Appendix A

Notice of Preparation and Public Hearing for the

2010 Urban Water Management Plan

CITY OF ONTARIO

ONTARIO MUNICIPAL UTILITIES COMPANY

PAUL S. LEON
MAYOR

DEBRA DORST-PORADA
MAYOR PRO TEM

ALAN D. WAPNER
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JIM W. BOWMAN
COUNCIL MEMBERS

CHRIS HUGHES
CITY MANAGER

MARY E. WIRTES, MMC
CITY CLERK

JAMES R. MILHISER
TREASURER

MOHAMED EL-AMAMY
UTILITIES GENERAL MANAGER

April 8, 2011

TO: Interested Parties

SUBJECT: **NOTICE OF PREPARATION AND PUBLIC HEARING FOR THE 2010 URBAN WATER MANAGEMENT PLAN**

The City of Ontario is currently preparing an update to its Urban Water Management Plan (UWMP) in compliance with the California Urban Water Management Planning Act. The current UWMP was completed in 2005. An update is required every five years. The City welcomes your agency's assistance and involvement as we update our UWMP.

The UWMP documents the City's planning efforts to ensure adequate water supply to meet existing and future water demands under a range of water supply conditions, including water shortages. Draft portions of the UWMP will be made available to appropriate water agencies including wholesale suppliers, water management agencies, and neighboring retail agencies as they are developed. The completed Draft 2010 UWMP will be available for public review starting June 7, 2011 on the City's website at www.ci.ontario.ca.us.

The City Council will conduct a public hearing at the following time and place to receive comments on the Draft 2010 UWMP.

Date:	*Tuesday, June 21, 2011*
Time:	*6:00 p.m.*
Location:	*Ontario City Hall – Council Chambers* *303 East "B" Street* *Ontario, CA 91761*

All interested persons are invited to attend the public hearing and provide comments regarding the Draft 2010 UWMP. Oral statements will be heard, but for accuracy of the record, all important testimony should be submitted in writing.

For more information, please feel free to contact Dennis Mejia, Utilities Engineering Division Manager at (909) 395-2609 (dmejia@ci.ontario.ca.us) or Cynthia Heredia-Torres, Assistant Engineer at (909) 395-2647 (ctorres@ci.ontario.ca.us).

Sincerely,

Mohamed El-Amamy
Utilities General Manager

1425 SOUTH BON VIEW AVENUE • ONTARIO, CALIFORNIA 91761-4406 • (909) 395-2605 • FAX: (909) 395-2601

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Appendix B

Chino Basin Water Master 33rd Annual Report

CHINO BASIN WATERMASTER

THIRTY-THIRD
33
ANNUAL REPORT
FISCAL YEAR 2009-10

DEVELOPING INDEPENDENCE FROM IMPORTED WATER

A Message From the Executive Director

The Chino Basin region has experienced a long history of water challenges. The situation is no different today. Recent rainfall data showed that 2007-2009 was the twelfth driest three-year period in the state's recorded history. Last year rainfall improved, but runoff was below average. In addition, court rulings to protect fish in the California Delta have resulted in cuts of imported Delta supplies by 50%!

Meeting the Challenges. *Watermaster and its Basin partners have stepped up to meet these challenges. Some of our notable water management achievements in the 2009-2010 fiscal year, include:*

- *Facilitated agreements with local and regional partners to expand desalter capacity.*
- *Completed the Phase II Chino Basin Facilities Improvement Project that increased recharge capacity to 99,000 acre-feet per year from 49,000 acre-feet.*
- *Made plans for cost-saving changes to the Basin Plan Amendment that are designed to reduce monitoring costs by hundreds of thousands of dollars per year.*
- *Continued actively facilitating cleanup programs throughout the Basin.*

Completed the Recharge Master Plan Update. *Watermaster's principal focus for the fiscal year was completion of the Recharge Master Plan Update. With cutbacks of replenishment water, a key goal of the plan is to identify how the Basin can take larger amounts of water during wet periods and recharge it in a shorter amount of time. Watermaster worked with the Chino Basin Conservation District and the Inland Empire Utilities Agency to successfully complete the Plan by the July 1, 2010 deadline.*

Kept Costs Down. *The Inland Empire's economy is one of the hardest hit in California, and Watermaster made administrative changes to improve efficiency and keep costs down. Many other technical, administrative and institutional achievements are summarized in this report.*

Watermaster's successes are rooted in collaboration locally, regionally and across the state. The result is that in drought years and flood years, we continue to enjoy the benefits of a reliable, high-quality and affordable water supply.

I am grateful to all my fellow stakeholders for their contributions to another successful year, and look ahead with confidence to more achievements in the future.

Kenneth R. Manning,
CEO Chino Basin
Watermaster

Cooperation and Leadership Serves All Basin Stakeholders

ANNUAL PLANNING CONFERENCE BUILDS

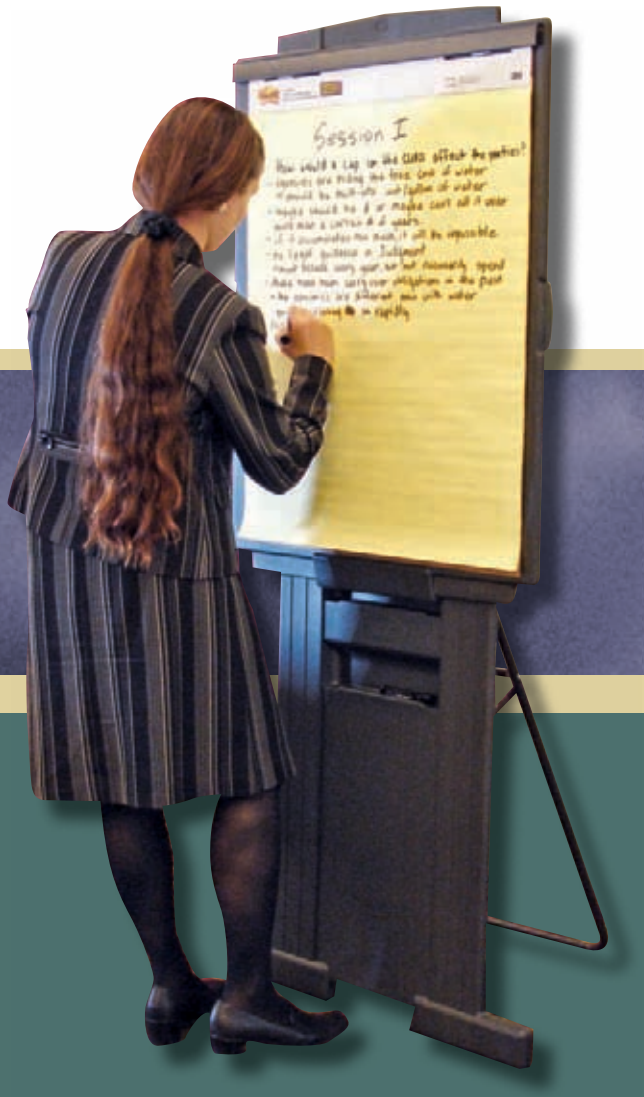
In September 2009, Chino Basin Watermaster met for the Strategic Annual Planning Conference with staff, Board members, consulting experts and stakeholders to plan for the future and to continue to develop the Recharge Master Plan Update (RMPU). This annual planning conference builds on a growing and successful history of collaboratively managing water supplies to benefit the entire region.

Early 1970s and Before: Conflict Over Water Supplies
Basin stakeholders had endured decades of conflict over water supplies, but this began to change in 1974 when stakeholders signed a memorandum of agreement. Within a year, the state authorized a $2 assessment per acre-foot of water to help support this effort by funding development of a Chino Groundwater Plan.

1978: Watermaster Provides a Permanent Forum
By 1978 a permanent structure was created by the San Bernardino Superior Court when it formed Watermaster. In subsequent years, Watermaster developed a governance structure, technical understanding and funding to manage the Basin.

Later 1990s: Optimum Basin Management Program, a Major Technical Advance
In the late 1990s, Watermaster developed a detailed program consisting of hundreds of specific actions designed to resolve basin water supply and quality challenges. This program, required by the Court, is still being systematically implemented and continually refined.

2000 and 2007: Peace Agreements Represent a Major Institutional Advance
Following years of negotiation, Basin stakeholders and the Court approved the Peace I Agreement in 2000, formalizing and making permanent the Watermaster governance structure. In 2007, a more profound level of collaboration became possible through signing of the Peace II Agreement that provides massive water supply benefits and cost savings of nearly $1 billion dollars.



Watermaster hosts an annual two-day Strategic Planning Conference that brings all Basin stakeholders together to work collaboratively on priorities for the coming years.

ON HISTORY OF COLLABORATION

2008-2010: Recharge Master Plan Update Development and Implementation

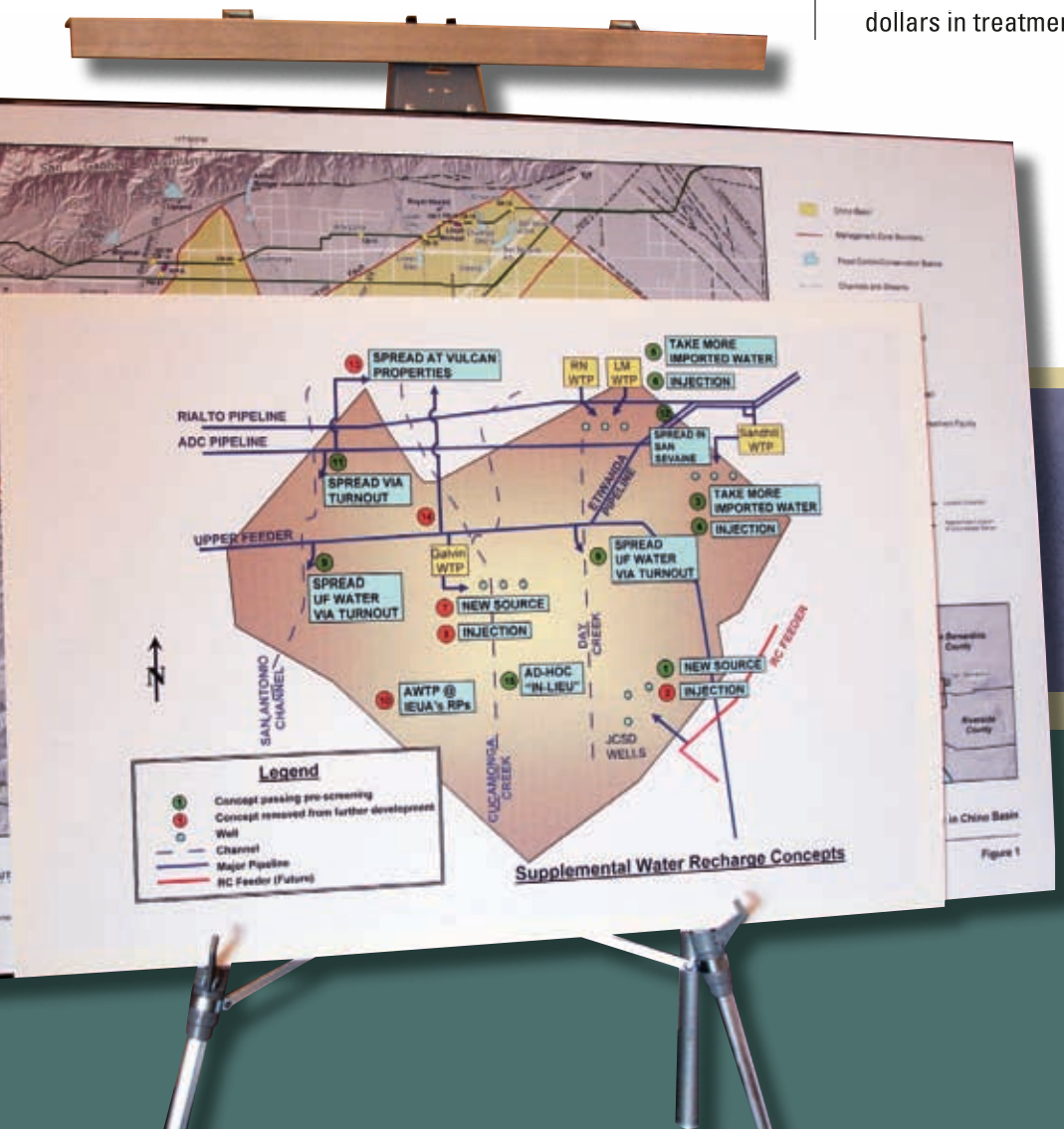
The most important single initiative of the last several years has been the Recharge Master Plan Update. Work on the plan was initiated at the 2008 Strategic Planning Conference. During the rest of the year and through 2009 the Recharge Master Plan Update was developed and finalized. Implementation of the Recharge Master Plan Update will begin during the 2010-2011 fiscal year.

2010 and Beyond: Increasing Capabilities and Successfully Managing Water Supply and Quality

While the 2009-2010 fiscal year focused on the Recharge Master Plan Update, Watermaster continued working in many arenas to increase water management capabilities and successes with more technical sophistication, better cost effectiveness and continually improved results.

What distinguishes progress in 2009-2010, and in recent years, are achievements that build on each other to make it possible to monitor, protect and expand our water supply and quality in ways that simply could not be achieved in the past.

- **Improved working relationships** and governance tools through Watermaster that allow stakeholders to work together and resolve complex challenges in a sustained way.
- **Regional partnerships** that make it possible to plan and implement large, cost-effective projects involving multiple parties, and that utilize multiple sources: recycled water, stormwater, imported water and groundwater.
- **Extensive physical facilities:** desalters, recharge basins, pipelines and channels that allow Watermaster to collect, spread and move water.
- **Unique regulatory and management tools:** such as Hydraulic Control and Maximum Benefit that will provide up to 140,000 acre-feet of new water and nearly one billion dollars in treatment savings over time.



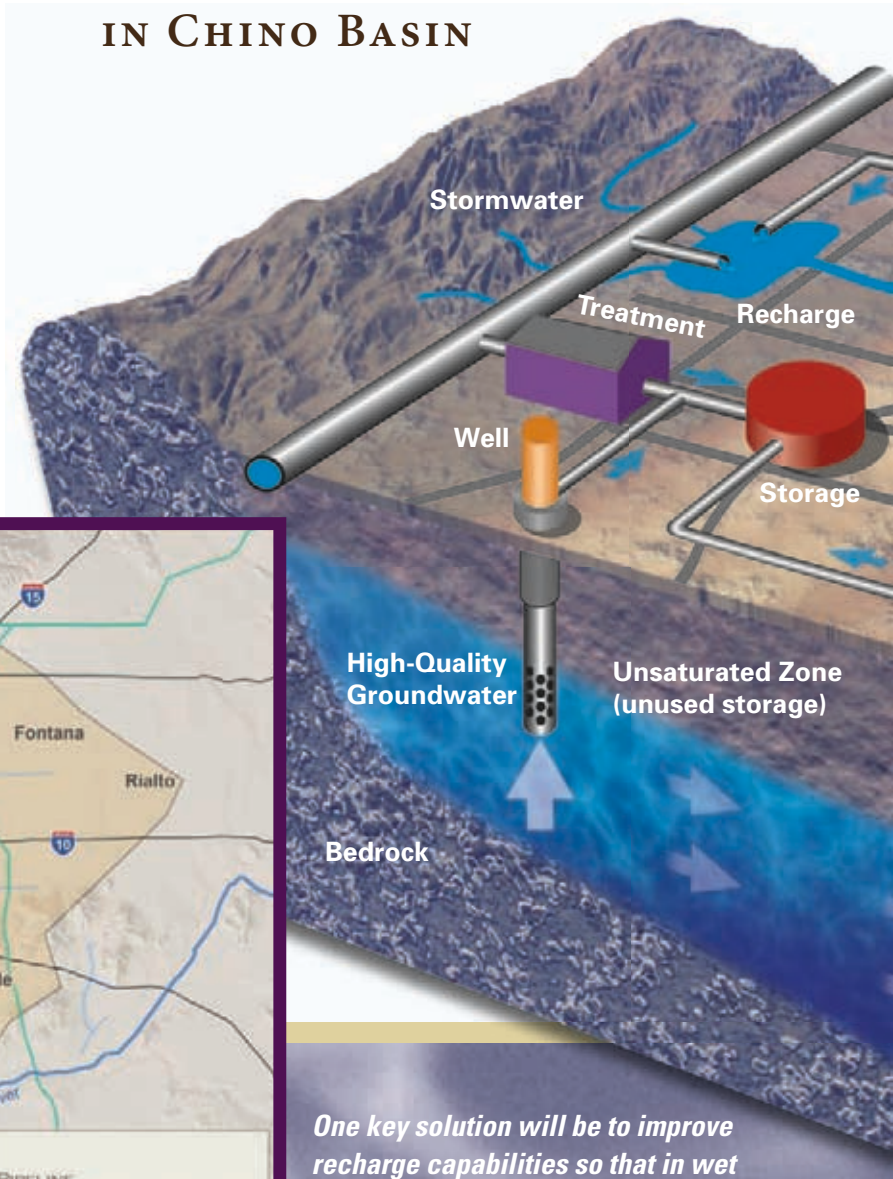
With imported replenishment supplies unavailable, Watermaster successfully made completion of the Recharge Master Plan Update its top Strategic priority in 2010.

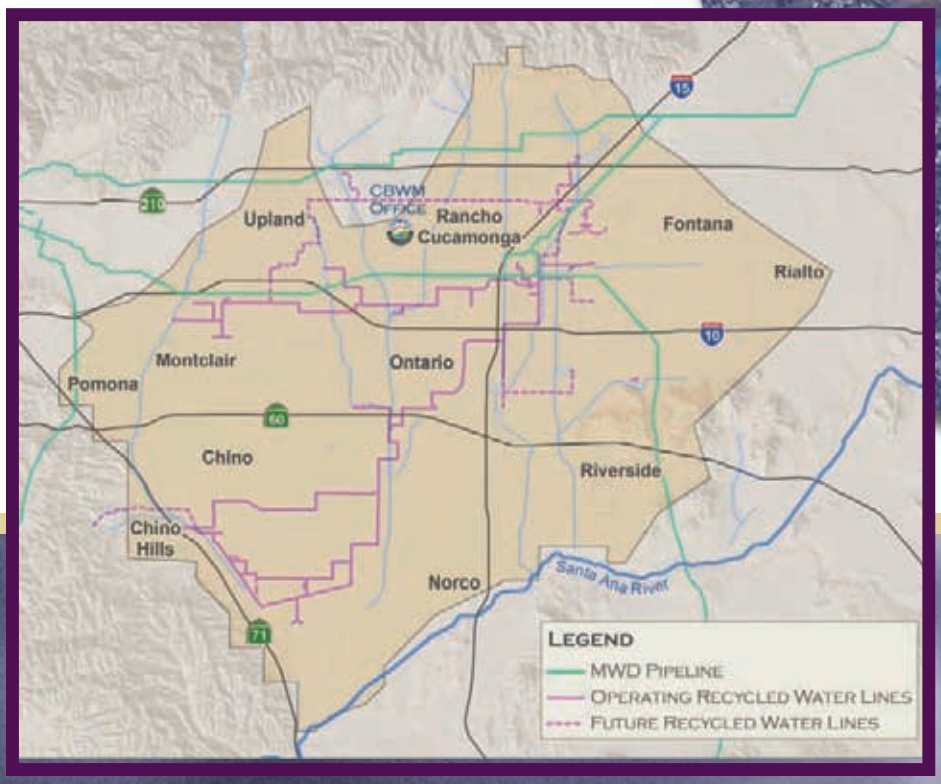
Statewide Water Crisis Means Our Region Must Develop Local Sources of Water

Historically, the source of replenishment water was surplus water that was made available at lower rates. However, for the last several years there has been no surplus water available because it has been given to newly recognized environmental needs by the courts.

As a result, Chino Basin Watermaster has been working systematically to develop new sources of water that are affordable, reliable and under local control through the Recharge Master Plan Update.

