951.508	5,349.188	3,602.320	2,975.624			0.000	0.000	0.000	0.000	0.000	0.000	0.000			

Appendix B

Upland History of Operations

Carry-Over				Under Production Balances										Local Storage		Supplemental Storage		Replenishment Obligations			WO Transfers				
FY	From Prior Year Operations	Assigned Share of Safe Yield	Water Transaction Activity Non-Wet	Wet Water	Ag Pool Safe Yield Reallocation	Annual Production Right	-----Applications-----					Total Under-Produced	Carry-Over to Next Year	Deposit to Storage	Withdrawals From Storage	Storage Account Balance	Deposit to Storage	Withdrawals From Storage	Storage Account Balance	WO Transfers & Excluding MWD Exchg	Equal to Net OverProd	Difference	WO Transfers & Including MWD Exchg	Equal to Net OverProd	Difference
							Production	MWD Exchanges	Net Over-Production 15%/85%	100%															
1989-90		2,852,401	0.000		1,853,534	7,558,336	2,445,600	0.000	0.000	0.000	5,112,736	2,852,401	2,260,335		2,225,719				0.000	0.000	0.000	0.000	0.000	0.000	0.000
1990-91	1	2,852,401	2,852,401	0.000	1,767,323	7,472,125	3,145,100	0.000	0.000	0.000	4,327,025	2,852,401	1,474,624		5,960,678				0.000	0.000	0.000	0.000	0.000	0.000	0.000
1991-92		2,852,401	2,852,401	0.000	1,784,718	7,489,520	2,585,500	237,000	0.000	0.000	4,667,020	2,852,401	1,814,619		7,775,297				0.000	0.000	0.000	0.000	0.000	0.000	0.000
1992-93		2,852,401	2,852,401	0.000	1,961,754	7,902,055	2,372,600	935,800	0.000	0.000	4,593,655	2,852,401	1,741,254		9,516,551				0.000	0.000	0.000	0.000	0.000	0.000	0.000
1993-94		2,852,401	2,852,401	0.000	1,992,419	7,697,221	2,182,200	3,696,100	0.000	0.000	1,818,921	1,818,921	0.000		9,516,551				0.000	0.000	0.000	0.000	0.000	0.000	0.000
1994-95		1,818,321	2,852,401	0.000	55,300	1,833,970	6,560,592	3,010,100	0.000	0.000	3,550,492	2,852,401	698,091		10,214,642				0.000	0.000	0.000	0.000	0.000	0.000	0.000
1995-96		2,852,401	2,852,401	0.000		1,140,401	6,845,203	2,489,610	1,487,000	0.000	0.000	2,868,593	2,852,401	16,192	5,048,000	5,182,834			0.000	0.000	0.000	0.000	0.000	0.000	0.000
1996-97		2,852,401	2,852,401	0.000		1,708,891	7,413,693	1,887,134	0.000	0.000	5,526,559	2,852,401	2,674,158	(1,876,800)	9,733,792				0.000	0.000	0.000	0.000	0.000	0.000	0.000
1997-98		2,852,401	2,852,401	0.000	34,957	1,601,029	7,340,788	1,923,610	1,251,500	0.000	0.000	4,165,678	2,852,401	1,313,277	1,446,848	9,600,221			0.000	0.000	0.000	0.000	0.000	0.000	0.000
1998-99		2,852,401	2,852,401	0.000		1,609,681	7,314,463	2,275,622	0.000	0.000	5,038,861	2,852,401	2,186,460		11,786,681				0.000	0.000	0.000	0.000	0.000	0.000	0.000
1999-00		2,852,401	2,852,401	0.000	69,200	3,287,155	9,061,157	1,736,969	0.000	0.000	7,324,188	2,852,401	4,471,787	5,286,680	10,971,788			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2000-01		2,852,401	2,852,401	0.000	45,800	1,504,718	7,255,320	2,580,132	0.000	0.000	4,675,188	2,852,401	1,822,787	10,971,788	1,822,787	11,309,918		11,309,918	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2001-02		2,852,401	2,852,401	0.000	57,200	1,517,566	7,279,568	2,390,151	0.000	0.000	4,889,417	2,852,401	6,178,452	8,000,000	1,239	338,130	4,141,436	7,506,612	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTALS	0.000	37,081,213	0.000	497,946	23,563,169	97,190,061	31,024,328	7,607,400	0.000	0.000	58,558,333	36,047,733	26,652,036	28,876,516					0.000	0.000	0.000	0.000	0.000	0.000	0.000

