

## Section 4 – Integrated Review of Water Supply Plans

---

The objectives of the work described herein are to produce future groundwater production projections and associated replenishment requirements for the Chino Basin parties that use the Chino Basin for all or part of their water supply. In the OBMP planning that was conducted in the late 1990s and in the Peace Agreement, which was approved in 2000, it was assumed that the Watermaster parties and others would construct recharge capacity to meet all of Watermaster’s replenishment needs through “wet” water recharge. The first step in this process is to develop projected water demand and supply plans for each party. These water demands include aggregated demands as well as individual draws on the various water supplies available to the parties. The annual replenishment requirement is estimated from aggregated Chino Basin production projections, the production rights contained in the Chino Basin Judgment, and amendments thereto. This section specifically addresses the RMPU requirements set forth in items 1 and 5 of the November 2007 Special Referee’s report to the Court, which read as follows:

1. Baseline conditions must be clearly defined and supported by technical analysis. The baseline definition should encompass factors such as pumping, demand, recharge capacity, total Basin water demand, and availability of replenishment water.
5. Total demand for groundwater should be forecast for 2015, 2020, 2025, and 2030. The availability of imported water for supply and replenishment, and the availability of recycled water should be forecast on the same schedule. The schedules should be refined in each Recharge Master Plan update. Projections should be supported by thorough technical analysis.

In this section, item 1, with the exception of recharge capacity and the availability of replenishment water, is fully addressed. For item 5, the projected groundwater production (demand), recycled water recharge, and replenishment requirements are developed and discussed. The availability of recycled water and imported water for replenishment is discussed in detail in Section 6.

### 4.1 Water Supply Plans for All Entities That Use the Chino Basin

Several municipal and private water purveyors and private users in the Chino Basin area depend in part or completely on Chino Basin groundwater. Figure 4-1 shows the service areas of Chino Basin area water purveyors. The IEUA consulted with the major water service purveyors and, in 2008, developed a basin wide water demand and supply plan for all municipal water purveyors that produce Chino Basin groundwater (IEUA, 2008). The IEUA-developed water supply plans and groundwater production plan were vetted through the Watermaster process during the summer of 2008 and accepted by the appropriators in September 2008. Watermaster developed similar projections for smaller groundwater producers. These projections were used by the IEUA in the environmental documentation for the proposed Dry Year Yield program expansion and the environmental documentation

for the Peace II Agreement. The table below contains the aggregate water demand and supply projection prepared by the IEUA and Watermaster.

**Macro Water Demand and Supply Plan for the Chino Basin**  
(acre-ft/yr)

Water Sources	2009-10 <sup>1</sup>	2014-15	2019-20	2024-25	2029-30
Chino Basin Groundwater	145,811	188,878	192,127	207,864	220,514
Non Chino Groundwater	33,200	33,200	33,200	33,200	33,200
Local Surface Water	16,918	16,490	16,990	17,990	17,990
Imported Water from Metropolitan	84,578	83,449	84,449	84,449	84,449
Recycled Water for Direct Reuse	18,800	33,870	34,520	34,570	34,570
<b>Total Demand</b>	<b>299,307</b>	<b>355,887</b>	<b>361,286</b>	<b>378,073</b>	<b>390,723</b>

Source: 2008 IEUA Water Supply Plan (attached as Appendix B) for large agencies and the *2009 Production Optimization and Evaluation of the Peace II Project Description* (WEI, 2009) for small agencies, small water companies and private well owners

1 -- 2009-10 Chino Basin groundwater production is actual 2009-09 production.

The total water demand is projected to grow about 91,000 acre-ft/yr through the planning period with most of the growth in demand projected to occur in the early part of planning period. With the exception of Chino Basin groundwater production and recycled water, the supply sources—non Chino Basin groundwater, local surface water, and imported water from Metropolitan for direct use—were assumed to be constant over the planning period. Chino Basin groundwater production increases about 75,000 acre-ft/yr over the planning period, resulting in a total increase of about 52 percent. Recycled water for direct reuse increases by about 15,000 acre-ft/yr during the early part of the planning period and then levels off after 2020, resulting in a total increase of about 84 percent.