Storage and Recovery in Chino Basin

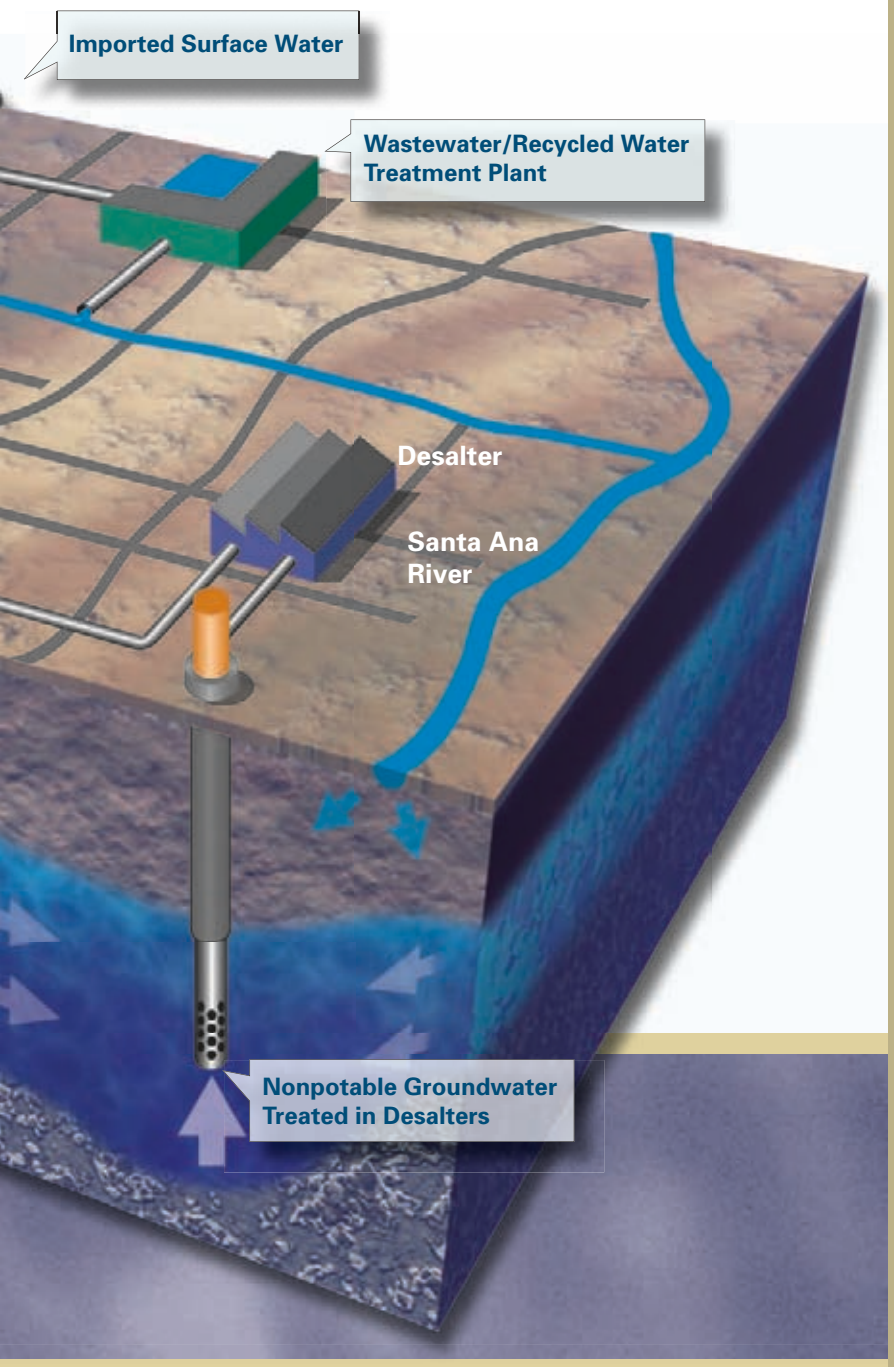




One key solution will be to improve recharge capabilities so that in wet years, when surplus water is available, the Basin can take larger amounts of water in shorter periods of time.

The Chino Groundwater Basin is a principal source of water for nearly one million people, extensive agriculture, businesses, and recreational facilities. The Basin itself stretches across 220 square miles, and stores an estimated six million acre-feet of water (about two trillion gallons). The Basin's safe yield is 140,000 acre-feet per year. Last year, about 170,000 acre-feet of water were pumped from it.

CHALLENGES LOCALLY



Southern California Reservoir Storage is Still Low

Provided courtesy of Metropolitan Water District of Southern California.

NEW WATER SOURCES: THE RECHARGE MASTER PLAN UPDATE

The Recharge Master Plan Update work started during the Strategic Planning Conference in September 2008, which was entirely dedicated to the topic. Watermaster worked collaboratively with the Chino Basin Water Conservation District (CBWCD) and Inland Empire Utilities Agency (IEUA) to assess the challenges, evaluate the assets available, and to develop solutions.

Following completion of the draft report in January 2009, several workshops were held and comments were received. Responses were incorporated into the final report, which will be submitted to the Court on time on July 1, 2010.

Recharge Master Plan Update: Identifies How the Basin Will Increase Capture and Replenishment of Stormwater:

- **Expand use of stormwater for recharge.** The Basin has captured most of the easy-to-obtain stormwater that can be replenished. Future projects will require substantial investments in new equipment such as pumps and pipelines, and require bigger recharge facilities since the areas with high infiltration rates have been taken. There will be less recharge of stormwater per dollar than in the past, but there is still much potential.
- **Increase capture and recharge from Municipal Separate Storm Sewer Systems.** To prevent harmful pollutants from being washed or dumped into storm drains, stormwater system operators require developers to capture stormwater onsite and recharge it into the ground through porous landscapes, mini-ponds and other methods. Watermaster is seeking to develop programs and incentives that would encourage property owners to go beyond minimum stormwater capture requirements by recharging additional water. The types of incentives under review include: clarifying who owns the water, giving water credits to developers of this water, and cost-sharing agreements or other financial incentives.

Purchase replenishment water from third parties:

Chino Basin Watermaster will also be seeking sources of supply that it could purchase from willing sellers and transport through the State system to the Chino Basin for recharge. The goal is to increase local responsibility for water supply and decrease dependence on imported water.

DEVELOPING WATER SUPPLY SOLUTIONS

It Rained Last Year, But Long-Term Water Supply Challenges Remain. Following three years of being below average, rainfall improved in the 2009-2010 fiscal year. However, there remains an ongoing supply challenge caused by environmental and regulatory restrictions that have slashed the amount of water that can be pumped from the Delta to protect endangered fish, limiting the ability to import adequate supplies from Northern California. Additionally, there have been multi-year droughts on the Colorado River Basin, and population growth that has further impacted statewide water supplies. As a result, the area needs to look inward to find solutions for developing local water independence.

Watermaster and its partners in the Chino Basin have started by developing the tools and maximizing the resources most easily available: increasing the use of recycled water, capturing more stormwater, desalinating brackish water, increasing conservation and more.

COLLABORATIVE WELLFIELD AND DESALTER EXPANSION

Watermaster has made progress toward its commitment to expand the desalters and obtain hydraulic control through a variety of coordinated and collaborative efforts with many partner agencies.

Progress on a Partnerships to Expand the Desalters and Well Fields. Chino Basin Watermaster took a leadership role in collaborating with neighboring agencies, Jurupa Community Services District, City of Ontario and Western Municipal Water District, on the Desalter expansion.

One key part of the program involves Western Municipal Water District paying to substantially expand the capacity of the Desalter II treatment facility by 10.5 million gallons per day or 11,800 acre-feet per year. Western Municipal will also fund construction of a new wellfield required for the hydraulic control commitment associated with the Maximum Benefit program.

This win/win desalter expansion program resulted in Western Municipal Water District obtaining a new and reliable water supply that is not dependent on the state water system. In doing so they will pay for treating contaminated groundwater and improving hydraulic control in the Chino Basin.

The Regional Water Quality Control Board (RWQCB) levied an Administrative Civil Liability complaint and fine against Watermaster and IEUA for not keeping up with the mandated schedule to expand the Desalters. Watermaster is now working with the various parties as a facilitator to maintain the realistic schedule approved by the RWQCB, and the project is progressing.

Reverse osmosis (RO) membrane array at the Chino II Desalter plant.

UNDER LOCAL CONTROL

Dry Year Yield. The Dry Year Yield Program provided Metropolitan Water District the right to store groundwater in the Basin, as a hedge against drought, in exchange for paying the costs of developing the facilities that deliver that water. The Program has now almost completed a full cycle, with Chino Basin benefiting from those facilities, and by Metropolitan Water District having filled the account and now drawing it down over three years. In April, MWD made the final call on that water, and the Dry Year Yield program will be zeroed out by April 30, 2011.

The Basin did not obtain large amounts of water from Metropolitan Water District (MWD) for replenishment purposes but did obtain and use storm and recycled water for recharge.

Chino Basin Facilities Improvement Project Completed. The Chino Basin Facilities Improvement Project (CBFIP) Phase II, a joint program of Watermaster, Chino Basin Water Conservation District, Inland Empire Utilities Agency, and the San Bernardino County Flood Control District, was created to increase the annual recharge of storm, imported, and recycled water and reduce long-term maintenance costs. The $10.5 million project, completed in May 2010, was co-funded by Watermaster and IEUA with matching funds from the California Department of Water Resources (DWR). The program installed monitoring wells, lysimeters, recycled water connections, remote computer control systems, and heightened and hardened berms.

Phases I and II of the Chino Basin Facilities Improvement Project increased recharge capacity from 36,000 acre-feet to 99,000 acre-feet per year.

Riser outlet tower at the Etiwanda Debris Basin.

Quality, Quantity, Production and More:

EXTENSIVE MONITORING PROVIDES DATA FOR

The Chino Groundwater Basin spreads across 220 square miles and holds about two trillion gallons of water. Watermaster carries out a number of extensive monitoring programs that make it possible to manage the Basin water supply and quality with increasing effectiveness and sustainability.

Changes to Basin Plan Expected to Result in Large Savings. Watermaster introduced Amendments to the 2010 Basin Plan that must be approved by regulators. The most important changes centered on the monitoring programs. Years ago, when Watermaster was developing the Hydraulic Control concept, a substantial monitoring program to prove whether Hydraulic Control is working was required, but can now be decreased. The 2010 amendments are expected to result in substantial cost savings in the monitoring program of up to $400,000 per year.

Obtained New Monitoring Wells. Watermaster began work on an agreement to take over three wells that would otherwise be destroyed by a local business. Watermaster proposes to accept this equipment and use it to monitor the groundwater basin.

MZ-1 Management Monitoring and Actions to Stop Subsidence. Due to the historical occurrence of pumping-induced land subsidence and ground fissuring in MZ-1, this management plan calls for numerous monitoring activities aimed at minimizing or completely avoiding future occurrences in the Chino Basin. During this year, Watermaster successfully recharged 5,000 acre-feet (AF) of imported water in the MZ-1 area.

OPTIMUM BASIN MANAGEMENT PROGRAM—MONITORING PROGRAMS

The Groundwater Level Monitoring Program is comprised of about 700 wells. The wells in the monitoring program within the southern portion of the Basin were selected to assist in Watermaster's monitoring programs for Hydraulic Control, land subsidence, and desalter impacts to private well owners. The remaining wells are monitored in support of the triennial re-computation of water quality in the Chino-North management zone. Water level data is collected quarterly with the assistance of several partner agencies. The water level data is checked by Watermaster staff and uploaded to a centralized relational database.

Measuring depth to water in a well.

IMPROVED BASIN MANAGEMENT

Extensive Groundwater Quality Monitoring Program Consists of Four Components:

1. *An annual key well water quality monitoring program* designed to target privately owned agricultural wells in the southern portion of Chino Basin that are otherwise not included in an established sampling program.
2. *Annual sampling at nine monitoring well clusters* strategically placed between the Chino Basin Desalter wellfields and the Santa Ana River. Results of the quarterly sampling are used to analyze the effect of the desalter pumping over time by comparing water quality of the native groundwater and the Santa Ana River.
3. *Monthly sampling at four near-river wells* to characterize the Santa Ana River's influence on nearby groundwater.
4. *Cooperative Basin-Wide data collection effort,* known as the Chino Basin Data Collection (CBDC) program, which relies on municipal producers and other government agencies to supply groundwater quality data on a cooperative basis, so it can be loaded into Watermaster's relational database.

Groundwater-Production Monitoring. All active wells (except for minimum user wells) are now metered. Watermaster reads the Agricultural Pool production data from the meters on a quarterly basis and enters the data into Watermaster's relational database.

Surface Water Monitoring. Watermaster measures the quantity and quality of storm and supplemental water in the recharge basins. Pressure transducers or staff gauges are used to measure water levels during recharge operations. In addition to these quantity measurements, imported water quality data for State Water Project water are obtained from the MWD and recycled water quality data for the RP-1 and RP-4 treatment plant effluents are obtained from IEUA. Water quality samples are also collected from recharge basins that are actively recharging recycled water from lysimeters installed within those recharge basins. Combining the measured flow data with the respective water qualities enables the calculation of the blended water quality in each recharge basin, the "new yield" to the Chino Basin, and the adequate dilution of recycled water.

Surface Water Monitoring in the Santa Ana River. Watermaster conducts bi-weekly flow and water quality measurements of the Santa Ana River and combines the data with discharge data from permanent USGS and Orange County Water District (OCWD) stream gauges, and discharge data from publicly owned treatment works. These data are used along with groundwater modeling to assess the extent of Hydraulic Control.

San Sevaine Recharge Basin following a winter storm.

Progress on the Peace II SEIR—The Peace II Environmental Impact Report (SEIR) was circulated for public review in May 2010. Several meetings were held to review the comments received as well as discussions on the impacts and mitigation measures. The final report is due out in September.

Changes in Judges. In September 2009, sitting Judge Wade retired. During his year on the case, Judge Wade carried out a comprehensive review of Watermaster's implementation of the OBMP and made a finding that Watermaster was fully compliant with all requirements associated with implementation.

In December 2009, Judge Reicher was assigned to the case. Reicher was the former assistant to Judge Gunn, who was Watermaster's sitting judge when the Peace I Agreement was written. Since that time, Judge Reicher has held informational hearings in order to come up to speed on the case and has successfully addressed a Paragraph 31 motion and approval of the Recharge Master Plan Update.

Cumulative Unmet Replenishment Obligation (CURO). Historically, when a pumper took more water than it had rights to, Watermaster would purchase replenishment water on its behalf and recharge it into the Basin. But, if Watermaster cannot purchase replenishment water due to unavailability, an unmet replenishment obligation is created. The sum of all these obligations becomes the Cumulative Unmet Replenishment Obligation (CURO). One challenge of the CURO is that the cost of water increases over time. So, for example, if the replenishment obligation occurs in one year, but the water to make it up is available two years later, the cost will be higher than originally assessed for, making it increasingly costly to buy water to meet the CURO. If the CURO debt grows, the concern is that the replenishment obligation debt could get too big and costly to pay off—leading to a perpetual overdraft of the Basin. Although these severe possibilities have not occurred, Watermaster began working with stakeholders on resolving the policy, water supply, and financial issues of the CURO.

WATER SUPPLY

Chino Basin Groundwater Recharge Program. IEUA, Watermaster, CBWCD, and the SBCFCD jointly sponsor the Chino Basin Groundwater Recharge Program. This is a comprehensive, ongoing water supply program to enhance water supply reliability and improve the groundwater quality in local drinking water wells throughout the Chino Basin by increasing the recharge of stormwater, imported water, and recycled water.

Custom HydroDaVE™ Software Improves Technical Collaboration. Hydrologic Database and Visual Explanations (HydroDaVE™) is a custom-developed software database that includes all of Watermaster's data and makes it readily available to Watermaster staff and any Watermaster Party. As Watermaster's partners use the software, it will be easier to share and download massive amounts of data about Basin water supply and quality. Of course, private party water quality data remains confidential.

Auction and Paragraph 31 Motion—conflict. A water auction was originally scheduled for November 2009, but was postponed until questions about how to recover the water can be resolved. Once this issue is resolved, the water will have a higher value and it is anticipated that the auction will resume. Many serious potential purchasers expressed interest in the water and a strong sale is expected once a new date is set. Also, some overlying Non-Agricultural parties challenged whether Watermaster provided adequate notice of the purchase of their storage water and sought to invalidate the sale of the water. The judge denied the motion and found on behalf of Watermaster that proper notice was provided.

Administrative Improvements. Watermaster continually looks to improve its administration and management, but this year made an unusual number of changes to make it a more efficient and effective organization.

Changes ranged from updating financial forms for water leases and purchases, to initiating cleanup of its database of members, which is critical to meet legal requirements of the Judgment. Cleaning up the database is especially challenging for the Agricultural Pool where there are hundreds of parties for whom there is no contact information or their status as water rights holders is unclear. Meeting dates were also changed so that the Watermaster Board and Advisory Committee don't meet on the same day.

Watermaster takes an active role in regional water quality issues by helping the Regional Water Quality Control Board set priorities by providing detailed monitoring data, and by reviewing plans and cleanup options.

MASSIVE BENEFITS FROM COORDINATED QUALITY AND SUPPLY MANAGEMENT

The value of the comprehensive, long-range water planning contained within the OBMP is demonstrated in regional water quality successes. The most dramatic examples include the water quality and financial benefits from the desalters. For example, the desalter wells are uniquely placed to intercept contamination plumes from Chino Airport and Ontario International Airport, providing a cost-effective additional level of treatment. By removing salts from the groundwater, and offsetting salt loads from recharged recycled water, the desalters provide $900 million in savings over 20 years compared to traditional salt management methods. In addition, there is a massive 400,000 acre-feet of new water that will be developed over time from the Basin Reoperation program. Local water suppliers that collaborate and place their wells and other facilities in locations that support the OBMP increase the overall benefits of the program and obtain access to the supply of reoperation water.

WATER QUALITY AND CLEANUP PROGRESS

Active role in the Ontario International Airport (OIA) Plume Investigation and Cleanup. Watermaster is active in the investigation of the trichloroethene (TCE) plume. Actions included: working with the potentially responsible parties (PRPs) to coordinate water quality sampling; working with stakeholders to identify the source of the plume; reviewing monthly reports; and receiving electronic data deliverables that were uploaded into HydroDaVE™. In addition, Watermaster sampled 12 private wells within and in the vicinity of the plume as part of its on-going plume-characterization work.

Developing Multi-Purpose Cleanup at Chino Airport and Identified Cost Savings. Watermaster has been working closely with the San Bernardino County Department of Airports on a number of programs aimed at facilitating the groundwater cleanup at the airport, lowering costs and benefiting all the parties. For example, Watermaster exchanged groundwater elevation and groundwater quality data for wells installed by the County, and coordinated on the possibility of locating a proposed monitoring well where it could benefit all parties and lower costs. In addition, Watermaster sampled private wells within and in the

Watermaster continues its active role in cleanups across the Basin, including at the Ontario International and Chino Airports.

WATER SUPPLY AND LOWER COSTS

vicinity of the plume. Watermaster's high-definition monitoring program also helped to establish that there is a 1,2,3-trichloropropane (TCP) plume co-mingled with the TCE plume at the Chino Airport. This is critical, because TCP will ultimately drive the mitigation costs at the Chino Airport. Watermaster continues to negotiate with the Department of Airports in order to find common ground for a joint remedy for desalting and plume mitigation.

Extensive Actions in Management Zone 3 (MZ-3). Watermaster is actively participating on a Technical Advisory Committee overseeing a collaborative project funded by the Department of Defense that seeks to determine the source of the wide-spread, low-level perchlorate in groundwater in MZ-3, and to develop a cost-effective and environmentally appropriate solution. Watermaster has provided extensive groundwater elevation and groundwater quality data to the co-principal investigators on this project.

Interagency Cooperation Saves Significant Funds. Watermaster coordinated closely with the State of California to retain 16 monitoring wells at the California Institution for Men. These wells are critical for on-going monitoring of both groundwater elevations and groundwater quality and are key to the HCMP. This inter-agency cooperation saved the State and Watermaster parties significant funds.

Maximum Benefit Objectives Will Allow Vastly Increased Recycled Water Use. Watermaster and IEUA convincingly demonstrated to regulators that groundwater quality objectives for total dissolved solids and nitrogen could be raised, allowing for vastly increased amounts of recycled water to be recharged and reused, which resulted in the maximum beneficial use of water supplies.

Peace II Agreement, Basin Reoperation and Hydraulic Control. A primary element of the Peace II Agreement is Basin Reoperation. Essentially, Basin Reoperation is the controlled overdraft of the Basin by 400,000 acre-feet via forgiveness of the Desalter replenishment obligation, resulting in a regional lowering of groundwater levels across the Chino Basin, which makes it possible for the Desalter pumping to achieve and maintain Hydraulic Control. The many benefits of Basin Reoperation and Hydraulic Control include improved basin yield by reduced groundwater outflow to (and increased groundwater inflow from) the Santa Ana River, a local and reliable supply of potable water from the Chino Desalters, improved salinity management via salt export from the Chino Desalters, and the "maximum benefit" groundwater quality objectives which allow for recycled water reuse, among others. An independent macro-economic analysis suggested that the net value of these management programs is about $900 million dollars.

Purging of the improved MWD connection CB-14.