APPENDIX C

Appendix C

Water Transfers* by Year By Zone -- Zone 1					
Production Year Ending	From		To		
	Entity	Mgmt Zone	Entity	Mgmt Zone	Quantity
1989	MARYGOLD	3	MVWD	1	800.0
1990	CHILLS(WW8)	1	CHINO	1	257.1
1990	CHILLS(WW8)	1	MVWD	1	477.6
1990	MARYGOLD	3	MVWD	1	800.0
1991	CHILLS(WW8)	1	CHINO	1	363.8
1991	CHILLS(WW8)	1	MVWD	1	675.6
1996	MVIC	1	CHINO	1	500.0
1996	UPLAND	1	CHINO	1	548.0
1997	WEST END CON	1	UPLAND	1	11,876.8
1997	WEST END CON	1	SOCAL	1	1,123.2
1997	CCWD	2	CHINO	1	1,233.0
1997	JCSD	3	SAWCO	1	4,555.0
1999	SAWCO	1	CHINO	1	1,500.0
2000	SAWCO	1	CHINO	1	2,000.0
2000	MVIC	1	MVWD	1	200.0
2000	CHILLS	1	MVWD	1	500.0
2001	SAWCO	1	CHINO	1	2,700.0
2002	UPLAND	1	MVWD	1	3,000.0
2002	MVIC	1	MVWD	1	2,500.0

* Not exhaustive - transfers involving only storage may not be included
Does not include MWD related transfers

Appendix C

Water Transfers* by Year By Zone -- Zone 2					
Production Year Ending	From Entity	Mgmt Zone	To Entity	Mgmt Zone	Quantity
1989	WSBCWD	2	CCWD	2	1,076.2
1989	FUWC	2	CCWD	2	22,701.5
1990	MVWD	1	CCWD	2	500.0
1990	FUWC	2	CCWD	2	3,815.5
1991	FUWC	2	CCWD	2	6,908.2
1991	FUWC	2	FWC	2	3,645.2
1991	FUWC	2	CCWD	2	4,156.7
1992	FUWC	2	CCWD	2	9,827.7
1994	POMONA	1	FWC	2	5,592.0
1994	POMONA	1	ONTARIO	2	5,592.0
1994	MARYGOLD	3	FWC	2	3,000.0
1995	POMONA	1	SCE	2	1,800.0
1995	POMONA	1	ONTARIO	2	5,000.0
1995	CCWD	2	FWC	2	3,740.0
1996	SOCAL	1	FWC	2	500.0
1996	UPLAND	1	ONTARIO	2	2,000.0
1996	POMONA	1	SCE	2	2,976.0
1996	MARYGOLD	3	FWC	2	2,500.0
1997	SOCAL	1	EDISON	2	750.0
1997	SAWCO	1	ONTARIO	2	2,500.0
1997	SUNKIST	2	ONTARIO	2	5,966.6
1997	MARYGOLD	3	FWC	2	700.0
1997	M.WCO GLEN AV	3	ONTARIO	2	108.2
1998	MVIC	1	ONTARIO	2	500.0
1998	SAWCO	1	ONTARIO	2	2,500.0
1998	POMONA	1	ONTARIO	2	4,800.0
1998	POMONA	1	ONTARIO	2	5,858.7
1998	WSBCWD	2	ONTARIO	2	1,000.0
1998	CCWD	2	FWC	2	9,773.7
1998	CCWD	2	EDISON	2	1,800.0
1998	MARYGOLD	3	FWC	2	1,200.0
1999	CHILLS	1	ONTARIO	2	9,000.0
1999	SAWCO	1	ONTARIO	2	2,500.0
1999	MVIC	1	ONTARIO	2	500.0
1999	POMONA	1	RELIANT	2	1,000.0
1999	POMONA	1	RELIANT	2	1,500.0
1999	CCWD	2	FWC	2	9,173.6
1999	CCWD	2	ONTARIO	2	3,915.6
1999	CCWD	2	RELIANT	2	750.0
1999	MARYGOLD	3	FWC	2	1,200.0