The IEUA had stated that certain factors in its 2008 water demand and supply projections may reduce future water demands. These factors, updated to 2010, include:

- The continued slowdown of the housing market, which will delay increases in water demand and, thus, the need for additional water supplies;
- Enhanced regional conservation efforts and programs in response to continued statewide dry conditions and environmental restrictions on Sacramento-San Joaquin River Delta (Delta) pumping; and
- The SB-7 requirement for a statewide 10-percent reduction in water use by 2015 and a 20-percent reduction by 2020.

The water demands projected by the IEUA and Watermaster are probably higher than will actually occur. Reductions in water demand from conservation generally reduce the use of the most expensive water supply(s) available to a water purveyor, which has, in the past, been imported water that is served for municipal and industrial uses. Thus, it's possible that even with new conservation efforts, the groundwater production projections used herein could be

representative of future conditions. That said, it is also possible that the cost of replenishment may be the most expensive water use in the future due to the scarcity of low cost replenishment water and the cost to recharge.

## **4.2 Projection of Chino Basin Groundwater Production and Replenishment**

Watermaster recharges supplemental water into the Chino Basin pursuant to the Judgment and the Peace Agreement. Total annual replenishment is calculated based on projected groundwater production, recharge facility capacity, and the following assumptions:

- The safe yield is 140,000 acre-ft/yr through 2010 and the 2007 Watermaster Model-calculated safe yield (WEI, 2009b) thereafter.
- The Judgment allows a 5,000 acre-ft/yr controlled overdraft of the Chino Basin through 2017.
- Reoperation water is allocated to the replenishment of CDA desalter production as provided for in the Peace II Agreement and updated in the report prepared to satisfy Condition Subsequent No. 7 (WEI, 2008). Reoperation water is completely used up by 2030.
- The 6,500 acre-ft/yr supplemental water recharge commitment to MZ1 pursuant to the Peace II Agreement.
- Recycled water recharge was assumed to occur pursuant to Watermaster and the IEUA's recharge permit (Order R8-2007-0039) as amended in October 2009 (Order R8-2009-0057) and as projected by the IEUA (IEUA, 2010).
- Post 2010 increase in stormwater recharge due to new development and redevelopment that is captured in existing stormwater recharge facilities and as a result of compliance with the 2010 Municipal Separate Storm Sewer System (MS4) Permit.

Table 4-2 contains the projected groundwater production from Table 4-1, the various components of production rights and total production rights, the projected replenishment obligation, and the cumulative replenishment obligation. Total production rights are about 187,000 acre-ft/yr in 2010 and generally decrease over time to about 159,000 acre-ft/yr through 2035. The decrease is due to the declining yield, the exhaustion of controlled overdraft in 2017, the programmatic decline in reoperation water, the exhaustion of reoperation water in 2030, and an assumed termination of the 6,500 acre-ft/yr supplemental water recharge commitment to MZ1. Watermaster's replenishment obligation was estimated using the following assumptions:

- Water in storage accounts at the start of fiscal year 2009-10 is not used to meet future replenishment obligations. This is a conservative assumption that reserves discretion regarding the use of this water to individual storing parties.
- On a go forward basis, under-producers will transfer un-pumped rights to over-producers each year; that is, there is an efficient market that moves unused production

rights from under-producers to over-producers.