WATERMASTER GOVERNANCE AND MEMBERSHIP – CALENDAR YEAR 2010

Watermaster Board

Agricultural Pool Representatives

MEMBER	*REPRESENTING*
Paul Hofer	Crops
Alternates: **Bob Feenstra/Jeff Pierson**	
Geoffrey Vanden Heuvel	Dairy
Alternates: **Bob Feenstra/Jeff Pierson**	

Non-Agricultural Pool Representatives

REPRESENTATIVE	*MEMBER ENTITY*
Bob Bowcock	Vulcan Materials Company
Alternate: **Kevin Sage**	(Calmat Division)

Appropriative Pool Representatives

REPRESENTATIVE	*MEMBER ENTITY*
Tom Haughey	Chino, City of
Alternate: **Earl Elrod**	
Michael Whitehead, Secretary	Fontana Water Company
Alternate: **Robert Young**	
Ken Willis, Chair	West End Consolidated Water Company
Alternates: **Tom Thomas/Anthony La**	

Municipal Water District Representatives

REPRESENTATIVE	*MEMBER ENTITY*
Michael Camacho, Vice-Chair	Inland Empire Utilities Agency
Alternate: **Terry Catlin**	
Bob Kuhn	Three Valleys Municipal Water District
Alternate: **David DeJesus**	
Charles Field	Western Municipal Water District
Alternate: **John Rossi**	

Staff

Kenneth R. Manning,
Chief Executive Officer

Sheri Rojo, CPA, (Jan.-Mar.)
CFO/Asst. General Manager

Joseph Joswiak, MBA, (April-Dec.)
Chief Financial Officer

Ben Pak,
Senior Project Engineer

Danielle Maurizio, PE,
Senior Engineer

Jim Theirl,
Water Resource Engineer

Frank Yoo,
GIS Specialist

Justin Nakano,
Environmental Specialist

Sherri Lynne Molino,
Executive Assistant

Janine Wilson,
Accountant

Alexandra Perez,
Office Specialist

Maricha Ramirez,
Office Assistant

Advisory Committee

Agricultural Pool Representatives

REGULAR MEMBERS	*REPRESENTING*
Nathan deBoom	Dairy
Glen Durrington	Crops
Robert Feenstra	Dairy
Pete Hall	State
Peter Hettinga	Dairy
Alternate: **Syp Vander Dussen**	
Gene Koopman, 2nd Vice-Chair	Dairy
Nate Mackamul	State
Jennifer Novak	State
Alternates: **Richard Alvarado/Henry Provencher**	
Jeff Pierson	Crops
Alternate: **Dan Hostetler**	
Rob Vanden Heuvel	Dairy

Non-Agricultural Pool Representatives

REPRESENTATIVE	*MEMBER ENTITY*
Steve Arbelbide/Ken Jeske	California Steel Industries (CSI)
Bob Bowcock, Vice-Chair	Vulcan Materials Company
Alternate: **Kevin Sage**	(Calmat Division)

Appropriative Pool Representatives

Patrick Bauer	Arrowhead Water Company
Dave Crosley	Chino, City of
Bill Kruger	Chino Hills, City of
Alternates: **Ron Craig/John Mura**	
Robert DeLoach, Chair	Cucamonga Valley Water District
Alternate: **Marty Zvirbulis**	
Chuck Hays	Fontana, City of
Josh Swift	Fontana Union Water Company
Robert Young	Fontana Water Company
Ben Lewis	Golden State Water Company
Eldon Horst	Jurupa Community Services District
Alternates: **Robert Tock/Tom Harder**	
Justin Brokaw	Marygold Mutual Water Company
Mark Kinsey	Monte Vista Irrigation Company
Mark Kinsey	Monte Vista Water District
—	Niagara Bottling Company
Robert Young	Nicholson Trust
Bill Thompson	Norco, City of
Mohamed El-Amamy	Ontario, City of
Alternate: **Scott Burton**	
Raul Garibay	Pomona, City of
Charles Moorrees	San Antonio Water Company
Phil Krause	San Bernardino, County of (Prado Shooting Park)
J. Arnold Rodriguez	Santa Ana River Water Company
Anthony La	Upland, City of
Anthony La	West End Consolidated Water Company
A.W. "Butch" Araiza	West Valley Water District

Municipal Water Districts

Rick Hansen	Three Valleys Municipal Water District
A.W. "Butch" Araiza	West Valley Water District
John Rossi	Western Municipal Water District

Agricultural Pool Committee

REGULAR MEMBERS	*REPRESENTING*
Nathan deBoom	Dairy
Glenn Durrington	Crops
Robert Feenstra, Chair	Dairy
Edward Gonsman	State of California-CIW
Pete Hall	State of California-CIM
Peter Hettinga	Dairy
John Huitsing	Dairy
Gene Koopman	Dairy
Nate Mackamul	State of California-CIW
Jennifer Novak	State of California-CIM
Jeff Pierson, Vice-Chair	Crops
Rob Vanden Heuvel	Dairy

ALTERNATES	*REPRESENTING*
Richard Alvarado	State of California
Dan Hostetler	Crops
Henry Provencher	State of California
Syp Vander Dussen	Dairy

Non-Agricultural Pool Committee

REPRESENTATIVE	*MEMBER ENTITY*
Mark Ward	Ameron Inc.
—	Angelica Textile Service
David Penrice	Aqua Capital Management LP
Brian Geye	Auto Club Speedway Speedway
Steve Arbelbide/Ken Jeske	California Steel Industries (CSI)
Alternate: **Dennis Poulsen**	
—	CCG Ontario, LLC (Catellus)
Lisa Hamilton	General Electric Company
—	Kaiser Ventures Inc.
Gerald Yahr	KCO LLC / The Koll Company
—	Loving Savior of the Hills
David Starnes	Mobile Community Management (Swan Lake Mobile Home Park)
Scott Burton	Ontario City Non-Ag
Alternate: **Tom O'Neill**	
Curtis Stubbings	Praxair
Alternate: **Roger Han**	
Bob Lawhn	RRI Etiwanda Inc.
Steve Riboli	San Antonio Winery
James Jenkins	San Bernardino County Department of Airports
Jorge Rosa, Jr.	Southern California Edison
Michael Thies	Space Center Mira Loma Inc.
Alternate: **Tom Cruikshank**	
Ted Leaman	Sunkist Growers Inc.
Alternate: **John Ayers**	
Bob Bowcock, Chair	Vulcan Materials Company
Alternate: **Kevin Sage,** Vice-Chair	(Calmat Division)
—	West Venture Development

Appropriative Pool Committee

REPRESENTATIVE	*MEMBER ENTITY*
Patrick Bauer	Arrowhead Mountain Spring Water*
Dave Crosley	Chino, City of
John Mura, Vice-Chair	Chino Hills, City of
Alternate: **Ron Craig**	
Robert DeLoach	Cucamonga Valley Water District
Alternate: **Marty Zvirbulis**	
Chuck Hays	Fontana, City of
Josh Swift	Fontana Union Water Company
Robert Young	Fontana Water Company
Ben Lewis	Golden State Water Company*
Eldon Horst	Jurupa Community Services District
Alternate: **Robert Tock**	
Justin Brokaw	Marygold Mutual Water Company*
Mark Kinsey	Monte Vista Irrigation Company*
Mark Kinsey, Chair	Monte Vista Water District
—	Niagara Bottling Company*
Robert Young	Nicholson Trust*
Bill Thompson	Norco, City of*
Mohamed El-Amamy	Ontario, City of
Alternate: **Scott Burton**	
Raul Garibay	Pomona, City of
Charles Moorrees	San Antonio Water Company*
Phil Krause	San Bernardino, County of (Prado Shooting Park)*
J. Arnold Rodriguez	Santa Ana River Water Company*
Anthony La	Upland, City of
Alternate: **Shaun Stone**	
Anthony La	West End Consolidated Water Company*
A.W. "Butch" Araiza	West Valley Water District*

* Minor Producer

Watermaster Represents All Key Stakeholder Groups

To draw together in a single organization all the diverse interests in the Basin, a governing structure was formed that represents all stakeholder groups, including a Board, Advisory Committee and three Producer Pools:

- Agricultural Pool to represent dairymen, farmers, and State interests.
- Non-Agricultural Pool to represent commercial and industrial producers.
- Appropriative Pool to represent cities, water districts, and water companies.

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Appendices

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COURT HEARINGS AND ORDERS
FISCAL YEAR 2009-2010

During the fiscal year 2009-10, several hearings were held relating to implementation of the Optimum Basin Management Program (OBMP). Hearings and orders were as follows:

Hearing Date	Primary Subject Matter
June 18, 2010	• Hearing – Paragraph 31 Motion of the Non-Agricultural Pool Committee • Ruling and Order – The Motion of the Non-Agricultural Pool Committee and Joinder Therein Is Denied
April 14, 2010	• Case Management Order – Regarding Paragraph 31 Motion by the Non-Agricultural Pool Committee
April 2, 2010	• Hearing – Ex-parte Application Regarding the Case Management Order for the Paragraph 31 Motion by the Non-Agricultural Pool Committee
December 11, 2009	• Hearing – Status Conference
November 30, 2009	• Notice and Order – To Attend the Status Conference on December 11, 2009
September 21, 2009	• Minute Order – By Order of Presiding Judge James C. McGuire, CHINO BASIN MUNICIPAL WATER DISTRICT V CITY OF CHINO, Et Al Is Hereby Reassigned to Judge Stanford Reichert, Judge of the Superior Court of San Bernardino County, Chino District, Department C-1, For All Purposes
September 17, 2009	• Hearing – Approval of Case Management Order That Indicates That Watermaster Is in Compliance with All of Its Current Deadlines with the Implementation of the OBMP
September 15, 2009	• Revised Order – Watermaster's Motion for Approval of the Template Storage and Recovery Agreement Is Granted
August 11, 2009	• Hearing – Status Update on Program Elements Seven, Eight, and Nine and the Motion Filed by Watermaster for Approval of the Template Auction Storage and Recovery Agreement • Order – Watermaster's Motion for Approval of the Template Storage and Recovery Agreement Is Granted

RESOLUTIONS
CALENDAR YEAR 2010

Resolution	Adopted	Summary of Resolution
10-03	June 24, 2010	*Regarding Ongoing Support for the Chino Basin Recharge Master Plan* • The updated Recharge Master Plan is based on sound technical analysis and adequately updates the 2000 Recharge Master Plan in light of Basin Re-Operation and Hydraulic Control and in light of changed economic and hydrologic conditions within the State of California. • Watermaster adopts the updated Recharge Master Plan as the guidance document for the further development of the recharge facilities for the Chino Basin. • Pursuant to the Peace II Agreement section 8.1, Watermaster and IEUA will update this plan not less than once every five years. In particular, the Plan will be updated following the completion of the parties' Urban Water Management Plans by June 30, 2011.
Revised 10-02	June 24, 2010	*Authorizing Investment of Monies in the Local Agency Investment Fund* • The Board of Directors does hereby authorize the deposit and withdrawal of Chino Basin Watermaster monies in the Local Agency Investment Fund in the State Treasury in accordance with the provisions of Section 16429.1 of the Government Code for the purpose of investment as stated therein, and verification by the State Treasurer's Office of all banking information provided in that record. • The following Chino Basin Watermaster officers and designated employees or their successors in office/position shall be authorized to order the deposit or withdrawal of monies in the Local Agency Investment Fund: Chairman of the Board, Vice-Chair, Board Secretary/Treasurer, Chief Executive Officer/Secretary, and CFO.
10-02	January 28, 2010	*Authorizing Investment of Monies in the Local Agency Investment Fund* • The Board of Directors does hereby authorize the deposit and withdrawal of Chino Basin Watermaster monies in the Local Agency Investment Fund in the State Treasury in accordance with the provisions of Section 16429.1 of the Government Code for the purpose of investment as stated therein, and verification by the State Treasurer's Office of all banking information provided in that record. • The following Chino Basin Watermaster officers and designated employees or their successors in office/position shall be authorized to order the deposit or withdrawal of monies in the Local Agency Investment Fund: Chairman of the Board, Vice-Chair, Board Secretary/Treasurer, Chief Executive Officer/Secretary, and CFO/Asst. GM.
10-01	January 28, 2010	*Establishing a Watermaster Investment Policy* • The authority to invest and reinvest funds of Watermaster is hereby delegated to the Watermaster Chief Executive Officer (and his/her designees) subject to the provisions of said Investment Policy and the ongoing review and control of Watermaster and the Watermaster Advisory Committee. • This resolution shall take effect from and after its date of adoption and Resolution 09-01 is rescinded in its entirety.

HISTORY OF INTERVENTIONS AFTER THE JUDGMENT

Production Year[1]	Appropriative	Non-Agricultural	Agricultural
09-10			Rafael Treto Guillermo Hurtado
08-09		City of Ontario Aqua Capital Management	Michael Y. Park
07-08		KCO, LLC / The Koll Company Riboli Family / San Antonio Winery	Fuji Natural Foods, Inc.
06-07			
05-06			
04-05			
03-04			
02-03	Niagara Bottling Company		
01-02	Nicholson Trust		
00-01		Loving Savior of the Hills Lutheran Church CCG Ontario, LLC (Catellus Commercial Group)	
99-00			
98-99			
97-98		Mountain Vista Power Generation Company, LLC	Louis Badders Paul Russavage
96-97		California Speedway Corporation	Ambrosia Farms, Chin T. Lee
95-96	City of Fontana	General Electric Company	Elizabeth H. Rohrs Richard Van Loon S.N.S. Dairy Wineside 45 Frank Lizzaraga
94-95			
93-94			
92-93			
91-92	Arrowhead Mountain Springs Water Co.	California Steel Industries, Inc.	
90-91			
89-90	Fontana Water Company		Gary Teed

[1] Refer to the Twenty-Seventh Annual Report (Fiscal Year 2003-04) for interventions prior to 89-90.

WATERMASTER'S "NOTICE OF INTENT" TO CHANGE THE OPERATING SAFE YIELD OF THE CHINO GROUNDWATER BASIN

PLEASE TAKE NOTICE that on this 28th day of January 2010, Chino Basin Watermaster hereby files this 'NOTICE OF INTENT' to change the operating safe yield of the Chino Groundwater Basin Pursuant to the Judgment entered in Chino Basin Municipal Water District v. City of Chino, et al., San Bernardino Superior Court, Case No. RCV 51010 (formerly Case No. 164327) (Exhibit I, Paragraph 2b, Page 80).

Approved by
CHINO BASIN WATERMASTER
ADVISORY COMMITTEE

By: /s/ Robert DeLoach
Chair

CHINO BASIN WATERMASTER
BOARD OF DIRECTORS

By: /s/ Kenneth Willis
Chair

ATTEST:

By: /s/ Michael Whitehead
Secretary

APPROPRIATIVE RIGHTS
(ORIGINAL PER JUDGMENT)

Party	Appropriative Right (Acre-Feet)	Share of Initial Operating Safe Yield (Acre-Feet)	Share of Operating Safe Yield (Percent)
City of Chino	5,271.7	3,670.067	6.693
City of Norco	289.5	201.545	0.368
City of Ontario	16,337.4	11,373.816	20.742
City of Pomona	16,110.5	11,215.852	20.454
City of Upland	4,097.2	2,852.401	5.202
Cucamonga County Water District	4,431.0	3,084.786	5.626
Jurupa Community Services District	1,104.1	768.655	1.402
Monte Vista County Water District	5,958.7	4,148.344	7.565
West San Bernardino County Water District	925.5	644.317	1.175
Etiwanda Water Company	768.0	534.668	0.975
Feldspar Gardens Mutual Water Company	68.3	47.549	0.087
Fontana Union Water Company	9,188.3	6,396.736	11.666
Marygold Mutual Water Company	941.3	655.317	1.195
Mira Loma Water Company	1,116.0	776.940	1.417
Monte Vista Irrigation Company	972.1	676.759	1.234
Mutual Water Company of Glen Avon Heights	672.2	467.974	0.853
Park Water Company	236.1	164.369	0.300
Pomona Valley Water Company	3,106.3	2,162.553	3.944
San Antonio Water Company	2,164.5	1,506.888	2.748
Santa Ana River Water Company	1,869.3	1,301.374	2.373
Southern California Water Company	1,774.5	1,235.376	2.253
West End Consolidated Water Company	1,361.3	947.714	1.728
Total	78,763.8	54,834.000	100.000

APPROPRIATIVE RIGHTS
(AS OF JUNE 30, 2010)

Party	Appropriative Right (Acre-Feet)	Share of Initial Operating Safe Yield (Acre-Feet)	Share of Operating Safe Yield (Percent)
City of Chino [A]	5,794.25	4,033.857	7.356
City of Chino Hills [B]	3,032.86	2,111.422	3.851
City of Norco	289.50	201.545	0.368
City of Ontario	16,337.40	11,373.816	20.742
City of Pomona	16,110.50	11,215.852	20.454
City of Upland	4,097.20	2,852.401	5.202
Cucamonga Valley Water District [C]	5,199.00	3,619.454	6.601
Jurupa Community Services District [D]	2,960.60	2,061.118	3.759
Monte Vista Water District [E]	6,929.15	4,823.954	8.797
West Valley Water District [F]	925.50	644.317	1.175
Fontana Union Water Company [G]	9,181.12	6,391.736	11.657
Fontana Water Company [H]	1.44	1.000	0.002
Los Serranos County Club [I]	-	-	-
Marygold Mutual Water Company	941.30	655.317	1.195
Monte Vista Irrigation Company	972.10	676.759	1.234
Niagara Bottling Company [J]	-	-	-
Nicholson Trust [K]	5.75	4.000	0.007
San Antonio Water Company	2,164.50	1,506.888	2.748
Santa Ana River Water Company	1,869.30	1,301.374	2.373
Golden State Water Company [L]	591.05	411.476	0.750
West End Consolidated Water Company	1,361.30	947.714	1.728
San Bernardino County (Shooting Park) [M]	-	-	-
Arrowhead Mountain Springs Water Company [N]	-	-	-
City of Fontana [O]	-	-	-
Total	78,763.82	54,834.000	100.000

[A] In 1990, Chino received a portion of San Bernardino County Water Works #8 (WW#8) OSY (363.790 AF) as a result of a permanent transfer.

[B] City of Chino Hills incorporated in 1991 and assumed the responsibility for providing the public services formerly provided by WW#8. WW#8 acquired a portion of the rights of Park and Pomona Valley Water Companies in 1983.

[C] CCWD acquired the rights to Etiwanda Water Company (upon dissolution) in 1986. CCWD changed its name to CVWD in 2004.

[D] JCSD acquired the rights of Mira Loma Water Company in 1979 (776.940 AF OSY), Feldspar Gardens in 1988 (47.549AF OSY) and Mutual Water Company of Glen Avon Heights in 1997 (467.974 AF OSY).

[E] MVCWD changed its name to MVWD in 1980. In 1990, MVWD received 675.610 AF of WW#8 OSY as a result of a permanent transfer.

[F] WSBCWD changed its name to WVWD in 2003.

[G] In FY 01-02, 5.000 AF OSY was reassigned: 1.000 AF to FWC and 4.000 AF to the Nicholson Trust.

[H] FWC intervened in 1989 and was assigned 1.000 AF OSY as a result of a permanent transfer of water rights from FUWC.

[I] Los Serranos intervened into the Appropriative Pool in 1990 with 0.000 AF OSY.

[J] Niagara Bottling Company intervened in FY 02-03 with 0.000 AF OSY.

[K] Nicholson Trust intervened in FY 01-02 and was assigned 4.000 AF OSY as a result of a permanent transfer of water rights from FUWC.

[L] GSWC permanently transferred 823.900 AF OSY to Park Water Company in 1980. Park Water Co was acquired by WW#8 which was subsequently acquired by the City of Chino Hills. SCWC changed its name to GSWC in 2005.

[M] San Bernardino County Prado Tiro (now known as Prado Shooting Park) was involuntarily reassigned to the Appropriative Pool from the Agricultural Pool in 1985.

[N] Arrowhead intervened in 1992 with 0.000 AF OSY.

[O] City of Fontana intervened in 1996 with 0.000 AF OSY.

NON-AGRICULTURAL RIGHTS
(ORIGINAL PER JUDGMENT)

Party	Total Overlying Non-Agricultural Rights (Acre-Feet)	Share of Safe Yield (Acre-Feet)
Ameron Steel Producers, Inc.	125	97.858
County of San Bernardino (Airport)	171	133.870
Conrock Company	406	317.844
Kaiser Steel Corporation	3,743	2,930.274
Red Star Fertilizer	20	15.657
Southern California Edison Co.	1,255	982.499
Space Center, Mira Loma	133	104.121
Southern Service Co. dba Blue Seal Linen	24	18.789
Sunkist Growers, Inc.	2,393	1,873.402
Carlsberg Mobile Home Properties, Ltd '73	593	464.240
Union Carbide Corporation	546	427.446
Quaker Chemical Co.	-	-
Total	9,409	7,366.000

NON-AGRICULTURAL RIGHTS
(AS OF JUNE 30, 2010)

Party	Total Overlying Non-Agricultural Rights (Acre-Feet)	Share of Safe Yield (Acre-Feet)
Ameron Steel Producers, Inc.	125.00	97.858
County of San Bernardino (Airport)	171.00	133.870
Vulcan Materials Company [A]	-	-
Kaiser Steel Corporation [B]	-	-
West Venture Development Co. [C]	-	-
Southern California Edison Co. [D]	35.71	27.959
RRI Energy West, Inc. [E]	1,219.29	954.540
Space Center, Mira Loma	133.00	104.121
Angelica Rental Service [F]	24.00	18.789
Sunkist Growers, Inc. [G]	-	-
Swan Lake Mobile Home Park [H]	593.00	464.240
Praxair [I]	1.28	1.000
Quaker Chemical Company [J]	-	-
California Steel Industries [K]	1,660.56	1,300.000
General Electric Company [L]	-	-
Auto Club Speedway [M]	1,277.36	1,000.000
Loving Savior of the Hills Lutheran Church [N]	-	-
CCG Ontario LLC [O]	-	-
KCO, LLC/The Koll Company [P]	-	-
San Antonio Winery [Q]	-	-
Ontario City Non-Ag [R]	2,937.72	2,299.848
Aqua Capital Management [S]	1,211.08	948.118
Total	9,389.00	7,350.343

[A] Conrock became Calmat and in FY 99-00 became Vulcan Materials Co. On July 23, 2009, Vulcan permanently transferred its 317.844 AF SY to Aqua Capital Management.

[B] Kaiser Steel Corporation became Kaiser Resources and then Kaiser Venture, Inc. Kaiser sold portions of its property to CSI & Speedway, then its last property holdings and all its remaining water rights to CCG Ontario LLP on August 16, 2000.

[C] Red Star Fertilizer became Anaheim Citrus then was acquired by West Venture Development. West Venture went out of business in 91-92 and abandoned its rights to production in FY 90-91.

[D] A portion of SCE was sold in FY 98-99; SCE retained 27.959 AF SY.

[E] Mountain Vista Power Generating Company (MVPG) purchased the Etiwanda Generating Facility owned by SCE in FY 98-99. MVPG became Reliant Energy, Etiwanda with 954.540 AF SY. Reliant Energy, Etiwanda changed its name to RRI Energy West, Inc. in FY 08-09.

[F] Southern Service Company became Angelica Rental Service in FY 90-91.

[G] On May 22, 2008, Sunkist permanently transferred 22.000 AF SY to Koll. On October 23, 2008 Sunkist permanently transferred 1,873.402 AF SY to Ontario City Non-Ag.

[H] Carlsberg Mobile Home Properties became Mobile Community Management and is known as Swan Lake Mobile Home Park.

[I] Union Carbide Corp. became Praxair, Inc. On May 27, 2010, Praxair permanently transferred 426.446 AF SY to Ontario City Non-Ag.

[J] Quaker Chemical Company went out of business in FY 93-94.