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Water Transfers* by Year By Zone -- Zone 2					
Production Year Ending	From Entity	Mgmt Zone	To Entity	Mgmt Zone	Quantity
2000	UPLAND	1	ONTARIO	2	5,000.0
2000	MVWD	1	ONTARIO	2	1,000.0
2000	MVWD CO-OP	1	ONTARIO	2	1,100.0
2000	POMONA	1	ONTARIO	2	7,900.0
2000	CHILLS	1	ONTARIO	2	1,368.3
2000	UPLAND	1	ONTARIO	2	289.7
2000	MVWD	1	ONTARIO	2	152.1
2000	CHINO	1	ONTARIO	2	602.9
2000	POMONA	1	RELIANT	2	2,500.0
2000	CCWD	2	FWC	2	19,746.8
2000	MARYGOLD	3	FWC	2	1,200.0
2001	POMONA	1	ONTARIO	2	2,000.0
2001	CHILLS	1	ONTARIO	2	4,500.0
2001	SAWCO	1	ONTARIO	2	1,300.0
2001	SAWCO	1	ONTARIO	2	1,000.0
2001	POMONA	1	FWC	2	2,000.0
2001	CCWD	2	FWC	2	14,000.0
2001	MARYGOLD	3	FWC	2	1,200.0
2001	SAWCO	1	FWC	2	3,000.0
2001	CSI	2	RELIANT	2	1,300.0
2001	WSBCWD	2	CCWD	2	500.0
2002	POMONA	1	ONTARIO	2	2,500.0
2002	SAWCO	1	FWC	2	1,500.0
2002	UPLAND	1	ONTARIO	2	5,000.0
2002	SAWCO	1	ONTARIO	2	2,500.0
2002	POMONA	1	FWC	2	2,000.0
2002	CCWD	2	FWC	2	10,000.0
2002	NICHOLSON TR	2	FWC	2	4.0
2002	FUWC	2	FWC	2	1.0
2002	WSBCWD	2	CCWD	2	500.0
2002	CSI	2	RELIANT	2	2,600.0
2002	JCSD	3	ONTARIO	2	2,500.0
2002	MARYGOLD	3	FWC	2	1,200.0

* Not exhaustive - transfers involving only storage may not be included
Does not include MWD related transfers

Appendix C

Water Transfers* by Year By Zone -- Zone 3					
Production Year Ending	From Entity	Mgmt Zone	To Entity	Mgmt Zone	Quantity
1990	SARWC	3	JCSD	3	1,300.0
1991	SARWC	3	JCSD	3	1,800.0
1992	SARWC	3	JCSD	3	1,600.0
1993	SARWCO	3	JCSD	3	1,600.0
1994	POMONA	1	JCSD	3	5,592.1
1994	POMONA	1	NORCO	3	3,223.8
1994	WSBCWD	2	JCSD	3	1,094.4
1994	SARWC	3	JCSD	3	1,600.0
1995	MVIC	1	JCSD	3	500.0
1995	POMONA	1	NORCO	3	1,200.0
1995	CCWD	2	JCSD	3	7,200.0
1995	WSBCWD	2	JCSD	3	1,000.0
1995	ONTARIO	2	JCSD - CO-OF	3	996.8
1995	SARWCO	3	JCSD	3	1,600.0
1996	SAWCO	1	JCSD	3	6,000.0
1996	UPLAND	1	JCSD	3	2,500.0
1996	WSBCWD	2	JCSD	3	1,000.0
1996	SARWCO	3	JCSD	3	1,800.0
1997	SARWCO	3	JCSD	3	600.0
1998	POMONA	1	JCSD	3	2,000.0
1998	SAWCO	1	JCSD	3	325.0
1998	CCWD	2	JCSD	3	1,575.0
1998	SARWCO	3	JCSD	3	1,500.0
1999	SAWCO	1	JCSD	3	325.0
1999	CCWD	2	JCSD	3	3,000.0
1999	SARWCO	3	JCSD	3	1,200.0
2000	SAWCO	1	JCSD	3	650.0
2000	CCWD	2	JCSD	3	5,000.0
2000	SARWCO	3	JCSD	3	1,500.0
2001	SAWCO	1	JCSD	3	650.0
2001	SARWCO	3	JCSD	3	2,000.0
2002	SAWCO	1	JCSD	3	650.0
2002	SARWCO	3	JCSD	3	2,000.0

* Not exhaustive - transfers involving only storage may not be included
Does not include MWD related transfers