For this investigation, the average annual replenishment obligation was assumed to be equal to the greater of zero and the difference between actual production and production rights. The replenishment obligation for the 2008 IEUA/Watermaster groundwater production scenario is projected to be zero in 2009-10 through 2012-13, jump to about 3,000 acre-ft/yr in 2013-14 as the amount of reoperation water starts to ratchet down to 10,000 acre-ft/yr, increase steadily to about 45,000 acre-ft/yr by 2029-30, jump to 55,000 acre-ft/yr in 2030-31, and increase very slightly thereafter due to a small decline in projected safe yield. This assumes that under-producers will transfer un-used production rights to over-producers each year; as previously stated, there is an efficient market that moves unexercised rights from under-producers to over-producers. This assumption will underestimate the replenishment obligation for some years. Though, over the long term, this assumption is valid because the appropriator parties cannot store unused production rights indefinitely, and the demand for replenishment water will provide financial incentives for unused production rights to be sold to over-producers. Figure 4-2 shows the projected groundwater production for the 2008 IEUA/Watermaster groundwater production projection as a stacked bar chart that consists of the production rights and replenishment obligations for each year in the planning period. The cumulative replenishment obligation is projected to be negative through 2021-22, implying that under-production and the MZ1 recharge mandated by the Peace II Agreement are being stored in appropriator storage accounts and subsequent replenishment obligations are being met from unused production rights via the efficient market assumption. After 2021-22, the cumulative replenishment obligation becomes positive and grows as the unused production rights are not sufficient to meet the replenishment obligation. In theory, this means that Watermaster could go ten years without purchasing imported water for replenishment if an efficient market for unused production rights exists.

### **4.3 Recharge Master Plan Implementation Items**

The December 21, 2007 Court order requires the completion of this RMPU by July 1, 2010 and, at a minimum, every five years thereafter. The RMPU process is very sensitive to projected groundwater production. By statute, groundwater production projections are prepared for UWMPs every five years and in years ending in “0” or “5.” Watermaster, the CBWCD, and the IEUA should review the groundwater production projections from the retail water purveyors’ 2010 UWMPs after their completion in June 2011<sup>2</sup> to update the groundwater production projections included herein and revise the conclusions and recommendations of the 2010 RMPU to comport with the 2010 UWMPs. Conclusions in Section 6 regarding the acquisition of supplemental water for replenishment and new supplemental water recharge facilities should be updated in fiscal 2011-12. Decisions regarding the acquisition of supplemental water for replenishment and new supplemental water recharge facilities should be deferred until that time.

---

<sup>2</sup> The deadline for completing the 2010 UWMPs for retail water agencies was extended by special legislation to June 30, 2010 for the 2010 UWMP. Subsequent UWMPs are required to be submitted to the DWR by December 31 of year due.

The next complete RMPU should be completed no later than December 2016, and subsequent RMPUs should be completed, at a minimum, every five years thereafter. This will ensure that the most up-to-date groundwater production estimates are included in future RMPUs.

**Table 4-1**  
**Projected Groundwater Production for the Chino Basin**  
**Based on August 2008 IEUA/Watermaster Estimates<sup>1</sup>**  
**(acre-ft/yr)**