[K] California Steel Industries (CSI) intervened in FY 91-92 after purchasing land from Kaiser.

[L] General Electric Company intervened in FY 95-96 with 0.000 AF SY.

[M] California Speedway intervened in FY 96-97 after purchasing land from Kaiser. On August 16, 2000, Catellus permanently transferred 525.000 AF SY to Speedway. California Speedway changed its name to Auto Club Speedway in FY 07-08.

[N] Loving Savior of the Hills Lutheran Church intervened in FY 00-01 with 0.000 AF SY.

[O] CCG Ontario LLC intervened in FY 00-01. Kaiser sold its last property holdings and all its remaining water rights to CCG Ontario LLP on August 16, 2000. On December 18, 2009, CCG Ontario permanently transferred its 630.274 AF SY to Aqua Capital Management.

[P] KCO/Koll intervened in FY 07-08 after purchasing land from Sunkist. On May 22, 2008, Sunkist permanently transferred 22.000 AF SY to Koll. On May 28, 2009, the 22.000 AF SY was permanently transferred to Ontario City Non-Ag.

[Q] San Antonio Winery intervened in FY 07-08 with 0.000 AF SY.

[R] Ontario City Non-Ag intervened in FY 08-09 after purchasing land from Sunkist. On October 23, 2008, Sunkist permanently transferred 1,873.402 AF SY to Ontario City Non-Ag. On May 28, 2009, Koll's 22.000 AF SY was permanently transferred to Ontario City Non-Ag. On May 27, 2010, Praxair permanently transferred 426.446 AF SY to Ontario City Non-Ag.

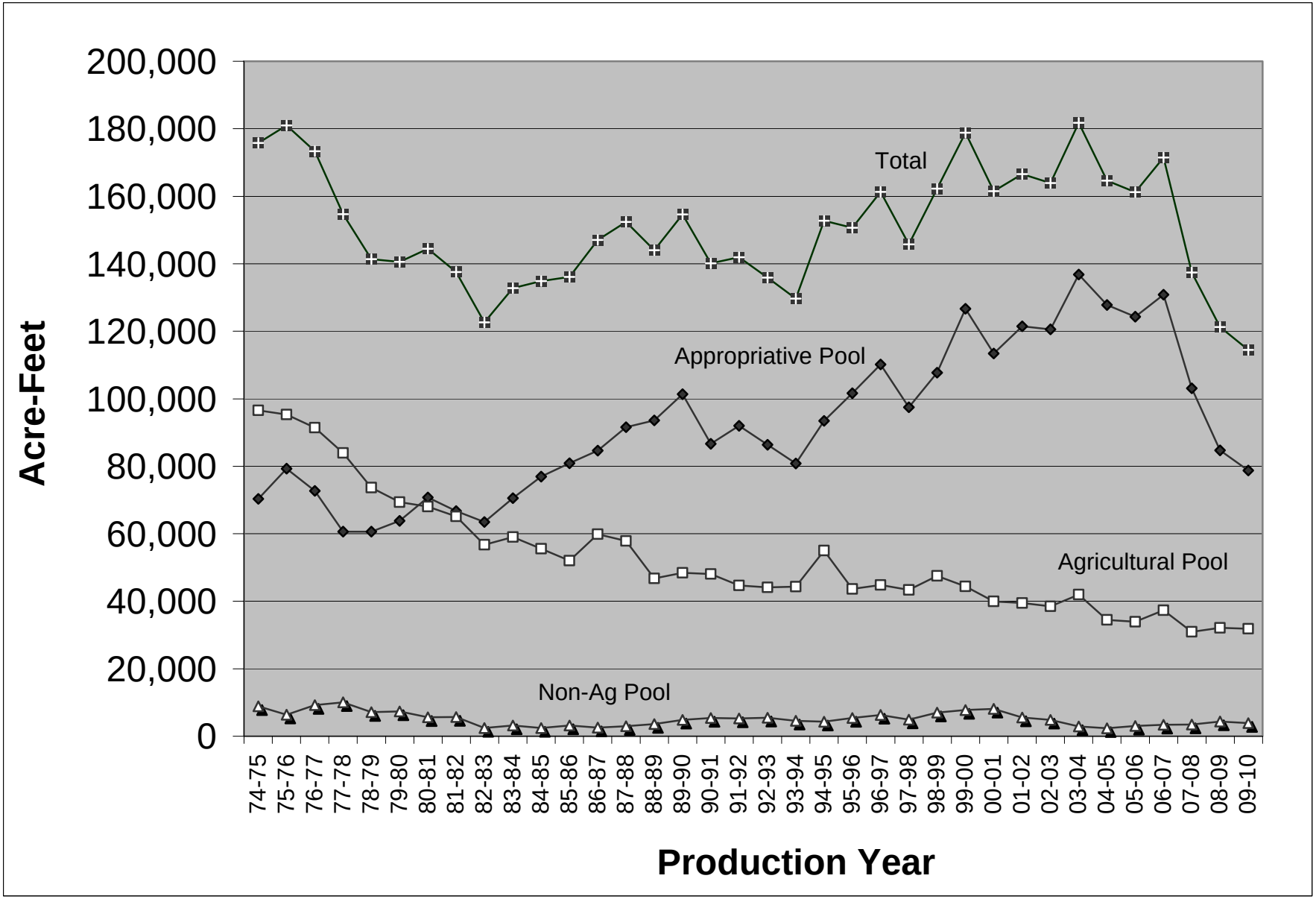
[S] Aqua Capital Management intervened in FY 08-09 after purchasing land from CCG Ontario. On December 18, 2008, CCG Ontario permanently transferred 630.274 AF SY to Aqua Capital Management. On July 23, 2009, Vulcan permanently transferred 317.844 AF SY to Aqua Capital Management.

HISTORY OF TOTAL ANNUAL GROUNDWATER PRODUCTION BY POOL (ACRE-FEET)

Production Year	Appropriative	Agricultural	Non-Agricultural	Total
74-75	70,312	96,567	8,878	175,757
75-76	79,312	95,349	6,356	181,017
76-77	72,707	91,450	9,198	173,355
77-78	60,659	83,934	10,082 [1]	154,675
78-79	60,597	73,688	7,127	141,412
79-80	63,834	69,369	7,363	140,566
80-81	70,726	68,040	5,650	144,416
81-82	66,731	65,117	5,684	137,532
82-83	63,481	56,759	2,395	122,635
83-84	70,558	59,033	3,208	132,799
84-85	76,912	55,543	2,415	134,870
85-86	80,859	52,061	3,193	136,113
86-87	84,662	59,847	2,559	147,068
87-88	91,579 [2]	57,865	2,958	152,402
88-89	93,617 [3]	46,762	3,619	143,998
89-90	101,344 [4]	48,420	4,856	154,620
90-91	86,658 [5]	48,085	5,407	140,150
91-92	91,982 [6]	44,682	5,240	141,904
92-93	86,367 [7]	44,092	5,464	135,923
93-94	80,798 [8]	44,298	4,586	129,682
94-95	93,419 [9]	55,022	4,327	152,768
95-96	101,606 [10, 11]	43,639	5,424	150,669
96-97	110,163 [11]	44,809	6,309	161,281
97-98	97,435 [12]	43,345	4,955 [13]	145,735
98-99	107,723	47,538	7,006	162,267
99-00	126,645	44,401	7,774	178,820
00-01	113,437 [11,14]	39,954	8,084	161,475
01-02	121,489 [11,15]	39,494	5,548	166,531
02-03	120,557 [11,16]	38,487 [11]	4,853	163,897
03-04	136,834 [17]	41,978	2,915	181,727
04-05	127,811 [18]	34,450	2,327	164,588
05-06	124,315 [19]	33,900	3,026	161,241
06-07	130,826 [20]	37,295	3,369	171,491
07-08	103,078 [21]	30,910	3,440	137,427
08-09	84,716 [22]	32,143	4,394	121,253
09-10	78,733 [23]	31,855	3,908	114,496

[1] Includes 3,945 AF of mined water pumped by Edison as agent for IEUA.
[2] Does not include 7,674.3 AF exchanged with MWDSC.
[3] Does not include 6,423.6 AF exchanged with MWDSC.
[4] Does not include 16,377.1 AF exchanged with MWDSC.
[5] Does not include 14,929.1 AF exchanged with MWDSC.
[6] Does not include 12,202.4 AF exchanged with MWDSC.
[7] Does not include 13,657.3 AF exchanged with MWDSC.
[8] Does not include 20,194.7 AF exchanged with MWDSC.
[9] Does not include 4,221.9 AF exchanged with MWDSC.
[10] Does not include 6,167.2 AF exchanged with MWDSC.
[11] Reflects corrected production after reporting errors were accounted for.
[12] Does not include 4,275.4 AF exchanged with MWDSC.
[13] Does not include 216.5 AF exchanged with MWDSC.
[14] Does not include 7,989 AF Desalter production or 99.8 AF Dept. of Toxic Substances Control (DTSC) production.
[15] Does not include 9,458 AF Desalter production or 80.8 AF Dept. of Toxic Substances Control (DTSC) production.
[16] Does not include 10,439 AF Desalter production or 79.1 AF Dept. of Toxic Substances Control (DTSC) production.
[17] Does not include 10,605 AF Desalter production or 79.1 AF Dept. of Toxic Substances Control (DTSC) production.
[18] Does not include 9,854 AF Desalter production or 80.7 AF Dept. of Toxic Substances Control (DTSC) production.
[19] Does not include 16,476 AF Desalter production or 79.5 AF Dept. of Toxic Substances Control (DTSC) production.
[20] Does not include 26,356 AF Desalter production or 79.3 AF Dept. of Toxic Substances Control (DTSC) production.
[21] Does not include 26,972 AF Desalter production or 81.1 AF Dept. of Toxic Substances Control (DTSC) production.
[22] Does not include 32,920 AF Desalter production or 82.6 AF Dept. of Toxic Substances Control (DTSC) production.
[23] Does not include 28,517 AF Desalter production or 85.1 AF Dept. of Toxic Substances Control (DTSC) production.

HISTORY OF TOTAL ANNUAL GROUNDWATER PRODUCTION BY POOL



HISTORY OF REALLOCATION OF UNPRODUCED AGRICULTURAL POOL SAFE YIELD[1] (ACRE-FEET)

Production Year	Land Use Conversions	Remaining 50% Allocated	Balance Available	Total Ag Pool Reallocated to Appropriators
83-84	297	297	25,762	26,355 [2]
84-85	297	297	18,543	19,136
85-86	406	406	21,091	21,902
86-87	406	406	36,348	37,159
87-88	2,028	2,028	74,433	78,489 [3]
88-89	406	406	24,124	24,935
89-90	406	406	35,227	36,038
90-91	406	406	33,569	34,380
91-92	406	406	33,904	34,715
92-93	406	406	37,307	38,118
93-94	406	406	37,897	38,708
94-95	3,246	406	34,850	38,502
95-96	5,855	5,855	16,067	27,778
96-97	6,310	6,310	26,541	39,161
97-98	7,213	7,213	23,565	37,991
98-99	8,511	8,511	22,433	39,455
99-00	10,471	N/A	63,191	73,662 [4]
00-01	13,920	N/A	28,926	42,846
01-02	14,133	N/A	29,173	43,306
02-03	16,480	N/A	27,833	44,313
03-04	17,510 [5]	N/A	23,312	40,822
04-05	19,013	N/A	29,336	48,350
05-06	20,370	N/A	28,530	48,900
06-07	22,158	N/A	23,346	45,505
07-08	22,461	N/A	23,346	45,505
08-09	22,730	N/A	27,927	50,657
09-10	22,943	N/A	28,002	50,945

[1] Source: Watermaster Annual Reports and Assessment Packages.

[2] First-year reallocation occurred under the Judgment.

[3] Appropriators agree to pay Ag Pool assessments. Reallocation procedure changed by agreement.

[4] Peace Agreement signed. Appropriators agree to pay Ag Pool assessments for life of Peace Agreement. Procedure changed by agreement. Ag Pool Annual Safe Yield is 82,800 AF.

[5] After duplication of conversion areas were identified, Jurupa's Pre-Peace Agreement acres were adjusted (337.6 acres), and Post-Peace Agreement acres were adjusted (846.4 acres).

TOTAL WATER CONSUMPTION WITHIN THE CHINO BASIN[1]
(ACRE-FEET)

Production Year	Chino Basin Extractions[2]	Other Imported Supplies[3]	Total
74-75	175,757	49,383	225,140
75-76	181,017	57,686	238,703
76-77	173,355	55,765	229,120
77-78	154,675	61,567	216,242
78-79	142,412 [4]	75,864	218,276
79-80	140,566	70,727	211,293
80-81	144,416	77,765	222,181
81-82	137,532	67,491	205,023
82-83	122,635	76,000	198,635
83-84	132,799	99,257	232,056
84-85	134,870	92,952	227,822
85-86	136,113	114,624	250,737
86-87	147,068	126,493	273,561
87-88	152,402	116,175	268,577
88-89	143,998	128,167	272,165
89-90	154,620	139,004	293,624
90-91	140,151	116,493	256,644
91-92	141,904	104,480	246,384
92-93	135,923	117,205	253,128
93-94	129,682	136,038	265,720
94-95	152,768	116,797	269,565
95-96	150,669 [4]	130,494	281,163
96-97	161,281 [4]	115,031	276,312
97-98	145,735	106,360	252,095
98-99	162,267	113,040	275,307
99-00	178,820	129,208	308,028
00-01	161,475 [4]	128,596	290,071
01-02	165,898	140,907	306,805
02-03	163,897	134,154 [4]	298,051
03-04	181,727	143,989	325,716
04-05	164,588	145,644	310,232
05-06	161,241	171,896	333,137
06-07	171,491	176,807 [4]	348,297
07-08	137,427	162,465	299,893
08-09	121,253	131,819 [4]	253,072
09-10	114,496	144,354	258,849

[1] Total includes water used over Cucamonga Basin.

[2] See Appendix G-1, "History of Total Annual Groundwater Production by Pool."

[3] Total does not include cyclic deliveries, water delivered by exchange, or water from direct spreading that was used for replenishment.

[4] Reflects corrected value.

SUMMARY OF SUPPLEMENTAL SUPPLIES
FISCAL YEAR 2009-2010
(ACRE-FEET)

Member Agency	Other Basins	Surface Diversions	SBVMWD & MWDSC Imported Deliveries	Recycled Water	Total
Chino, City of	-	-	-	7,839.3	7,839.3
Chino Hills, City of	-	-	-	2,104.8	2,104.8
Cucamonga Valley Water District [1]	5,851.3	4,156.0	-	2,219.9	12,227.2
Inland Empire Utilities Agency [2]	-	-	-	818.0	818.0
Fontana Water Company [3]	19,155.7	8,953.9	1,012.1	-	29,121.7
Jurupa Community Services District [4]	678.8	-	-	589.4	1,268.2
Marygold Mutual Water Company [5]	868.3	-	-	-	868.3
MWDSC [6]	-	-	37,981.8	-	37,981.8
Monte Vista Water District	-	-	-	531.4	531.4
Ontario, City of	-	-	-	8,472.6	8,472.6
Pomona, City of [7]	4,636.9	2,573.3	1,227.0	-	8,437.2
San Antonio Water Company [8]	4,112.1	2,250.8	-	-	6,363.0
San Bernardino, County of	-	-	-	1,250.7	1,250.7
State of California, CIM [9]	-	-	-	874.6	874.6
Upland, City of [10]	10,025.0	2,865.0	-	679.9	13,569.9
West End Consolidated Water Company [11]	3,461.0	-	-	-	3,461.0
West Valley Water District [12]	9,164.0	-	-	-	9,164.0
Total	57,953.2	20,799.0	40,220.9	25,380.4	144,353.6

[1] Includes groundwater produced from Cucamonga Basin and surface water from Lloyd Michaels, Royer-Nesbit, and Arthur H. Bridge WTPs, and Deer Canyon.

[2] IEUA provided 24,505.8 AF of recycled water as follows: 7,157.2 AF to the City of Chino, 1,494.0 AF to the City of Chino Hills, 659.5 AF to Cucamonga Valley Water District, 818.0 AF to IEUA, 241.3 AF to Monte Vista Water District, 5,677.9 AF to Ontario, 1,250.7AF to San Bernardino County, and 0.0 AF to the City of Upland. Additionally, recycled water groundwater recharge in the amount of 7,208.0 AF is shown as allocated within each service area.

[3] Imported groundwater produced from Colton/Rialto, Lytle, and "unnamed" Basins. Surface water deliveries are from Lytle Creek. Imported deliveries are via both IEUA/MWD and SVBMWD.

[4] Imported groundwater produced from Rubidoux Basin. Recycled water is purchased through IEUA.

[5] Imported groundwater produced from wells located in the Rialto Basin.

[6] MWDSC and SBVMWD deliveries (See Appendix K, "Summary of MWDSC Deliveries," for individual agencies breakdown).

[7] Includes 4,192.2 AF of groundwater from Six Basins and 444.7 AF of groundwater from Spadra Basin. Imported water was delivered through TVMWD.

[8] An amount of 2,250.8 AF was treated local canyon flow used in the overlying Chino Basin. The imported groundwater was 638.5 AF from San Antonio Tunnel, 3,219.6 AF from Cucamonga Basin, and 254.0 AF from Six Basins.

[9] Recycled wastewater that was applied to fields, including water held in storage ponds.

[10] Imported groundwater produced from Cucamonga and Six Basins. Surface water deliveries are from the San Antonio Water Company and treated at the San Antonio Canyon WTP.

[11] Imported groundwater produced from Cucamonga and Six Basins.

[12] Listed amount was delivered to "meter book" service area.

SUMMARY OF MWDSC DELIVERIES[1]
FISCAL YEAR 2009-2010
(ACRE-FEET)

Month	Water Facilities Authority - CB-12					
	Upland	MVWD	Ontario	Chino	Chino Hills[2]	Total
July	370	18	416	420	645	1,869
August	620	128	575	394	469	2,186
September	706	217	611	394	486	2,414
October	347	39	632	240	235	1,493
November	195	-	584	124	208	1,111
December	-	-	565	127	222	914
January	-	5	590	116	420	1,131
February	-	-	255	65	32	352
March	210	41	143	147	147	688
April	232	-	65	111	214	622
May	64	-	68	253	386	771
June	16	-	379	366	553	1,314
Total	2,760	448	4,883	2,757	4,017	14,865

Month	Reliant	Fontana Water Co.	Cucamonga Valley Water District			Pomona	Total
	CB-01	CB-19	CB-07	CB-16	Sub-Total		
July	-	208	55	2,673	2,728	235	5,040
August	-	174	149	2,459	2,608	193	5,161
September	-	196	174	2,286	2,460	164	5,234
October	-	211	127	1,978	2,105	116	3,925
November	-	184	108	2,168	2,276	113	3,684
December	-	7	-	1,654	1,654	50	2,625
January	-	-	22	1,596	1,618	5	2,754
February	-	-	-	321	321	15	688
March	-	-	-	1,466	1,466	34	2,188
April	-	-	-	1,333	1,333	58	2,013
May	-	-	-	1,468	1,468	96	2,335
June	-	-	-	2,102	2,102	148	3,564
Total	-	980	634	21,503	22,137	1,227	39,209

[1] Does not include Dry Year Yield activity ("puts" or "takes").

[2] Total includes water delivered directly from WFA and from WFA through MVWD by agreement.

SUMMARY OF CONJUNCTIVE USE, REPLENISHMENT, AND CYCLIC ACTIVITIES
FISCAL YEAR 2009-2010
(ACRE-FEET)

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Conjunctive Use, All Parties - Storage													
Direct													
Monte Vista Water District	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-
In-Lieu													
Chino Basin Watermaster	-	-	-	-	-	-	-	-	-	-	-	-	-
Chino, City of [1]	(1,042.9)	(1.0)	-	-	-	-	-	-	-	-	(289.0)	(298.0)	(1,630.9)
Chino Hills, City of	-	-	-	-	-	-	-	-	-	-	-	-	-
Cucamonga Valley Water District	(2,656.1)	(2,657.0)	(1,032.0)	-	-	-	-	-	-	-	(2,449.2)	(2,465.9)	(11,260.2)
Jurupa Community Services District	(270.0)	(250.0)	(340.0)	(360.0)	(289.9)	-	-	-	-	-	(100.0)	(200.0)	(1,809.9)
Monte Vista Water District	(1,825.8)	(1,073.0)	-	-	-	-	-	-	-	-	(510.0)	(510.0)	(3,918.8)
Ontario, City of	(1,752.0)	-	-	-	-	-	-	-	-	-	-	(478.8)	(2,230.8)
Pomona, City of [2]	(1,000.0)	-	-	-	-	-	-	-	-	-	(1,000.0)	(42.5)	(2,042.5)
Upland, City of	(366.2)	(497.8)	(435.9)	(293.1)	(272.7)	(187.6)	-	-	-	-	(189.7)	(124.5)	(2,367.5)
	(8,913.0)	(4,478.8)	(1,807.9)	(653.1)	(562.6)	(187.6)	-	-	-	-	(4,537.9)	(4,119.7)	(25,260.6)
Total Storage / (Withdrawals)	(8,913.0)	(4,478.8)	(1,807.9)	(653.1)	(562.6)	(187.6)	-	-	-	-	(4,537.9)	(4,119.7)	(25,260.6)
Replenishment Deliveries to Watermaster				Obligation = 11,426.202 AF + 9,527.581 AF (CURO) = 20,953.783 AF									
Direct													
CB-11 (Deer Creek)	-	-	-	-	-	-	-	-	-	-	-	-	-
CB-13 (San Sevaine)	-	-	-	-	-	-	-	-	-	-	-	-	-
CB-14 (Etiwanda)	-	-	-	17.1	-	-	-	-	-	-	-	-	17.1
CB-15 (Day Creek)	-	-	-	-	-	-	-	2.7	-	-	-	-	2.7
CB-18 (Etiwanda Inter-tie)	-	-	-	-	-	-	-	-	-	-	-	-	-
CB-20 (West Cucamonga)	-	-	-	-	2.9	-	-	4.0	-	-	-	-	6.9
OC-59 (San Antonio)	-	-	-	-	-	-	-	-	-	365.8	2,433.1	2,175.5	4,974.4
	-	-	-	17.1	2.9	-	-	6.7	-	365.8	2,433.1	2,175.5	5,001.1
In-Lieu													
Service Connections													
CB-12	-	-	-	-	-	-	-	-	-	-	-	-	-
CB-16	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-
Purchased from Appropriators	-	-	-	-	-	-	-	-		-	11,085.0	500.0	11,585.0
Purchased from Cyclic Account	-	-	-	-	-	-	-	-	-	-	-	-	-
Pre-Purchased Previous Year(s)	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Replenishment	-	-	-	17.1	2.9	-	-	6.7	-	365.8	13,518.1	2,675.5	16,586.1

[1] City of Chino's May 2009's 0.0 AF certification and June 2009's 0.0 AF certification were recertified to be 353.1 AF and 315.9 AF during the 2009-10 production year (July 2009 is 373.9 AF).