Producer	Production Projection					
	2009/10 <sup>2</sup>	2014/15	2019/20	2024/25	2029/30	2034/35
<b>Overlying Agricultural Pool</b>						
Combined total Agricultural Pool Production	32,143	18,577	5,010	5,010	5,010	5,010
<b>Overlying Non-Agricultural Pool</b>						
San Bernardino County (Chino Airport)	94	94	94	94	94	94
California Steel Industries Inc	1,126	1,126	563	563	563	563
Swan Lake Mobile Home Park	36	36	36	36	36	36
Vulcan Materials Company	5	5	5	5	5	5
Space Center Mira Loma Inc.	94	94	94	94	94	94
Angelica Textile Service	31	31	31	31	31	31
Sunkist Growers Inc	43	43	43	43	43	43
Praxair Inc	113	113	0	0	0	0
General Electric Company	10	10	10	10	10	10
California Speedway	505	505	505	505	505	505
RRI Etiwanda	536	536	268	268	268	268
<i>Subtotal Overlying Non-Agricultural Pool Production</i>	<i>2,593</i>	<i>2,593</i>	<i>1,649</i>	<i>1,649</i>	<i>1,649</i>	<i>1,649</i>
<b>Appropriative Pool</b>						
Arrowhead Mountain Spring Water Company	350	350	350	350	350	350
Chino Desalter Authority	26,356	39,400	39,400	39,400	39,400	39,400
City of Chino	2,244	10,844	11,811	14,900	14,900	14,900
City of Chino Hills	1,990	4,823	4,823	4,823	4,823	4,823
City of Norco	0	0	0	0	0	0
City of Ontario	13,222	27,211	32,360	37,508	42,658	42,658
City of Pomona	11,731	13,000	13,000	13,000	13,000	13,000
City of Upland	1,021	2,140	2,140	2,140	2,140	2,140
Cucamonga Valley Water District	11,006	21,229	26,729	32,229	37,729	37,729
Fontana Union Water Company	0	0	0	0	0	0
Fontana Water Company	13,202	10,000	11,000	11,500	12,000	12,000
Jurupa Community Services District	17,160	18,123	21,616	21,616	21,616	21,616
Inland Empire Utilities Agency	0	0	0	0	0	0
Marygold Mutual Water Company	142	142	142	142	142	142
Metropolitan Water District of Southern California	0	0	0	0	0	0
Monte Vista Irrigation Company	0	0	0	0	0	0
Monte Vista Water District	9,519	17,000	18,500	20,000	21,500	21,500
Niagara	1,210	1,210	1,210	1,210	1,210	1,210
San Antonio Water Company	992	1,149	1,282	1,282	1,282	1,282
San Bernardino County (Olympic Facility)	22	22	22	22	22	22
Santa Ana River Water Company	160	318	335	335	335	335
Golden State Water Company	748	748	748	748	748	748
West End Consolidated Water Company	0	0	0	0	0	0
West Valley Water District	0	0	0	0	0	0
<i>Subtotal Appropriators</i>	<i>111,075</i>	<i>167,709</i>	<i>185,468</i>	<i>201,205</i>	<i>213,855</i>	<i>213,855</i>
<b>Total Production</b>	<b>145,811</b>	<b>188,878</b>	<b>192,127</b>	<b>207,864</b>	<b>220,514</b>	<b>220,514</b>

1 -- IEUA developed estimates for the Appropriative Pool and Watermaster developed estimates for the other two pools.

2 -- 2009/10 production estimates are based on actual 2008/09 production reported in the FY 2008/09 Watermaster Annual Report and excluding Dry Year Yield Program production