[2] City of Pomona's May 2009's 0.0 AF certification and June 2009's 1,000.000 AF certification were recertified to be 1,100.000 AF and 900.000 AF during the 2009-10 production year (July is 0.000 AF).

SUMMARY OF STORMWATER RECHARGE
FISCAL YEAR 2009-2010
(ACRE-FEET)

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
San Antonio Channel / CB-59													
College Heights (MZ-1)	-	-	-	-	-	-	58.0	7.0	-	-	-	-	65.0
Upland (MZ-1)	-	-	-	12.0	-	102.0	212.0	168.0	13.0	25.0	-	-	532.0
Montclair 1, 2, 3, 4 (MZ-1)	-	-	-	19.0	7.0	119.0	368.0	279.0	30.0	36.0	-	-	858.0
Brooks (MZ-1)	1.0	-	-	13.0	4.0	129.0	251.0	215.0	27.0	23.0	2.0	1.0	666.0
West Cucamonga Channel / CB-20													
8th Street (MZ-1)	19.0	33.0	18.0	74.0	90.0	249.0	294.0	366.0	36.0	108.0	30.0	33.0	1,350.0
7th Street (MZ-1)	-	-	-	-	-	54.0	93.0	108.0	37.0	98.0	4.0	-	394.0
Ely 1, 2 & 3 (MZ-2)	-	7.0	17.0	131.0	78.0	215.0	319.0	221.0	45.0	109.0	22.0	-	1,164.0
Riverside Drive Drain													
Grove (MZ-2)	-	-	-	8.0	25.0	127.0	57.0	71.0	20.0	43.0	-	-	351.0
Cucamonga/Deer Creek Ch / CB-11	-	-	-	-	-	-	-	-	-	-	-	-	-
Turner 1 & 2 (MZ-2)	32	19	28	80	49	401	294	329	31	158	38	0	1,459.0
Turner 3 & 4 (MZ-2)	0	0	0	0	3	98	185	175	114	83	27	21	706.0
Day Creek Channel / CB-15	-	-	-	-	-	-	-	-	-	-	-	-	
Lower Day (MZ-2)	2	3	0	8	11	117	237	146	5	10	1	0	540.0
Etiwanda Channel / CB-14	-	-	-	-	-	-	-	-	-	-	-	-	
Etiwanda Debris Basin (MZ-2)	0	0	0	0	17	38	387	278	27	28	0	0	775.0
Victoria (MZ-2)	1	0	0	37	19	89	153	174	0	20	0	1	494.0
San Sevaine Channel / CB-13	-	-	-	-	-	-	-	-	-	-	-	-	
San Sevaine 1, 2, 3 & 4 (MZ-2)	0	0	0	20	21	109	185	197	15	47	0	0	594.0
San Sevaine 5 (MZ-2)	0	0	0	36	0	225	105	26	1	6	0	0	399.0
West Fontana Channel / CB-18	-	-	-	-	-	-	-	-	-	-	-	-	
Hickory (MZ-2)	9	4	3	24	26	158	214	200	16	46	0	0	700.0
Banana (MZ-3)	0	0	0	15	0	75	100	143	17	66	0	0	416.0
DeClez Channel	-	-	-	-	-	-	-	-	-	-	-	-	
RP3 Cells 1, 3 & 4 (MZ-3)	20	27	27	91	69	311	438	345	84	112	37	25	1,586.0
RP3 Cell 2 (MZ-3)	2	3	9	31	31	62	88	25	20	16	12	17	316.0
DeClez (MZ-3)	21	17	6	15	39	173	73	241	55	122	6	6	774.0
Totals	107.0	113.0	108.0	614.0	489.0	2,851.0	4,111.0	3,714.0	593.0	1,156.0	179.0	104.0	14,139.0

APPROPRIATIVE POOL ASSESSMENT FEE SUMMARY
PRODUCTION YEAR 2009-2010

Assessment Year 2010-2011 (Production Year 2009-2010)

Pool 3 Assessment Fee Summary

		Appropriative Pool		Ag Pool SY Reallocation			Replen
					$235,794.00	$1,338,112.00	
	AF Production	$7.40 AF/Admin	$42.01 AF/OBMP	*AF Total Reallocation*	$4.63 AF/Admin	$26.27 AF/OBMP	AF/15%
Arrowhead Mtn Spring Water Co	*373.665*	2,765.12	15,697.67	*0.000*	0.00	0.00	0.00
Chino Hills, City Of	*973.554*	7,204.30	40,899.00	*2,056.775*	9,519.54	54,022.63	3,289.09
Chino, City Of	*(424.265)*	(3,139.56)	(17,823.37)	*8,113.788*	37,553.71	213,114.29	(1,433.35)
Cucamonga Valley Water District	*8,002.959*	59,221.90	336,204.35	*2,525.639*	11,689.62	66,337.67	27,037.45
Desalter Authority	*28,516.731*	0.00	0.00	*0.000*	0.00	0.00	0.00
Fontana Union Water Company	*0.000*	0.00	0.00	*3,494.409*	16,173.46	91,783.08	0.00
Fontana Water Company	*13,557.470*	100,325.28	569,549.31	*762.817*	3,530.61	20,035.92	45,802.99
Fontana, City Of	*0.000*	0.00	0.00	*0.000*	0.00	0.00	0.00
Golden State Water Company	*359.382*	2,659.43	15,097.64	*224.827*	1,040.59	5,905.24	1,214.15
Jurupa Community Services District	*13,728.325*	101,589.61	576,726.93	*12,622.316*	58,420.90	331,533.91	46,380.21
Marygold Mutual Water Company	*346.141*	2,561.44	14,541.38	*358.224*	1,658.00	9,409.00	0.00
Monte Vista Irrigation Company	*0.000*	0.00	0.00	*369.915*	1,712.11	9,716.07	0.00
Monte Vista Water District	*11,653.266*	86,234.17	489,553.70	*2,687.404*	12,438.33	70,586.54	39,369.76
Niagara Water Company	*1,298.352*	9,607.80	54,543.77	*0.000*	0.00	0.00	0.00
Nicholson Trust	*0.000*	0.00	0.00	*2.098*	9.71	55.11	0.00
Norco, City Of	*0.000*	0.00	0.00	*110.315*	510.58	2,897.50	0.00
Ontario, City Of	*17,478.191*	129,338.61	734,258.80	*7,520.482*	34,807.66	197,530.69	59,048.88
Pomona, City Of	*9,361.359*	69,274.06	393,270.69	*6,131.477*	28,378.82	161,047.51	0.00
San Antonio Water Company	*966.222*	7,150.04	40,590.99	*823.766*	3,812.70	21,636.79	3,264.32
San Bernardino County Shtg Prk	*16.494*	122.06	692.91	*0.000*	0.00	0.00	55.72
Santa Ana River Water Company	*0.000*	0.00	0.00	*711.352*	3,292.41	18,684.16	0.00
Upland, City Of	*1,042.123*	7,711.72	43,779.63	*1,559.399*	7,217.49	40,958.70	3,520.74
West End Consolidated Water Com	*0.000*	0.00	0.00	*518.001*	2,397.51	13,605.66	0.00
West Valley Water District	*0.000*	0.00	0.00	*352.229*	1,630.25	9,251.54	0.00
	107,249.969	**582,625.98**	**3,307,583.41**	***50,945.233***	**235,794.00**	**1,338,112.00**	**227,549.96**
	1A	1B	1C	1D	1E	1F	1G

1: The "Pomona Credit" column was removed as it is no longer needed. Recharge Debt Payment is for the Phase I CBFIP Bond.

ishment Assessments		85/15 Water Transaction Activity				ASSESSMENTS DUE		
$459.85 AF/85%	$541.00 AF/100%	15% Producer Credits	15% Pro-rated Debits	CURO Adjustment	Other Adjustments	Total Production Based	Recharge Debt Payment	Total Due
0.00	202,152.77	0.00	0.00	71,469.02	0.00	292,084.57	0.00	292,084.57
0.00	0.00	0.00	11,214.62	1,871.54	0.00	128,020.72	26,994.12	155,014.84
0.00	0.00	0.00	(4,887.22)	(815.60)	0.00	222,568.90	51,569.92	274,138.82
0.00	0.00	0.00	92,188.16	15,384.72	0.00	608,063.88	46,270.63	654,334.51
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	107,956.54	81,711.37	189,667.92
1,281,864.52	0.00	(600,364.92)	156,172.00	586,125.94	0.00	2,163,041.64	14.02	2,163,055.66
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	4,139.81	690.87	0.00	30,747.72	5,257.23	36,004.95
0.00	0.00	0.00	158,140.12	196,653.58	0.00	1,469,445.26	26,349.24	1,495,794.50
0.00	0.00	0.00	0.00	0.00	0.00	28,169.83	8,376.52	36,546.35
0.00	0.00	(117,000.00)	0.00	0.00	0.00	(105,571.82)	8,649.90	(96,921.92)
0.00	0.00	0.00	134,236.98	22,401.99	0.00	854,821.48	61,663.80	916,485.28
0.00	702,408.43	0.00	0.00	238,232.61	0.00	1,004,792.61	0.00	1,004,792.61
0.00	0.00	0.00	0.00	0.00	0.00	64.82	49.07	113.88
0.00	0.00	0.00	0.00	0.00	0.00	3,408.08	2,579.55	5,987.63
0.00	0.00	0.00	201,335.79	33,599.71	0.00	1,389,920.15	145,393.95	1,535,314.10
0.00	0.00	0.00	0.00	0.00	0.00	651,971.08	143,375.18	795,346.25
0.00	0.00	0.00	11,130.16	1,857.44	0.00	89,442.44	19,262.49	108,704.93
7,584.77	0.00	0.00	190.00	3,422.31	0.00	12,067.77	0.00	12,067.77
0.00	0.00	0.00	0.00	0.00	0.00	21,976.56	16,633.88	38,610.44
0.00	0.00	(58,500.00)	12,004.50	2,003.36	0.00	58,696.14	36,464.15	95,160.29
0.46	0.00	0.00	0.00	0.00	0.00	16,003.62	12,112.66	28,116.28
0.00	0.00	0.00	0.00	0.00	0.00	10,881.79	8,236.33	19,118.12
1,289,449.75	**904,561.20**	**(775,864.92)**	**775,864.92**	**1,172,897.48**	**0.00**	**9,058,573.77**	**700,964.00**	**9,759,537.77**
1H	1I	1J	1K	1L	1M	1N	1O	1P

APPROPRIATIVE POOL WATER PRODUCTION SUMMARY
PRODUCTION YEAR 2009-2010

Assessment Year 2010-2011 (Production Year 2009-2010)

Pool 3 Water Production Summary

	Percent of Operating Safe Yield	Assigned Share of Operating Safe Yield	Carryover Beginning Balance	Prior Year Adjust-ments	2% Storage Loss	Net Ag Pool Reallocation	Water Transaction Activity
Arrowhead Mtn Spring Water Co	*0.000%*	0.000	0.000	0.000	0.000	0.000	0.000
Chino Hills, City Of	*3.851%*	2,111.422	2,111.422	0.000	(42.228)	2,056.775	0.000
Chino, City Of	*7.357%*	4,033.857	4,033.857	0.000	(80.677)	8,113.788	(5,085.000)
Cucamonga Valley Water District	*6.601%*	3,619.454	3,619.454	0.000	(72.389)	2,525.639	9,886.145
Desalter Authority	*0.000%*	0.000	0.000	0.000	0.000	0.000	0.000
Fontana Union Water Company	*11.657%*	6,391.736	0.000	0.000	0.000	3,494.409	(9,886.145)
Fontana Water Company	*0.002%*	1.000	0.000	0.000	0.000	762.817	10,006.082
Fontana, City Of	*0.000%*	0.000	0.000	0.000	0.000	0.000	0.000
Golden State Water Company	*0.750%*	411.476	237.956	0.000	(4.759)	224.827	0.000
Jurupa Community Services District	*3.759%*	2,061.118	0.000	0.000	0.000	12,622.316	1,200.000
Marygold Mutual Water Company	*1.195%*	655.317	655.317	0.000	(13.106)	358.224	16.000
Monte Vista Irrigation Company	*1.234%*	676.759	676.759	0.000	(13.535)	369.915	(1,709.898)
Monte Vista Water District	*8.797%*	4,823.954	2,358.606	0.000	(47.172)	2,687.404	3,237.111
Niagara Water Company	*0.000%*	0.000	0.000	0.000	0.000	0.000	0.000
Nicholson Trust	*0.007%*	4.000	1.082	0.000	(0.021)	2.098	(6.082)
Norco, City Of	*0.368%*	201.545	201.545	0.000	(4.030)	110.315	0.000
Ontario, City Of	*20.742%*	11,373.816	11,373.816	0.000	(227.476)	7,520.482	845.000
Pomona, City Of	*20.454%*	11,215.852	11,215.852	0.000	(224.317)	6,131.477	(2,280.322)
San Antonio Water Company	*2.748%*	1,506.888	1,506.888	0.000	(30.137)	823.766	(789.433)
San Bernardino County Shtg Prk	*0.000%*	0.000	0.000	0.000	0.000	0.000	0.000
Santa Ana River Water Company	*2.373%*	1,301.374	357.591	0.000	(7.151)	711.352	(2,169.000)
Upland, City Of	*5.202%*	2,852.401	2,852.401	0.000	(57.048)	1,559.399	(4,339.322)
West End Consolidated Water Compa	*1.728%*	947.714	947.714	0.000	(18.954)	518.001	(2,394.476)
West Valley Water District	*1.175%*	644.317	644.317	0.000	(12.886)	352.229	15.000
	100.00%	**54,834.000**	**42,794.577**	**0.000**	**(855.886)**	**50,945.233**	**(3,454.340)**
Less Desalter Authority Production							
Total Less Desalter Authority Production							
2: Watermaster Party DYY accounting is on a July 1 - June 30 fiscal year.	2A	2B	2C	2D	2E	2F	2G

New Yield	Annual Production Right	Actual Fiscal Year Production	Storage and Recovery Program(s)	Total Production and Exchanges	Net Over-Production		Under Production Balances		
					85/15%	100%	Total Under-Produced	Carryover: Next Year Begin Bal	To Excess Carryover Account
0.000	0.000	373.665	0.000	373.665	0.000	373.665	0.000	0.000	0.000
0.000	6,237.391	973.554	0.000	973.554	0.000	0.000	5,263.837	2,111.422	3,152.415
0.000	11,015.824	1,206.635	(1,630.900)	(424.265)	0.000	0.000	11,440.089	4,033.857	7,406.232
0.000	19,578.303	19,263.160	(11,260.200)	8,002.959	0.000	0.000	11,575.343	3,619.454	7,955.889
0.000	0.000	28,516.731	0.000	28,516.731	0.000	28,516.731	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	10,769.899	13,557.470	0.000	13,557.470	2,787.571	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	869.500	359.382	0.000	359.382	0.000	0.000	510.118	411.476	98.642
0.000	15,883.434	15,538.225	(1,809.900)	13,728.325	0.000	0.000	2,155.108	2,061.118	93.990
0.000	1,671.752	346.141	0.000	346.141	0.000	0.000	1,325.610	655.317	670.293
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	13,059.902	15,572.066	(3,918.800)	11,653.266	0.000	0.000	1,406.635	1,406.635	0.000
0.000	0.000	1,298.352	0.000	1,298.352	0.000	1,298.352	0.000	0.000	0.000
0.000	1.077	0.000	0.000	0.000	0.000	0.000	1.077	1.077	0.000
0.000	509.375	0.000	0.000	0.000	0.000	0.000	509.375	201.545	307.830
0.000	30,885.638	19,708.991	(2,230.800)	17,478.191	0.000	0.000	13,407.446	11,373.816	2,033.630
0.000	26,058.542	11,403.859	(2,042.500)	9,361.359	0.000	0.000	16,697.183	11,215.852	5,481.331
0.000	3,017.971	966.222	0.000	966.222	0.000	0.000	2,051.748	1,506.888	544.860
0.000	0.000	16.494	0.000	16.494	16.494	0.000	0.000	0.000	0.000
0.000	194.166	0.000	0.000	0.000	0.000	0.000	194.166	194.166	0.000
0.000	2,867.831	3,409.624	(2,367.500)	1,042.123	0.000	0.000	1,825.707	1,825.707	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	1,642.977	0.000	0.000	0.000	0.000	0.000	1,642.977	644.317	998.660
0.000	**144,263.582**	**132,510.571**	**(25,260.600)**	**107,249.969**	**2,804.065**	**30,188.748**	**70,006.419**	**41,262.647**	**28,743.772**
		28,516.731		**28,516.731**		**28,516.731**			
		103,993.840		**78,733.238**		**1,672.017**			
2H	2I	2J	2K	2L	2M	2N	2O	2P	2Q

APPROPRIATIVE POOL SUPPLEMENTAL STORAGE ACCOUNT SUMMARY
PRODUCTION YEAR 2009-2010

Assessment Year 2010-2011 (Production Year 2009-2010)

Pool 3 Supplemental Storage Account Summary

	Reference	Recharged Recycled Account					
	Production + Exchanges (RW Agencies Only)	Beginning Balance	2% Storage Loss	Current Recharged Recycled	Transfer to ECO Account	Ending Balance	Beginning Balance
Arrowhead Mtn Spring Water Co	-	0.000	0.000	0.000	0.000	0.000	0.000
Chino Hills, City Of	*973.554*	452.588	(9.052)	610.800	0.000	1,054.336	5,487.657
Chino, City Of	*(424.265)*	519.250	(10.385)	682.100	0.000	1,190.965	1,205.087
Cucamonga Valley Water District	*8,002.959*	1,185.120	(23.702)	1,560.400	0.000	2,721.818	12,252.293
Desalter Authority	-	0.000	0.000	0.000	0.000	0.000	0.000
Fontana Union Water Company	-	0.000	0.000	0.000	0.000	0.000	0.000
Fontana Water Company	-	0.000	0.000	0.000	0.000	0.000	0.000
Fontana, City Of	*0.000*	0.000	0.000	0.000	0.000	0.000	0.000
Golden State Water Company	-	0.000	0.000	0.000	0.000	0.000	1,591.484
Jurupa Community Services District	*13,728.325*	30.772	(0.615)	589.400	0.000	619.557	0.000
Marygold Mutual Water Company	-	0.000	0.000	0.000	0.000	0.000	1,749.292
Monte Vista Irrigation Company	-	0.000	0.000	0.000	0.000	0.000	6,470.703
Monte Vista Water District	*11,653.266*	222.394	(4.448)	290.100	0.000	508.046	3,868.752
Niagara Water Company	-	0.000	0.000	0.000	0.000	0.000	0.000
Nicholson Trust	-	0.000	0.000	0.000	0.000	0.000	0.000
Norco, City Of	-	0.000	0.000	0.000	0.000	0.000	0.000
Ontario, City Of	*17,478.191*	2,057.572	(41.151)	2,794.700	0.000	4,811.121	9,223.684
Pomona, City Of	-	0.000	0.000	0.000	0.000	0.000	12,502.866
San Antonio Water Company	-	0.000	0.000	0.000	0.000	0.000	0.000
San Bernardino County Shtg Prk	-	0.000	0.000	0.000	0.000	0.000	0.000
Santa Ana River Water Company	-	0.000	0.000	0.000	0.000	0.000	0.000
Upland, City Of	*1,042.123*	509.202	(10.184)	679.900	0.000	1,178.918	6,649.181
West End Consolidated Water Company	-	0.000	0.000	0.000	0.000	0.000	0.000
West Valley Water District	-	0.000	0.000	0.000	0.000	0.000	0.000
	52,454.153	**4,976.898**	**(99.538)**	**7,207.400**	**0.000**	**12,084.760**	**61,000.999**

3: Supplemental Storage accounts have been divided as required by the Peace I Agreement.

4A	4B	4C	4D	4E	4F	4G

Quantified (Pre 7/1/2000) Account				New (Post 7/1/2000) Account					Combined
2% Storage Loss	Transfers To / (From)	Transfer to ECO Account	Ending Balance	Beginning Balance	2% Storage Loss	Transfers To / (From)	Transfer to ECO Account	Ending Balance	Ending Balance
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(109.753)	0.000	0.000	5,377.904	0.000	0.000	0.000	0.000	0.000	6,432.240
(24.101)	0.000	0.000	1,180.986	2,207.491	(44.149)	0.000	0.000	2,163.342	4,535.293
(245.045)	0.000	0.000	12,007.248	2,676.744	(53.534)	0.000	0.000	2,623.210	17,352.276
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	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.031	0.000	0.000	0.000	0.031	0.031
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(31.829)	0.000	0.000	1,559.655	65.534	(1.310)	0.000	0.000	64.224	1,623.879
0.000	0.000	0.000	0.000	1,127.901	(22.558)	0.000	0.000	1,105.343	1,724.900
(34.985)	0.000	0.000	1,714.307	358.563	(7.171)	0.000	(244.030)	107.362	1,821.669
(129.414)	0.000	0.000	6,341.289	370.266	(7.405)	0.000	0.000	362.861	6,704.150
(77.375)	0.000	0.000	3,791.377	2,430.182	(48.603)	0.000	0.000	2,381.579	6,681.002
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	0.000	0.000	0.000
0.000	0.000	0.000	0.000	110.421	(2.208)	0.000	0.000	108.213	108.213
(184.473)	0.000	0.000	9,039.211	5,507.814	(110.156)	0.000	0.000	5,397.658	19,247.990
(250.057)	0.000	0.000	12,252.809	1,787.250	(35.745)	0.000	0.000	1,751.505	14,004.314
0.000	0.000	0.000	0.000	824.548	(16.490)	0.000	0.000	808.058	808.058
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	551.204	(11.024)	0.000	0.000	540.180	540.180
(132.983)	0.000	0.000	6,516.198	0.000	0.000	0.000	0.000	0.000	7,695.116
0.000	0.000	0.000	0.000	518.494	(10.369)	0.000	0.000	508.125	508.125
0.000	0.000	0.000	0.000	352.564	(7.051)	0.000	0.000	345.513	345.513
(1,220.015)	**0.000**	**0.000**	**59,780.984**	**18,889.007**	**(377.773)**	**0.000**	**(244.030)**	**18,267.204**	**90,132.948**

12,084.760 + 18,267.204 = 30,351.964

Must not exceed 100,000 AF per Peace Agreeements I and II

4H	4I	4J	4K	4L	4M	4N	4O	4P	4Q

APPROPRIATIVE POOL EXCESS CARRY OVER STORAGE ACCOUNT
PRODUCTION YEAR 2009-2010

Assessment Year 2010-2011 (Production Year 2009-2010)

Pool 3 Excess Carry Over Storage Account

	Excess Carry Over Account (ECO)					
	Beginning Balance	2% Storage Loss	Transfers To / (From)	From Supplemental Storage	From Under-Production	Ending Balance
Arrowhead Mtn Spring Water Co	0.000	0.000	0.000	0.000	0.000	0.000
Chino Hills, City Of	3,611.239	(72.224)	0.000	0.000	3,152.415	6,691.430
Chino, City Of	15,761.955	(315.239)	0.000	0.000	7,406.232	22,852.948
Cucamonga Valley Water District A	38,228.278	(764.565)	(2,560.011)	0.000	7,955.889	42,859.591
Desalter Authority B	314,359.706	0.000	(314,359.706)	0.000	0.000	0.000
Fontana Union Water Company	0.000	0.000	0.000	0.000	0.000	0.000
Fontana Water Company	0.000	0.000	0.000	0.000	0.000	0.000
Fontana, City Of	0.000	0.000	0.000	0.000	0.000	0.000
Golden State Water Company	802.225	(16.044)	0.000	0.000	98.642	884.823
Jurupa Community Services District	4,393.191	(87.863)	0.000	0.000	93.990	4,399.318
Marygold Mutual Water Company	(244.030)	0.000	0.000	244.030	670.293	670.293
Metropolitan Water District	0.000	0.000	0.000	0.000	0.000	0.000
Monte Vista Irrigation Company	1,952.826	(39.056)	(290.102)	0.000	0.000	1,623.668
Monte Vista Water District	1,199.079	(23.981)	0.000	0.000	0.000	1,175.098
Niagara Water Company	0.000	0.000	0.000	0.000	0.000	0.000
Nicholson Trust	0.000	0.000	0.000	0.000	0.000	0.000
Norco, City Of	1,667.559	(33.351)	0.000	0.000	307.830	1,942.038
Ontario, City Of	8,673.819	(173.476)	0.000	0.000	2,033.630	10,533.973
Pomona, City Of	2,886.970	(57.739)	0.000	0.000	5,481.331	8,310.562
San Antonio Water Company	7,887.440	(157.748)	0.000	0.000	544.860	8,274.552
San Bernardino County Shtg Prk	0.000	0.000	0.000	0.000	0.000	0.000
Santa Ana River Water Company	218.371	(4.367)	0.000	0.000	0.000	214.004
Upland, City Of	6,200.694	(124.013)	0.000	0.000	0.000	6,076.681
West End Consolidated Water Comp	5,598.524	(111.970)	(4,105.524)	0.000	0.000	1,381.030
West Valley Water District	3,069.398	(61.387)	(1,000.000)	0.000	998.660	3,006.671
	416,267.244	(2,043.023)	(322,315.343)	244.030	28,743.772	120,896.680
	3A	3B	3C	3D	3E	3F

APPROPRIATIVE POOL OTHER STORAGE ACCOUNTS SUMMARY
PRODUCTION YEAR 2009-2010

Assessment Year 2010-2011 (Production Year 2009-2010)

2010-2011 Pool 3 Other Storage Accounts Summary

Desalter Authority Replenishment:

	Beginning Balance	Storage Loss	Transfers To	Transfers From	Ending Balance
Re-Operation Offset	314,359.706	0.000	0.000	(28,516.731)	285,842.975
Non-Ag Dedication	0.000	0.000	0.000	0.000	0.000
	5A	5B	5C	5D	5E

Storage and Recovery:

	Beginning Balance	Storage Loss	Transfers To	Transfers From	Ending Balance
MWD DYY / CUP	34,493.564	(689.871)	0.000	(25,260.600)	8,543.093
	5F	5G	5H	5I	5J

Chino Basin Watermaster:

	June 30, 2007 Storage Balance	June 30, 2008 Storage Loss	June 30, 2009 Storage Loss	June 30, 2010 Storage Loss	Ending Balance
Holding Account	0.000	0.000	0.000	0.000	0.000
	5K	5L	5M	5N	5O

APPROPRIATIVE POOL WATER TRANSACTION SUMMARY
PRODUCTION YEAR 2009-2010

Assessment Year 2010-2011 (Production Year 2009-2010)

Pool 3 Water Transaction Summary

	Water Transactions			
	Assigned Rights	General Transfer	Transfers To / (From) ECO Account	Total Water Transactions
Arrowhead Mtn Spring Water Co	0.000	0.000	0.000	0.000
Chino Hills, City Of	0.000	0.000	0.000	0.000
Chino, City Of	(5,085.000)	0.000	0.000	(5,085.000)
Cucamonga Valley Water District	7,886.145	0.000	2,000.000	9,886.145
Desalter Authority	0.000	0.000	0.000	0.000
Fontana Union Water Company	(9,886.145)	0.000	0.000	(9,886.145)
Fontana Water Company	10,006.082	0.000	0.000	10,006.082
Fontana, City Of	0.000	0.000	0.000	0.000
Golden State Water Company	0.000	0.000	0.000	0.000
Jurupa Community Services District	1,200.000	0.000	0.000	1,200.000
Marygold Mutual Water Company	0.000	16.000	0.000	16.000
Monte Vista Irrigation Company	(2,000.000)	0.000	290.102	(1,709.898)
Monte Vista Water District	3,024.433	212.678	0.000	3,237.111
Niagara Water Company	0.000	0.000	0.000	0.000
Nicholson Trust	(6.082)	0.000	0.000	(6.082)
Norco, City Of	0.000	0.000	0.000	0.000
Ontario, City Of	765.000	80.000	0.000	845.000
Pomona, City Of	(2,500.000)	219.678	0.000	(2,280.322)
San Antonio Water Company	(789.433)	0.000	0.000	(789.433)
San Bernardino County Shtg Prk	0.000	0.000	0.000	0.000
Santa Ana River Water Company	(2,200.000)	31.000	0.000	(2,169.000)
Upland, City Of	(4,500.000)	160.678	0.000	(4,339.322)
West End Consolidated Water Company	(6,500.000)	0.000	4,105.524	(2,394.476)
West Valley Water District	(1,000.000)	15.000	1,000.000	15.000
	(11,585.000)	**735.034**	**7,395.626**	**(3,454.340)**
4: Column 6A does not equal zero because CBWM purchased water from Appropriators to offset the CURO.	6A	6B	6C	6D

APPROPRIATIVE POOL WATER TRANSACTION DETAIL
PRODUCTION YEAR 2009-2010

Chino Basin Watermaster Asssessment Breakdown

2010-2011 Water Transaction Detail

Assessment Year 2010-2011 (Production Year 2009-2010)

To:	From:	Date of Submittal	Quantity	$ / Acre Feet	Total $	85%	15%	WM Pays
Chino Basin Watermaster	Aqua Capital Management Annual Account	9/18/2009	21.215	321.76	$6,826.14			
	To offset Non-Ag Parties replenishment obligation/CURO for FY 08-09 (previous Assessment Package).							
	Chino, City Of Annual Account	3/18/2010	5,085.000	366.00	$1,861,110.00			
	To offset FWC's replenishment obligation/CURO.							
	Cucamonga Valley Water District Storage Account	3/18/2010	5,000.000	400.00	$2,000,000.00			
	To offset FWC's replenishment obligation/CURO.							
	Santa Ana River Water Company Annual Account	3/3/2010	1,000.000	366.00	$366,000.00			
	To offset general replenishment obligation/CURO.							
	West Valley Water District Storage Account	6/30/2010	500.000	366.00	$183,000.00			
	To offset general replenishment obligation/CURO.							
Cucamonga Valley Water District	Pomona, City Of Annual Account	3/3/2010	2,500.000	366.00	$915,000.00			
	The transfer does not qualify for 85/15 consideration because CVWD had water placed in storage.							
	West Valley Water District Storage Account	5/10/2010	500.000	311.11	$155,555.00			
	The transfer does not qualify for 85/15 consideration because CVWD had water placed in storage.							
Fontana Water Company	Nicholson Trust Annual Account	6/23/2010	6.082	400.00	$2,432.80	$2,067.88	$364.92	Fontana Water Company
	Upland, City Of Annual Account	6/29/2010	10,000.000	400.00	$4,000,000.00	$3,400,000.00	$600,000.00	Fontana Water Company
Jurupa Community Services District	Santa Ana River Water Company Annual Account	3/25/2010	1,200.000	304.00	$364,800.00			

APPROPRIATIVE POOL WATER TRANSACTION DETAIL CONT.
PRODUCTION YEAR 2009-2010

Chino Basin Watermaster Asssessment Breakdown

2010-2011 Water Transaction Detail

Assessment Year 2010-2011 (Production Year 2009-2010)

To:	From:	Date of Submittal	Quantity	$ / Acre Feet	Total $	85%	15%	WM Pays
Monte Vista Water District	Monte Vista Irrigation Company Annual Account	4/5/2010	2,000.000	390.00	$780,000.00	$663,000.00	$117,000.00	Monte Vista Irrigation Company
	San Antonio Water Company Annual Account *85/15 Rules does not apply--method of utilizing SAWCO shares.*	4/5/2010	19.245	182.95	$3,520.87			
	San Antonio Water Company Annual Account *85/15 Rules does not apply--method of utilizing SAWCO shares.*	10/14/2009	5.188	184.00	$954.59			
	Upland, City Of Annual Account	6/15/2010	1,000.000	390.00	$390,000.00	$331,500.00	$58,500.00	Upland, City Of
Ontario, City Of	San Antonio Water Company Annual Account *85/15 Rules does not apply--method of utilizing SAWCO shares.*	6/16/2010	765.000	183.00	$139,995.00			
Upland, City Of	West End Consolidated Water Company Annual Account	11/9/2009	6,500.000	49.00	$318,500.00			
			36,101.730		**$11,487,694.40**	**$4,396,567.88**	**$775,864.92**	
					Total Credits		**$775,864.92**	

APPROPRIATIVE POOL RECURRING WATER TRANSACTION DETAIL
PRODUCTION YEAR 2009-2010

Chino Basin Watermaster Asssessment Breakdown

2010-2011 Water Transaction Detail

Assessment Year 2010-2011 (Production Year 2009-2010)

Applied Recurring Transactions:

From:	To:	Quantity	$ / Acre Feet	
Fontana Union Water Company Annual Account - 32,800 AF Early Transfer	Cucamonga Valley Water District Annual Account - Assigned Rights	All	0.00	*Transfer FUWC Ag Pool Reallocation Early Transfer to CVWD.*
Fontana Union Water Company Annual Account - Diff - Potential vs. Net	Cucamonga Valley Water District Annual Account - Assigned Rights	All	0.00	*Transfer FUWC Ag Pool Reallocation Difference (Potential vs. Net) to CVWD.*
Fontana Union Water Company Annual Account - New Yield	Cucamonga Valley Water District Annual Account - Assigned Rights	All	0.00	*Transfer FUWC New Yield to CVWD.*
Fontana Union Water Company Annual Account - Assigned Share of Operating Safe Yield	Cucamonga Valley Water District Annual Account - Assigned Rights	All	0.00	*Transfer FUWC Share of Safe Yield to CVWD.*

WATERMASTER REPLENISHMENT CALCULATION
PRODUCTION YEAR 2009-2010

Assessment Year 2010-2011 (Production Year 2009-2010)

Watermaster Replenishment Calculation

Cost of Replenishment Water per acre foot:	
Watermaster Replenishment Cost	$527.00
Projected Spreading - OCWD Connection Fee	$2.00
Projected Spreading - IEUA Surcharge	$12.00
Pre-purchased Credit	$0.00
Total Replenishment Cost per acre foot	**$541.00**

Replenishment Obligation:	AF @ $541.00	15%	85%	Total
Appropriative - 100	1,672.017			$904,561.20
Appropriative - 15/85	2,804.065	$227,549.87	$1,289,449.29	$1,516,999.17
Non-Agricultural - 100	45.319			$24,517.58
	4,521.401			**$2,446,077.94**

Company	AF Production and Exchanges	85/15 Producers	Percent	15% Replenishment Assessments	15% Water Transaction Debits
Arrowhead Mtn Spring Water Co	373.665			-	-
Chino Hills, City Of	973.554	973.554	1.445%	$3,289.09	$11,214.62
Chino, City Of	(424.265)	(424.265)	(0.630%)	($1,433.35)	($4,887.22)
Cucamonga Valley Water District	8,002.959	8,002.959	11.882%	$27,037.45	$92,188.16
Desalter Authority	28,516.731			-	-
Fontana Union Water Company	0.000	0.000	0.000%	$0.00	$0.00
Fontana Water Company	13,557.470	13,557.470	20.129%	$45,802.99	$156,172.00
Fontana, City Of	0.000	0.000	0.000%	$0.00	$0.00
Golden State Water Company	359.382	359.382	0.534%	$1,214.15	$4,139.81
Jurupa Community Services District	13,728.325	13,728.325	20.382%	$46,380.21	$158,140.12
Marygold Mutual Water Company	346.141			-	-
Monte Vista Irrigation Company	0.000	0.000	0.000%	$0.00	$0.00
Monte Vista Water District	11,653.266	11,653.266	17.302%	$39,369.76	$134,236.98
Niagara Water Company	1,298.352			-	-
Nicholson Trust	0.000	0.000	0.000%	$0.00	$0.00
Norco, City Of	0.000	0.000	0.000%	$0.00	$0.00
Ontario, City Of	17,478.191	17,478.191	25.950%	$59,048.88	$201,335.79
Pomona, City Of	9,361.359			-	-
San Antonio Water Company	966.222	966.222	1.435%	$3,264.32	$11,130.16
San Bernardino County Shtg Prk	16.494	16.494	0.024%	$55.72	$190.00
Santa Ana River Water Company	0.000	0.000	0.000%	$0.00	$0.00
Upland, City Of	1,042.123	1,042.123	1.547%	$3,520.74	$12,004.50
West End Consolidated Water Co	0.000	0.000	0.000%	$0.00	$0.00
West Valley Water District	0.000	0.000	0.000%	$0.00	$0.00
** *Fee assessment total is 15% of Appropriate 15/85 replenishment*	**107,249.969**	**67,353.721**	**	**$227,549.96**	**$775,864.92**
	2L			1G	1K

5: The "Watermaster Replenishment Cost" listed is MWD's 2011 Tier 1 Full Service Untreated Rate.

WATERMASTER CUMULATIVE UNMET REPLENISHMENT OBLIGATION (CURO)
PRODUCTION YEAR 2009-2010

Assessment Year 2010-2011 (Production Year 2009-2010)

Watermaster Cumulative Unmet Replenishment Obligation

Remaining Replenishment Obligation:	AF
Appropriative - 100	1,076.342
Appropriative - 15/85	3,280.818
Non-Agricultural - 100	10.524
	4,367.684

Replenishment Rate	
2010 Rate	$541.00
2009 Rate	$380.00

Pool 3 Appropriative

Company	Outstanding Obligation (AF)	Fund Balance ($)	Outstanding Obligation ($)	*AF Production and Exchanges*	85/15 Producers	Percent	15%	85%	100%	Total
Arrowhead Mtn Spring Water Co	248.385	$62,907.27	$71,469.02	*373.665*					$71,469.02	$71,469.02
Chino Hills, City Of	0.000	$0.00	$0.00	*973.554*	973.554	1.445%	$1,871.54	$0.00		$1,871.54
Chino, City Of	0.000	$0.00	$0.00	*(424.265)*	(424.265)	(0.630%)	($815.60)	$0.00		($815.60)
Cucamonga Valley Water District	0.000	$0.00	$0.00	*8,002.959*	8,002.959	11.882%	$15,384.72	$0.00		$15,384.72
Desalter Authority	0.000	$0.00	$0.00	*28,516.731*						$0.00
Fontana Union Water Company	0.000	$0.00	$0.00	*0.000*	0.000	0.000%	$0.00	$0.00		$0.00
Fontana Water Company	2,570.808	$731,909.08	$658,898.05	*13,557.470*	13,557.470	20.129%	$26,062.59	$560,063.34		$586,125.94
Fontana, City Of	0.000	$0.00	$0.00	*0.000*	0.000	0.000%	$0.00	$0.00		$0.00
Golden State Water Company	0.000	$0.00	$0.00	*359.382*	359.382	0.534%	$690.87	$0.00		$690.87
Jurupa Community Services District	696.147	$176,306.66	$200,308.87	*13,728.325*	13,728.325	20.382%	$26,391.04	$170,262.54		$196,653.58
Marygold Mutual Water Company	0.000	$0.00	$0.00	*346.141*					$0.00	$0.00
Monte Vista Irrigation Company	0.000	$0.00	$0.00	*0.000*	0.000	0.000%	$0.00	$0.00		$0.00
Monte Vista Water District	0.000	$0.00	$0.00	*11,653.266*	11,653.266	17.302%	$22,401.99	$0.00		$22,401.99
Niagara Water Company	827.957	$209,692.13	$238,232.61	*1,298.352*					$238,232.61	$238,232.61
Nicholson Trust	0.000	$0.00	$0.00	*0.000*	0.000	0.000%	$0.00	$0.00		$0.00
Norco, City Of	0.000	$0.00	$0.00	*0.000*	0.000	0.000%	$0.00	$0.00		$0.00
Ontario, City Of	0.000	$0.00	$0.00	*17,478.191*	17,478.191	25.950%	$33,599.71	$0.00		$33,599.71
Pomona, City Of	0.000	$0.00	$0.00	*9,361.359*					$0.00	$0.00
San Antonio Water Company	0.000	$0.00	$0.00	*966.222*	966.222	1.435%	$1,857.44	$0.00		$1,857.44
San Bernardino County Shtg Prk	13.863	$3,510.94	$3,988.94	*16.494*	16.494	0.024%	$31.71	$3,390.60		$3,422.31
Santa Ana River Water Company	0.000	$0.00	$0.00	*0.000*	0.000	0.000%	$0.00	$0.00		$0.00
Upland, City Of	0.000	$0.00	$0.00	*1,042.123*	1,042.123	1.547%	$2,003.36	$0.00		$2,003.36
West End Consolidated Water Company	0.000	$0.00	$0.00	*0.000*	0.000	0.000%	$0.00	$0.00		$0.00
West Valley Water District	0.000	$0.00	$0.00	*0.000*	0.000	0.000%	$0.00	$0.00		$0.00
Pool 3 Appropriative Total	**4,357.160**	**$1,184,326.08**	**$1,172,897.48**	***107,249.969***	**67,353.721**	**	**$129,479.38**	**$733,716.48**	**$309,701.62**	**$1,172,897.48**

WATERMASTER CUMULATIVE UNMET REPLENISHMENT OBLIGATION (CURO) CONT.
PRODUCTION YEAR 2009-2010

Assessment Year 2010-2011 (Production Year 2009-2010)

Watermaster Cumulative Unmet Replenishment Obligation

Remaining Replenishment Obligation:	AF
Appropriative - 100	1,076.342
Appropriative - 15/85	3,280.818
Non-Agricultural - 100	10.524
	4,367.684