**Table 4-2**  
**Projected Groundwater Production and Production Rights**  
 (acre-ft)

Fiscal Year	Projected Groundwater Production 2008 IEUA / Watermaster Projection per Table 4-1	Pre 2010 RMPU Production Rights								Replenishment Obligation <sup>3</sup>	Cumulative Replenishment Obligation
		Safe Yield <sup>1</sup>	Controlled Overdraft	Reoperation Water	6,500 acre-ft/yr Supplemental Water Recharge in MZ1 per Peace II <sup>5</sup>	Mid-Range Recycled Water Recharge <sup>4</sup>	Post 2010 Increase in Stormwater Recharge from Development <sup>2</sup>	Post 2010 Increase in Stormwater Recharge from 2010 MS4 Compliance	Total		
2009 - 2010	145,811	140,000	5,000	28,910	6,500	8,100	0	0	188,510	0	-33,699
2010 - 2011	154,424	134,127	5,000	31,500	6,500	14,100	150	265	191,642	0	-70,916
2011 - 2012	163,038	134,545	5,000	33,740	6,500	16,000	300	530	196,615	0	-104,494
2012 - 2013	171,651	134,844	5,000	11,909	6,500	17,800	450	795	177,298	0	-110,141
2013 - 2014	180,265	135,211	5,000	10,000	6,500	19,100	600	1,060	177,471	2,794	-107,347
2014 - 2015	188,878	135,593	5,000	10,000	6,500	20,000	750	1,325	179,168	9,710	-97,636
2015 - 2016	189,528	136,418	5,000	10,000	6,500	20,700	900	1,590	181,108	8,420	-89,216
2016 - 2017	190,178	137,123	5,000	10,000	6,500	21,000	1,050	1,855	182,528	7,649	-81,567
2017 - 2018	190,827	137,332	0	10,000	6,500	21,000	1,200	2,120	178,152	12,675	-68,892
2018 - 2019	191,477	137,170	0	10,000	6,500	21,000	1,350	2,385	178,405	13,072	-55,820
2019 - 2020	192,127	136,695	0	10,000	6,500	21,000	1,500	2,650	178,345	13,782	-42,038
2020 - 2021	195,274	136,055	0	10,000	6,500	21,000	1,650	2,915	178,120	17,154	-24,884
2021 - 2022	198,421	135,529	0	10,000	6,500	21,000	1,800	3,180	178,009	20,412	-4,472
2022 - 2023	201,569	134,947	0	10,000	6,500	21,000	1,950	3,445	177,842	23,727	19,256
2023 - 2024	204,716	134,188	0	10,000	6,500	21,000	2,100	3,710	177,498	27,218	46,474
2024 - 2025	207,864	133,281	0	10,000	6,500	21,000	2,250	3,975	177,006	30,858	77,332
2025 - 2026	210,394	132,413	0	10,000	6,500	21,000	2,400	4,240	176,553	33,841	111,173
2026 - 2027	212,924	131,603	0	10,000	6,500	21,000	2,550	4,505	176,158	36,766	147,939
2027 - 2028	215,454	130,964	0	10,000	6,500	21,000	2,700	4,770	175,934	39,520	187,459
2028 - 2029	217,984	130,485	0	10,000	6,500	21,000	2,850	5,035	175,870	42,114	229,573
2029 - 2030	220,514	130,210	0	10,000	6,500	21,000	3,000	5,300	176,010	44,504	274,077
2030 - 2031	220,514	130,010	0	0	6,500	21,000	3,000	5,300	165,810	54,704	328,781
2031 - 2032	220,514	129,810	0	0	6,500	21,000	3,000	5,300	165,610	54,904	383,685
2032 - 2033	220,514	129,610	0	0	6,500	21,000	3,000	5,300	165,410	55,104	438,789
2033 - 2034	220,514	129,410	0	0	6,500	21,000	3,000	5,300	165,210	55,304	494,093
2034 - 2035	220,514	129,210	0	0	6,500	21,000	3,000	5,300	165,010	55,504	549,596
Total	5,145,884	3,476,779	40,000	276,058	169,000	514,800	46,500	82,150	4,605,287	659,737	
Average	197,919	133,722	1,538	10,618	6,500	19,800	1,788	3,160	177,126	25,375	