Replenishment Rate	
2010 Rate	$541.00
2009 Rate	$380.00

Pool 2 Non-Agricultural

Company	Outstanding Obligation (AF)	Fund Balance ($)	Outstanding Obligation ($)
Ameron Inc	0.000	$0.00	$0.00
Angelica Textile Service	5.949	$1,506.59	$1,711.82
Aqua Capital Management	0.000	$0.00	$0.00
Auto Club Speedway	0.000	$0.00	$0.00
California Steel Industries Inc	0.000	$0.00	$0.00
Ccg Ontario, Llc	0.000	$0.00	$0.00
General Electric Company	4.354	$1,102.74	$1,252.77
GenOn West, LP	0.000	$0.00	$0.00
Kaiser Ventures Inc	0.000	$0.00	$0.00
KCO, LLC / The Koll Company	0.000	$0.00	$0.00
Loving Savior Of The Hills	0.000	$0.00	$0.00
Ontario City Non-Ag	0.000	$0.00	$0.00
Praxair Inc	0.000	$0.00	$0.00
San Antonio Winery	0.221	$55.88	$63.68
San Bernardino Cty (Chino Airport)	0.000	$0.00	$0.00
Southern California Edison Company	0.000	$0.00	$0.00
Space Center Mira Loma Inc.	0.000	$0.00	$0.00
Sunkist Growers Inc	0.000	$0.00	$0.00
Swan Lake Mobile Home Park	0.000	$0.00	$0.00
Vulcan Materials Company	0.000	$0.00	$0.00
West Venture Development	0.000	$0.00	$0.00
Pool 2 Non-Agricultural Total	**10.524**	**$2,665.21**	**$3,028.27**

APPROPRIATIVE POOL LAND USE CONVERSION SUMMARY
PRODUCTION YEAR 2009-2010

Chino Basin Watermaster Asssessment Breakdown

2010-2011 Land Use Conversion Summary

Assessment Year 2010-2011 (Production Year 2009-2010)

AGRICULTURAL POOL SUMMARY IN ACRE FEET

Agricultural Pool Safe Yield	82,800.000
Agricultural Total Pool Production	(31,854.766)
Early Transfer	(32,800.000)
Total Conversions	(22,943.024)
Under(Over) Production:	**(4,797.790)**

		Acres Converted @ 1.3 af/ac		Total Prior to Peace Agrmt Converted AF	Acres Converted @ 2.0 af/ac		Total Land Use Conversations Acre-Feet
	Prior Converted	Acres	Acre Feet		Acres	Acre Feet	
Chino Hills, City Of	0.000	670.266	871.346	871.346	58.000	116.000	987.346
Chino, City Of	196.235	1,454.750	1,891.175	2,087.410	2,188.701	4,377.402	6,464.812
Cucamonga Valley Water District	0.000	460.280	598.364	598.364	0.000	0.000	598.364
Fontana Water Company	0.000	0.000	0.000	0.000	417.000	834.000	834.000
Jurupa Community Services District	0.000	2,756.920	3,583.996	3,583.996	4,497.040	8,994.080	12,578.076
Monte Vista Water District	0.000	28.150	36.595	36.595	9.240	18.480	55.075
Ontario, City Of	209.400	527.044	685.157	894.557	265.397	530.794	1,425.351
	405.635	**5,897.410**	**7,666.633**	**8,072.268**	**7,435.378**	**14,870.756**	**22,943.024**

APPROPRIATIVE POOL AGRICULTURAL POOL REALLOCATION SUMMARY
PRODUCTION YEAR 2009-2010

Assessment Year 2010-2011 (Production Year 2009-2010)

Pool 3 Agricultural Pool Reallocation Summary

		Reallocation of Agricutural Pool Safe Yield				
	% Share of Operating Safe Yield	32,800 AF Early Transfer	Land Use Conver-sions	Potential for Reallocation (AF)	Difference: Potential vs. Net	Net Ag Pool Reallocation
Arrowhead Mtn Spring Water Co	*0.000%*	0.000	0.000	0.000	0.000	0.000
Chino Hills, City Of	*3.851%*	1,263.128	987.346	2,250.473	(193.698)	2,056.775
Chino, City Of	*7.357%*	2,413.096	6,464.812	8,877.908	(764.120)	8,113.788
Cucamonga Valley Water District	*6.601%*	2,165.128	598.364	2,763.492	(237.853)	2,525.639
Desalter Authority	*0.000%*	0.000	0.000	0.000	0.000	0.000
Fontana Union Water Company	*11.657%*	3,823.496	0.000	3,823.496	(329.087)	3,494.409
Fontana Water Company	*0.002%*	0.656	834.000	834.656	(71.839)	762.817
Fontana, City Of	*0.000%*	0.000	0.000	0.000	0.000	0.000
Golden State Water Company	*0.750%*	246.000	0.000	246.000	(21.173)	224.827
Jurupa Community Services District	*3.759%*	1,232.952	12,578.076	13,811.028	(1,188.712)	12,622.316
Marygold Mutual Water Company	*1.195%*	391.960	0.000	391.960	(33.736)	358.224
Monte Vista Irrigation Company	*1.234%*	404.752	0.000	404.752	(34.837)	369.915
Monte Vista Water District	*8.797%*	2,885.416	55.075	2,940.491	(253.087)	2,687.404
Niagara Water Company	*0.000%*	0.000	0.000	0.000	0.000	0.000
Nicholson Trust	*0.007%*	2.296	0.000	2.296	(0.198)	2.098
Norco, City Of	*0.368%*	120.704	0.000	120.704	(10.389)	110.315
Ontario, City Of	*20.742%*	6,803.376	1,425.351	8,228.727	(708.245)	7,520.482
Pomona, City Of	*20.454%*	6,708.912	0.000	6,708.912	(577.435)	6,131.477
San Antonio Water Company	*2.748%*	901.344	0.000	901.344	(77.578)	823.766
San Bernardino County Shtg Prk	*0.000%*	0.000	0.000	0.000	0.000	0.000
Santa Ana River Water Company	*2.373%*	778.344	0.000	778.344	(66.992)	711.352
Upland, City Of	*5.202%*	1,706.256	0.000	1,706.256	(146.857)	1,559.399
West End Consolidated Water Company	*1.728%*	566.784	0.000	566.784	(48.783)	518.001
West Valley Water District	*1.175%*	385.400	0.000	385.400	(33.171)	352.229
	100.000%	**32,800.000**	**22,943.024**	**55,743.023**	**(4,797.790)**	**50,945.233**
	11A	11B	11C	11D	11E	11F

NON-AGRICULTURAL POOL ASSESSMENT FEE SUMMARY
PRODUCTION YEAR 2009-2010

Assessment Year 2010-2011 (Production Year 2009-2010)

Pool 2 Assessment Fee Summary

		Non-Agricultural Pool		Replenishment Assessments				
	AF Production	$7.40 AF/Admin	$42.01 AF/OBMP	*AF Exceeding Safe Yield*	$541.00 Per AF	CURO Adjustment	Other Adjustments	Total Assessments Due
Ameron Inc	*4.548*	33.66	191.06	*0.000*	0.00	0.00	0.00	224.72
Angelica Textile Service	*40.897*	302.64	1,718.08	*23.987*	12,976.97	1,711.82	0.00	16,709.51
Aqua Capital Management	*0.000*	0.00	0.00	*0.000*	0.00	0.00	0.00	0.00
Auto Club Speedway	*495.942*	3,669.97	20,834.52	*0.000*	0.00	0.00	0.00	24,504.49
California Steel Industries Inc	*1,059.223*	7,838.25	44,497.96	*0.000*	0.00	0.00	0.00	52,336.21
CCG Ontario, Llc	*0.000*	0.00	0.00	*0.000*	0.00	0.00	0.00	0.00
General Electric Company	*8.615*	63.75	361.92	*8.615*	4,660.72	1,252.77	0.00	6,339.16
GenOn West, LP	*(17.428)*	(128.97)	(732.15)	*0.000*	0.00	0.00	0.00	(861.12)
Kaiser Ventures Inc	*0.000*	0.00	0.00	*0.000*	0.00	0.00	0.00	0.00
KCO, LLC / The Koll Company	*0.000*	0.00	0.00	*0.000*	0.00	0.00	0.00	0.00
Loving Savior Of The Hills	*0.000*	0.00	0.00	*0.000*	0.00	0.00	0.00	0.00
Ontario City Non-Ag	*1,682.150*	12,447.91	70,667.12	*0.000*	0.00	0.00	0.00	83,115.03
Praxair Inc	*0.000*	0.00	0.00	*0.000*	0.00	0.00	0.00	0.00
San Antonio Winery	*12.717*	94.11	534.24	*12.717*	6,879.90	63.68	0.00	7,571.92
San Bernardino Cty (Chino Airport)	*146.522*	1,084.26	6,155.39	*0.000*	0.00	0.00	0.00	7,239.65
Southern California Edison Company	*0.000*	0.00	0.00	*0.000*	0.00	0.00	0.00	0.00
Space Center Mira Loma Inc.	*93.707*	693.43	3,936.63	*0.000*	0.00	0.00	0.00	4,630.06
Sunkist Growers Inc	*0.000*	0.00	0.00	*0.000*	0.00	0.00	0.00	0.00
Swan Lake Mobile Home Park	*380.711*	2,817.26	15,993.67	*0.000*	0.00	0.00	0.00	18,810.93
Vulcan Materials Company	*0.307*	2.27	12.90	*0.000*	0.00	0.00	0.00	15.17
West Venture Development	*0.000*	0.00	0.00	*0.000*	0.00	0.00	0.00	0.00
	3,907.911	**28,918.54**	**164,171.34**	***45.319***	**24,517.58**	**3,028.27**	**0.00**	**220,635.74**
	12A	12B	12C	12D	12E	12F	12G	12H

NON-AGRICULTURAL POOL WATER PRODUCTION SUMMARY
PRODUCTION YEAR 2009-2010

Assessment Year 2010-2011 (Production Year 2009-2010)

Pool 2 Water Production Summary

	Carryover Beginning Balance	Prior Year Adjust-ments	2% Storage Loss	Assigned Share of Operating Safe Yield (AF)	Water Transaction Activity	Annual Production Right	Actual Fiscal Year Production	Net Over Production	Under Production Balances		
									Total Under-Produced	Carryover: Next Year Begin Bal	To Local Storage Account
Ameron Inc	97.858	0.000	(1.957)	97.858	(9.786)	183.973	4.548	0.000	179.425	97.858	81.567
Angelica Textile Service	0.000	0.000	0.000	18.789	(1.879)	16.910	40.897	23.987	0.000	0.000	0.000
Aqua Capital Management	948.118	0.000	(18.962)	948.118	(94.811)	1,782.463	0.000	0.000	1,782.463	948.118	834.345
Auto Club Speedway	1,000.000	0.000	(20.000)	1,000.000	(100.000)	1,880.000	495.942	0.000	1,384.058	1,000.000	384.058
California Steel Industries Inc	1,000.234	0.000	(20.004)	1,300.000	(130.000)	2,150.230	1,059.223	0.000	1,091.007	1,091.007	0.000
CCG Ontario, Llc	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
General Electric Company	0.000	0.000	0.000	0.000	0.000	0.000	8.615	8.615	0.000	0.000	0.000
GenOn West, LP	954.540	0.000	(19.090)	954.540	(95.454)	1,794.536	(17.428)	0.000	1,811.964	954.540	857.424
Kaiser Ventures Inc	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
KCO, LLC / The Koll Company	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Loving Savior Of The Hills	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ontario City Non-Ag	2,101.659	0.000	(42.033)	2,299.848	(229.985)	4,129.488	1,682.150	0.000	2,447.338	2,299.848	147.490
Praxair Inc	0.000	0.000	0.000	1.000	(0.100)	0.900	0.000	0.000	0.900	0.900	0.000
San Antonio Winery	0.000	0.000	0.000	0.000	0.000	0.000	12.717	12.717	0.000	0.000	0.000
San Bernardino Cty (Chino Airport)	77.397	0.000	(1.547)	133.870	(13.387)	196.333	146.522	0.000	49.811	49.811	0.000
Southern California Edison Company	27.959	0.000	(0.559)	27.959	(2.796)	52.563	0.000	0.000	52.563	27.959	24.604
Space Center Mira Loma Inc.	0.000	0.000	0.000	104.121	(10.412)	93.709	93.707	0.000	0.002	0.002	0.000
Sunkist Growers Inc	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Swan Lake Mobile Home Park	464.240	0.000	(9.284)	464.240	(46.424)	872.772	380.711	0.000	492.061	464.240	27.821
Vulcan Materials Company	0.000	0.000	0.000	0.000	0.307	0.307	0.307	0.000	0.000	0.000	0.000
West Venture Development	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	6,672.005	**0.000**	**(133.436)**	**7,350.343**	**(734.727)**	**13,154.184**	**3,907.911**	**45.319**	**9,291.592**	**6,934.283**	**2,357.309**
	13A	13B	13C	13D	13E	13F	13G	13H	13I	13J	13K

NON-AGRICULTURAL POOL STORAGE ACCOUNT SUMMARY
PRODUCTION YEAR 2009-2010

Assessment Year 2010-2011 (Production Year 2009-2010)

Pool 2 Storage Account Summary

	Local Storage Account			
	Carryover Beginning Balance	2% Storage Loss	Transfers To / (From)	Ending Balance
Ameron Inc	2,053.411	(41.068)	81.567	2,093.910
Angelica Textile Service	0.000	0.000	0.000	0.000
Aqua Capital Management	10,076.934	(201.538)	834.345	10,709.741
Auto Club Speedway	2,002.621	(40.052)	384.058	2,346.627
California Steel Industries Inc	3,036.569	(60.731)	0.000	2,975.838
CCG Ontario, Llc	0.000	0.000	0.000	0.000
General Electric Company	0.000	0.000	0.000	0.000
GenOn West, LP	6,128.256	(122.565)	857.424	6,863.115
Kaiser Ventures Inc	0.000	0.000	0.000	0.000
KCO, LLC / The Koll Company	0.000	0.000	0.000	0.000
Loving Savior Of The Hills	0.000	0.000	0.000	0.000
Ontario City Non-Ag	14,756.219	(295.124)	147.490	14,608.585
Praxair Inc	4,554.345	(91.086)	0.000	4,463.259
San Antonio Winery	0.000	0.000	0.000	0.000
San Bernardino Cty (Chino Airport)	176.728	(3.534)	0.000	173.194
Southern California Edison Company	252.867	(5.057)	24.604	272.414
Space Center Mira Loma Inc.	0.000	0.000	0.000	0.000
Sunkist Growers Inc	0.000	0.000	0.000	0.000
Swan Lake Mobile Home Park	3,256.675	(65.133)	27.821	3,219.363
Vulcan Materials Company C	305.004	(6.100)	(293.296)	5.608
West Venture Development	0.000	0.000	0.000	0.000
	46,599.629	**(931.988)**	**2,064.013**	**47,731.654**
	14A	14B	14C	14D

6: Ontario City Non-Ag purchased all but 4,463.259 AF of Praxair's storage water. The 4,463.259 AF amount is the amount that was in the account on 06/30/07 subject to the Attachment G Purchase and Sale Agreement.

ASSESSMENT PACKAGE NOTES
PRODUCTION YEAR 2009-2010

Assessment Year 2010-2011 (Production Year 2009-2010)

Assessment Package Notes

	Company	Account	Note
A	Cucamonga Valley Water District	Local Storage	The Peace II Vulcan over-transfer has been corrected by removing 292.989 AF from Vulcan's Storage account & 560.011 AF from CVWD's ECO account.
B	Desalter Authority	Local Storage	There is no loss assessed on the native basin water allocated to offset desalter production as a result of basin reoperation as approved in Peace II.
C	Vulcan Materials Company	Local Storage	The Peace II Vulcan over-transfer has been corrected by removing 292.989 AF from Vulcan's Storage account & 560.011 AF from CVWD's ECO account.

HISTORIC ASSESSMENTS PER ACRE-FOOT OF PRODUCTION

Assessment Year	Agricultural Pool [1] ($/AF)	Non-Ag Pool ($/AF)	Appropriative Pool [2] ($/AF)	Gross Replenishment Water Rate ($/AF)
77-78	0.29	0.32	0.42	
78-79	0.65	1.29	0.77	51.00
79-80	0.54	0.20	0.51	56.20
80-81	0.32	0.00	0.00	62.51
81-82	0.10	0.00	0.00	63.78
82-83	0.10	0.00	0.00	81.46
83-84	0.10	0.00	0.00	102.18
84-85	0.10	0.00	0.10	154.00
85-86	0.10	0.00	0.45	149.39
86-87	0.10	0.00	0.41	155.10
87-88	0.10	0.00	0.25	155.42
88-89	0.09	0.00	0.67	155.33
89-90	3.27	0.00	0.48	115.00
90-91	2.31	0.00	0.43	117.55
91-92	3.53	0.12	0.11	132.55
92-93	7.03	4.07	3.41	169.89
93-94	12.37	6.67	2.51	210.69
94-95	9.86	3.24	2.06	222.00
95-96	11.68	3.43	1.57	233.15
96-97	19.70	7.55	3.69	233.15
97-98	15.19	6.56	2.73	237.15
98-99	19.04	9.85	7.77	243.00
99-00	26.30	14.12	11.75	243.00
00-01	18.15	25.79	24.74	242.00
01-02	34.37	29.93	25.42	243.00
02-03	35.69	26.72	21.35	244.00
03-04	34.10	25.39	22.90	244.00
04-05	26.15	25.43	25.43	250.00
05-06	19.91	27.94	27.94	251.00
06-07	28.23	40.72	40.72	251.00
07-08	29.76	36.30	36.30	257.00
08-09	29.93	50.24	50.24	309.00
09-10	32.50	51.21	51.21	380.00
10-11	33.90	49.41	49.41	541.00

[1] $/AF of water reallocated to the Appropriative Pool.

[2] Excludes amounts related to the debt service of the Recharge Improvement Project, and supplemental and replenishment water purchases.

SUMMARY BUDGET
FISCAL YEAR 2009-2010

	FY 07-08 June Actual	FY 08-09 December Actual	FY 08-09 Amended Budget	FY 09-10 Proposed Budget	FY 09-10 Amended Budget	Current vs. Proposed
Ordinary Income						
4000 Mutual Agency Revenue	$237,370	$0	$148,410	$148,410	$148,410	$0
4110 Appropriative Pool Assessments	7,480,676	7,993,307	7,860,411	7,185,411	7,185,411	-675,000
4120 Non-Agricultural Pool Assessments	122,298	172,817	132,237	155,427	155,427	23,190
4730 Prorated Interest Income	186,184	60,829	174,368	191,540	191,540	17,172
Total Income	**8,061,582**	**8,227,982**	**8,315,426**	**7,680,789**	**7,680,789**	**-634,637**
Administrative Expenses						
6010 Salary Costs	486,402	297,801	484,302	487,838	487,838	3,536
6020 Office Building Expense	91,236	41,986	102,000	102,500	102,500	500
6030 Office Supplies & Equip.	39,086	10,381	50,500	46,500	46,500	-4,000
6040 Postage & Printing Costs	89,126	34,653	87,380	84,300	84,300	-3,080
6050 Information Services	139,480	66,989	144,000	148,500	148,500	4,500
6060 WM Special Contract Services	95,138	38,797	98,000	98,000	98,000	0
6080 Insurance Expense	15,414	15,706	17,730	16,730	16,730	-1,000
6110 Dues and Subscriptions	17,453	10,286	16,750	17,000	17,000	250
6150 Field Supplies & Equipment	554	864	2,500	2,800	2,800	300
6170 Vehicle Maintenance Costs	18,443	14,541	39,200	37,800	37,800	-1,400
6190 Conferences & Seminars	24,172	13,523	26,500	26,500	26,500	0
6200 Advisory Committee Expenses	17,065	7,667	19,181	18,078	18,078	-1,103
6300 Watermaster Board Expenses	37,819	21,913	42,020	43,823	43,823	1,803
6500 Education Fund Expenditures	375	0	375	375	375	0
8300 Appropriative Pool Administration	20,280	11,496	24,008	23,069	23,069	-939
8400 Agricultural Pool Administration	137,820	64,372	134,820	200,114	200,114	65,294
8500 Non-Agricultural Pool Administration	6,561	2,412	7,695	6,677	6,677	-1,018
9400 Depreciation Expense	25,131	0	0	0	0	0
9500 Allocated G&A Expenditures	-506,732	-204,742	-448,902	-488,230	-488,230	-39,328
Total Administrative Expenses	**754,824**	**448,648**	**848,059**	**872,374**	**872,374**	**24,315**
General OBMP Expenditures						
6900 Optimum Basin Mgmt Program	2,282,059	603,285	1,785,421	1,399,372	1,568,881	-216,540
6950 Cooperative Efforts	10,000	0	10,000	10,000	10,000	0
9501 Allocated G&A Expenditures	177,356	60,562	137,959	148,448	148,448	10,489
Total General OBMP Expenditures	**2,469,415**	**663,847**	**1,933,380**	**1,557,820**	**1,727,329**	**-206,051**
7000 OBMP Implementation Projects						
7101 Production Monitoring	104,920	63,293	107,515	107,047	107,047	-468
7102 In-Line Meter Installation/Maintenance	24,844	24,714	87,931	56,179	56,179	-31,752
7103 Groundwater Quality Monitoring	98,466	95,584	210,458	214,362	214,362	3,904
7104 Groundwater Level Monitoring	189,377	218,154	372,538	366,956	366,956	-5,582
7105 Recharge Basin Water Quality Monitoring	13,527	2,433	46,717	43,912	43,912	-2,805
7106 Water Level Sensors Install	0	0	0	0	0	0
7107 Ground Level Monitoring	275,165	123,949	651,468	550,059	381,406	-270,062
7108 Hydraulic Control Monitoring Program	193,337	244,213	713,949	567,022	533,543	-180,406
7109 Recharge & Well Monitoring Program	33,157	0	0	9,152	9,152	9,152
7200 OBMP Pgm Element 2 - Comp Recharge	918,727	509,652	1,245,266	1,478,560	1,492,772	247,506
7300 OBMP Pgm Element 3 & 5 - Water Supply Plan - Desalter	131,340	56,084	108,477	96,003	85,694	-22,783
7400 OBMP Pgm Element 4 - Mgmt Zone Strategies	147,404	137,989	272,515	91,985	120,705	-151,810
7500 OBMP Pgm Element 6 & 7 - Coop Efforts/Salt Mgmt	111,259	21,588	76,411	163,727	163,727	87,316
7600 OBMP Pgm Element 8 & 9 Storage Mgmt/Conj Use	93,140	387,503	61,909	29,550	29,550	-32,359
7700 Inactive Well Protection Program	295	0	6,296	5,066	5,066	-1,230
7690 Recharge Improvement Debt Payment	1,368,373	511,894	1,261,594	1,131,233	1,131,233	-130,361
9502 Allocated G&A Expenditures	322,589	144,179	310,943	339,782	339,782	28,839
Total OBMP Implementation Projects	**4,025,921**	**2,541,229**	**5,533,987**	**5,250,595**	**5,081,086**	**-452,901**
Total Expenses	**7,250,160**	**3,653,724**	**8,315,426**	**7,680,789**	**7,680,789**	**-634,637**
Net Ordinary Income	**811,422**	**4,574,257**	**0**	**0**	**0**	**0**
Other Income						
4210 Approp Pool-Replenishment	3,393,110	6,427,596	0	0	0	0
4220 Non-Ag Pool-Replenishment	9,256	10,047	0	0	0	0
4230 Groundwater Recharge Activity	0	0	0	0	0	0
Total Other Income	**3,402,366**	**6,437,643**	**0**	**0**	**0**	**0**
Other Expense						
5010 Groundwater Recharge	3,325,123	0	0	0	0	0
Total Other Expense	**3,325,123**	**0**	**0**	**0**	**0**	**0**
Net Other Income	**77,244**	**6,437,643**	**0**	**0**	**0**	**0**
9800 From / (To) Reserves	**-913,796**	**-11,011,900**	**0**	**0**	**0**	**0**
Net Income	**-$25,130**	**$0**	**$0**	**$0**	**$0**	**$0**

CHINO BASIN WATERMASTER

BASIC FINANCIAL STATEMENTS AND SUPPLEMENTAL DATA

YEAR ENDED JUNE 30, 2010

(WITH INDEPENDENT AUDITORS' REPORT THEREON)

CHINO BASIN WATERMASTER

Basic Financial Statements and Supplemental Data

Year ended June 30, 2010

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Board of Directors
Chino Basin Watermaster
Rancho Cucamonga, California

Independent Auditors' Report

We have audited the accompanying basic financial statements of the Chino Basin Watermaster as of and for the year ended June 30, 2010, as listed in the table of contents. These basic financial statements are the responsibility of the management of Chino Basin Watermaster. Our responsibility is to express an opinion on these basic financial statements based on our audit. The prior year partial comparative information has been derived from the Chino Basin Watermaster's basic financial statements for the year ended June 30, 2009 and, in our report dated December 11, 2009, we expressed an unqualified opinion on those financial statements.