1 -- Safe yield includes stormwater recharge from the CBFIP

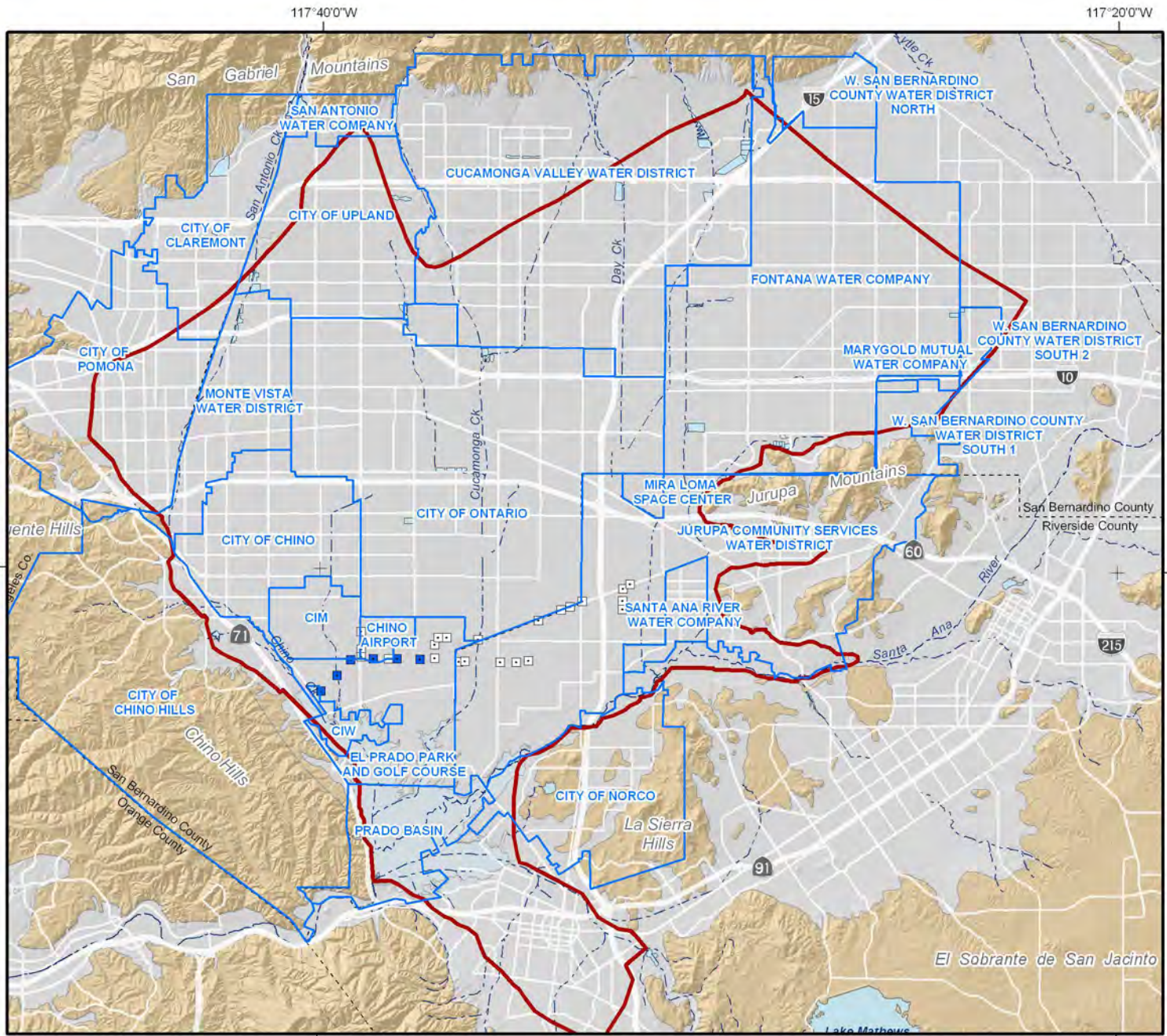
2 -- This is the increase in stormwater recharge that will occur due to increased imperviousness from new development.

3 -- This is the net replenishment obligation based on the assumptions described in the text.

4 -- Mid-range Projection from Table 2 of the IEUA May 4, 2010 *Integrated Review of Water Supply Plans Used for the Chino Basin Recharge Master Plan Update IEUA Tech Memo No. 3* (Appendix B to this report)

5 -- Pursuant to the Peace II Agreement.

6 -- Replenishment will be required when the CURO becomes positive.

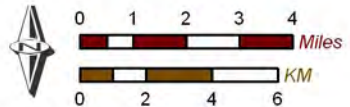


- Main Features**
- Water Service Area Boundaries
- Geology**
- Water-Bearing Sediments**
- Quaternary Alluvium
- Consolidated Bedrock**
- Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks
- Faults**
- Location Certain
  - Location Approximate
  - Location Concealed
  - Location Uncertain
  - Approximate Location of Groundwater Barrier
- Other Features**
- Existing Chino Desalter Well
  - Proposed Chino Desalter Well
  - Groundwater Flow Model Boundary
  - Flood Control/Conservation Basins
  - Streams, Rivers, and Channels



Produced by:  
**WILDERMUTH**  
 ENVIRONMENTAL INC.  
 23692 Bircher Drive  
 Lake Forest, CA 92630  
 949.420.3030  
 www.wildermuthenvironmental.com

Author: MJC  
 Date: 20100322  
 File: Figure\_4-1.mxd



**Figure 4-2**  
**Projected Groundwater Production in the Chino Basin**  
**For the 2008 IEUA/Watermaster Production Projection**