We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of Chino Basin Watermaster as of June 30, 2010, and respective changes in financial position and cash flows of the Chino Basin Watermaster for the year then ended in conformity with accounting principles generally accepted in the United States of America.

The information identified in the accompanying table of contents as *management's discussion and analysis* is not a required part of the basic financial statements, but is supplementary information required by accounting principles generally accepted in the United States of America. We have applied certain limited procedures, which consisted principally of inquiries of management regarding the methods of measurement and presentation of the required supplementary information. However, we did not audit the information and express no opinion on it.

Our audit was conducted for the purpose of forming an opinion on the financial statements that collectively comprise the Chino Basin Watermaster's basic financial statements. The supplementary information is presented for purposes of additional analysis and is not a required part of the basic financial statements. The supplementary information identified in the table of contents has been subjected to the auditing procedures applied in the audit of the basic financial statements and, in our opinion, is fairly stated in all material respects in relation to the basic financial statements taken as a whole.

Mayer Hoffman McCann P.C.

Irvine, California
October 11, 2010

CHINO BASIN WATERMASTER

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MANAGEMENT'S DISCUSSION AND ANALYSIS

BACKGROUND

The Chino Basin Watermaster (Watermaster) was established under a Judgment entered in the Superior Court of the State of California for the County of San Bernardino, entitled "Chino Basin Municipal Water District v. City of Chino, et al.," (originally Case No. SCV 164327, the file was transferred in August 1989 and assigned a new Case No. RCV 51010). The Judgment prescribes Watermaster's authorities and specifies classes of water production assessments to be used to fund certain activities. Those assessment categories are: Administration, Optimal Basin Management Program, Special Projects and Replenishment. Each class of assessment has a prescribed purpose and water production base. Assessment revenue is Watermaster's principal source of income.

This section of the Watermaster's annual financial report presents our analysis of the Watermaster's financial performance during the fiscal year ended on June 30, 2010. Please read it in conjunction with the basic financial statements that follow this section.

OVERVIEW OF THE FINANCIAL STATEMENTS

The discussion and analysis are intended to serve as an introduction to the Watermaster's basic financial statements, which are comprised of two components: Financial Statements (pages 6-8) and Notes to the Financial Statements (pages 9-19). This report also contains other supplementary information in addition to the basic financial statements (pages 20-22).

Required Financial Statements

The financial statements of the Watermaster report information using the accrual basis of accounting; accordingly, all of the current year's revenues and expenses are accounted for regardless of when the cash is received or paid. This accounting treatment is similar to the methods used by private sector companies and aids in answering the question of whether the Watermaster, as a whole, has improved or deteriorated as a result of this year's activities.

The Statement of Net Assets (page 6) includes all of the Watermaster's investments in resources (assets) and the obligations to creditors (liabilities). It also provides the basis for evaluating the capital structure of the Watermaster and assessing the liquidity and financial flexibility of the Watermaster.

The Statement of Revenues, Expenses and Changes in Net Assets (page 7) includes all of the current year revenues and expenses. This statement measures the success of the Watermaster's operations over the past year and can be used to determine whether the Watermaster has successfully recovered all of its costs through assessments and other charges.

The Statement of Cash Flows (page 8) reports cash receipts, cash payments, and net changes in cash resulting from operations, investing, and financing activities. This statement demonstrates where the cash came from, how the cash was used, and how much the change in cash was during the fiscal year.

These statements are one of many different ways to measure the Watermaster's financial health, or financial position. Over time, increases or decreases in the Watermaster's net assets are one of the indicators of whether its financial position is improving or deteriorating. You will need to consider other non-financial factors, however, such as changes in the Watermaster's, assessment income, cost sharing agreements, and other operational measures to help assess the overall financial position of the Watermaster.

SUMMARY OF FINANCIAL INFORMATION

Statement of Net Assets

June 30, 2010
(With comparative totals for June 30, 2009)

	2010	2009	Difference	% Change
Assets				
Current	$ 10,614,785	$ 11,596,978	$ (982,193)	-8.5%
Capital	46,889	53,176	(6,287)	-11.8%
Total Assets	10,661,674	11,650,154	(988,480)	-8.5%
Liabilities				
Current	1,989,063	469,002	1,520,061	324.1%
Non current	194,246	185,186	9,060	4.9%
Total Liabilities	2,183,309	654,188	1,529,121	233.8%
Net Assets				
Invested in capital assets	46,889	53,176	(6,287)	-11.8%
Restricted for Water Purchases	1,280,113	4,111,568	(2,831,455)	-68.9%
Unrestricted	7,151,363	6,831,222	320,141	4.7%
Total Net Assets	$ 8,478,365	$10,995,966	($ 2,517,601)	-22.9%

For the year ended June 30, 2010 and June 30, 2009, Watermaster's Total Net Assets was $8,478,365 and $10,995,966 respectively.

Total Assets decreased by $988,480 or 8.5% in FY 2010 compared to FY 2009. Parties who extract water in excess of their rights are assessed on an annual basis to cover the cost of purchasing replenishment water. In fiscal year 2008/2009, Watermaster collected the money for the purchase of replenishment water but was unable to satisfy the purchase obligation of the replenishment water. For FY 2010, the majority of the decrease in Total Assets was a direct result of the purchase of replenishment water throughout the fiscal year. Comparing FY 2010 to FY 2009, Cash and Investments (Note 2 - pages 12-15) decreased by $787,508 or 7.0% (net of the audit adjustment described below), Accounts Receivables decreased by $176,515 or 89.2%, Prepaid Expenses decreased by $18,170 or 54.3% and Capital Assets (net of accumulated depreciation) decreased by $6,287 or 11.9%.

The first of four payments related to the purchase and sale agreement between the Overlying (Non-Agricultural) Pool and Watermaster (Note 9 - page 19) was issued on January 14, 2010 in the amount of $2,166,022. At the end of the fiscal year June 30, 2010, three checks issued to members of the Overlying (Non-Agricultural) Pool totaling $415,136 had not cleared the Watermaster bank account. As a result, an

audit adjustment was recorded increasing the categories of Cash and Investments and Accounts Payable for $415,136.

Total Liabilities increased by $1,529,121 or 233.8% in FY 2010 as compared to FY 2009. Accounts Payable increased $1,581,185 or 406.4% (which included the audit adjustment amount of $415,136 listed above). The Accounts Payable increase was directly related to the recording and paying of outstanding invoices at fiscal year end June 30, 2010. Accrued Salaries and Benefits decreased by $61,124 or 76.5% and Compensated Absences (Note 4 - page 16) increased by $9,060 or 4.9%.

Statement of Revenues, Expenses, and Changes in Net Assets

June 30, 2010
(With comparative totals for June 30, 2009)

	2010	2009	Difference	% Change
Operating Revenues				
Administrative assessments	$ 7,404,003	$ 8,166,124	($ 762,121)	-9.3%
Mutual agency project revenue	0	51,217	(51,217)	-100.0%
Replenishment water	7,073,805	6,437,643	636,162	9.9%
Miscellaneous revenue	111,188	0	111,188	100.0%
Total Operating Revenues	14,588,996	14,654,984	(65,988)	-0.5%
Operating Expenses				
Watermaster administration	657,236	510,988	146,248	28.6%
Depreciation	29,103	25,577	3,526	13.8%
Pool, Advisory and Board	277,050	250,870	26,180	10.4%
Optimum Basin Management Plan	6,327,400	6,913,336	(585,936)	-8.5%
Mutual agency project costs	0	10,000	(10,000)	-100.0%
Groundwater replenishment	9,894,321	2,326,075	7,568,246	325.4%
Total Operating Expenses	17,185,110	10,036,846	7,148,264	71.2%
Income from operations	(2,596,114)	4,618,138	(7,214,252)	-156.2%
Non-Operating Revenues				
Interest	78,513	179,866	(101,353)	-56.3%
Total Non-Operating Revenues	78,513	179,866	(101,353)	-56.3%
Change in net assets	(2,517,601)	4,798,004	(7,315,605)	-152.5%
Net assets at beginning of year	10,995,966	6,197,962	4,798,004	77.4%
Total net assets at end of year	$ 8,478,365	$ 10,995,966	($ 2,517,601)	-22.9%

REVIEW OF REVENUES AND EXPENSES

Total Operating Revenues decreased $65,988 or 0.5% in FY 2010 as compared to FY 2009. Annual administrative assessments are determined by dividing the adopted budget by the total assessable production. Administrative assessment revenue for FY 2010 decreased $762,121 or 9.3% from the previous year due to budgeted decreases in the overall OBMP expenses, recharge basin operations and maintenance expenses. Replenishment water assessment revenue for FY 2010 increased by $636,162 or 9.9% compared to the previous year due to production increases in excess of production rights, and due to the increased cost of replenishment water. For the current fiscal year, there was no Mutual Agency Project Revenue recorded (a

decrease of $51,217 or 100.0%) and the Miscellaneous Revenue category increased by $111,188 or 100.0% as compared to the previous year.

Overall operating expenses (excluding replenishment activities) decreased by $419,982 or 5.4% in FY 2010 as compared to FY 2009. The operating expense categories for the fiscal year ending June 30, 2010 were as follows: Watermaster administrative expenses increased $146,248 or 28.6%; Depreciation expense increased by $3,526 or 13.8%; the Pools, Advisory and Board administration expenses increased by $26,180 or 10.4%; Optimum Basin Management Plan (OBMP) decreased $585,936 or 8.5%; and Mutual agency project costs decreased $10,000 or 100% as compared to the previous fiscal year ended June 30, 2009.

Groundwater replenishment activities increased dramatically in FY 2010 as compared to FY 2009. The replenishment activities for FY 2010 were $7,728,299, along with the water purchase of $2,166,022 (see Note 9) for a total of $9,894,321 as compared to $2,326,075 for FY 2009, an increase of $7,568,246 or 325.4% from the prior year.

Non-operating revenue represented interest income of $78,513 and $179,866 for the years ending June 30, 2010 and June 30, 2009, which decreased due to the falling interest rates.

CONTACTING THE WATERMASTER

This financial report is designed to provide a general overview of the Watermaster's finances and to demonstrate the Watermaster's accountability for the resources it receives. If you have any questions about this report, or need additional information, please contact Joseph S. Joswiak, Chief Financial Officer at (909) 484-3888.

CHINO BASIN WATERMASTER

Statement of Net Assets

June 30, 2010

(with comparative totals for June 30, 2009)

Assets	2010	2009
Current assets:		
Cash and investments (note 2)	$ 10,578,034	$ 11,365,542
Accounts receivable	21,458	197,973
Prepaid expenses	15,293	33,463
Total current assets	10,614,785	11,596,978
Noncurrent assets:		
Capital assets, net of accumulated depreciation (note 3)	46,889	53,176
Total noncurrent assets	46,889	53,176
Total assets	10,661,674	11,650,154
Liabilities		
Current liabilities:		
Accounts payable	1,970,273	389,088
Accrued salaries and benefits	18,790	79,914
Total current liabilities	1,989,063	469,002
Noncurrent liabilities:		
Compensated absences (note 4)	194,246	185,186
Total noncurrent liabilities	194,246	185,186
Total liabilities	2,183,309	654,188
Net Assets		
Net assets:		
Invested in capital assets	46,889	53,176
Restricted for water purchases	1,280,113	4,111,568
Unrestricted	7,151,363	6,831,222
Total net assets	$ 8,478,365	$ 10,995,966

See accompanying notes to the basic financial statements.

CHINO BASIN WATERMASTER

Statement of Revenues, Expenses and Changes in Net Assets

Year ended June 30, 2010

(with comparative totals for June 30, 2009)

	2010	2009
Operating revenues:		
Administrative assessments (note 1)	$ 7,404,003	$ 8,166,124
Mutual agency project revenue	-	51,217
Replenishment water	7,073,805	6,437,643
Miscellaneous revenue	111,188	-
Total operating revenues	14,588,996	14,654,984
Operating expenses:		
Watermaster administration	657,236	510,988
Depreciation	29,103	25,577
Pool, advisory and Board administration	277,050	250,870
Optimum Basin Management Plan	6,327,400	6,913,336
Mutual agency project costs	-	10,000
Groundwater replenishment and other water purchases	9,894,321	2,326,075
Total operating expenses	17,185,110	10,036,846
Income (loss) from operations	(2,596,114)	4,618,138
Nonoperating revenues:		
Interest income	78,513	179,866
Total nonoperating revenues	78,513	179,866
Change in net assets	(2,517,601)	4,798,004
Net assets at beginning of year	10,995,966	6,197,962
Total net assets at end of year	$ 8,478,365	$ 10,995,966

See accompanying notes to the basic financial statements.

CHINO BASIN WATERMASTER

Statement of Cash Flows

Year ended June 30, 2010

(with comparative totals for June 30, 2009)

	2010	2009
Cash flows from operating activities:		
Cash received from customers	$ 14,765,511	$ 15,316,256
Cash received from other agencies	-	51,217
Cash paid to employees for services	(1,330,329)	(1,196,994)
Cash paid to suppliers of goods and services	(14,278,387)	(9,111,868)
Net cash provided by (used for) operating activities	(843,205)	5,058,611
Cash flows from capital financing activities:		
Acqusition of capital assets	(22,816)	(19,530)
Net cash provided by (used for) capital financing activities	(22,816)	(19,530)
Cash flows from investing activities:		
Interest received	78,513	179,866
Net cash provided by (used for) investing activities	78,513	179,866
Net increase (decrease) in cash	(787,508)	5,218,947
Cash and investments at the beginning of year	11,365,542	6,146,595
Cash and investments at the end of year	$ 10,578,034	$ 11,365,542
Reconciliation of operating income (loss) to net cash provided by (used for) operating activities:		
Operating income (loss)	$ (2,596,114)	$ 4,618,138
Adjustments to reconcile operating income (loss) to net cash used for operating activities:		
Depreciation	29,103	25,577
(Increase) decrease in accounts receivable	176,515	712,489
(Increase) decrease in prepaid expenses	18,170	(10,206)
Increase (decrease) in account payable	1,581,185	(404,168)
Increase (decrease) in accrued salaries and benefits	(61,124)	74,590
Increase (decrease) in compensated absences	9,060	42,191
Net cash provided by (used for) operating activities	$ (843,205)	$ 5,058,611

Noncash investing, capital and financing activities:

There were no significant noncash investing, capital or financing activities during the fiscal year ended June 30, 2010.

See accompanying notes to the basic financial statements.

CHINO BASIN WATERMASTER

Notes to the Basic Financial Statements

Year ended June 30, 2010

(1) Reporting Entity and Summary of Significant Accounting Policies

Description of Reporting Entity

The Chino Basin Watermaster ("Watermaster") was established under a judgment entered in Superior Court of the State of California for the County of San Bernardino as a result of Case No. RCV 51010 (formerly Case No. SCV 164327) entitled "Chino Basin Municipal Water District v. City of Chino, et al.", signed by the Honorable Judge Howard B. Wiener on January 27, 1978. The effective date of this Judgment for accounting and operations was July 1, 1977.

Pursuant to the Judgment, the Chino Basin Municipal Water District (CBMWD) five member Board of Directors was initially appointed as "Watermaster". Their term of appointment as Watermaster was for five years, and the Court, by subsequent orders, provides for successive terms or for a successor Watermaster. Pursuant to a recommendation of the Advisory Committee, the Honorable J. Michael Gunn appointed a nine-member board as Watermaster on September 28, 2000.

Under the Judgment, three Pool committees were formed: (1) Overlying (Agricultural) Pool which includes the State of California and all producers of water for overlying uses other than industrial or commercial purposes; (2) Overlying (Non-Agricultural) Pool which represents producers of water for overlying industrial or commercial purposes; and (3) Appropriative Pool which represents cities, districts, other public or private entities and utilities. The three Pools act together to form the "Advisory Committee".

The Watermaster provides the Chino Groundwater Basin service area with services which primarily include: accounting for water appropriations and components of acre-footage of stored water by agency, purchase of replenishment water, groundwater monitoring and implementation of special projects.

Watermaster expenditures are allocated to the pools based on the prior year's production volume (or the same percentage used to set the annual assessments). Allocations for fiscal year 2009-10 expenses are based on the 2008-09 production volume.

	2008-09	
	Acre Feet	%
Production Volume:		
Appropriative Pool	84,716	69.867
Agricultural Pool	32,143	26.509
Non-Agricultural Pool	4,394	3.624
Total Production Volume	121,253	100.000

(1) Reporting Entity and Summary of Significant Accounting Policies, (Continued)

The Agricultural Pool members ratified an agreement with the Appropriative Pool at their meeting of June 16, 1988, wherein the Appropriative Pool assumes Agricultural Pool administrative expenses and special project cost allocations in exchange for an accelerated transfer of unpumped agricultural water to the Appropriative Pool. In addition the Agricultural Pool transferred all pool administrative reserves at June 30, 1988 to the Appropriative Pool effective July 1, 1988.

In July of 2000, the principal parties in the Basin signed an agreement, known as the Peace Agreement, which among other things formalized the commitment of the Basin parties to implement an Optimum Basin Management Program. The Peace Agreement was signed by all of the parties, and the Court has approved the agreement and ordered the Watermaster to proceed in accordance with the terms of the agreement. The Court has approved revisions to the Chino Basin Watermaster Rules and Regulations.

Basis of Accounting

The Watermaster is accounted for as an enterprise fund (proprietary fund type). A fund is an accounting entity with a self-balancing set of accounts established to record the financial position and results of operations of a specific governmental activity. The activities of enterprise funds closely resemble those of ongoing businesses in which the purpose is to conserve and add to basic resources while meeting operating expenses from current revenues. Enterprise funds account for operations that provide services on a continuous basis and are substantially financed by revenues derived from user charges. The Watermaster utilizes the accrual basis of accounting. Revenues are recognized when earned and expenses are recognized as they are incurred.

The Watermaster applies all applicable GASB pronouncements in accounting and reporting for proprietary operations as well as the following pronouncements issued on or before November 30, 1989, unless those pronouncements conflict with or contradict GASB pronouncements: Financial Accounting Standards Board (FASB) Statements and Interpretations, Accounting Principals Board (APB) Opinions, and Accounting Research Bulletins (ARB's) of the Committee on Accounting Procedure.

Cash and Investments

Investments are reported in the accompanying balance sheet at fair value. Changes in fair value that occur during a fiscal year are recognized as interest income reported for that fiscal year.

Watermaster pools cash and investments of all fund balance reserves. Interest income earned by the pooled investments is allocated quarterly to the various reserves based on each reserve's average cash and investments balance.

(1) Reporting Entity and Summary of Significant Accounting Policies, (Continued)

Cash Equivalents

For the purposes of the statements of cash flows, cash equivalents are defined as short-term, highly liquid investments that are both readily convertible to known amounts of cash or so near their maturity that they present insignificant risk of changes in value because of changes in interest rates, and have an original maturity date of three months or less.

Capital Assets

Capital assets are valued at cost where historical records are available and at an estimated historical cost where no historical records exist. The Watermaster capitalizes all assets with a historical cost of at least $5,000 and a useful life of at least three years. The cost of normal maintenance and repairs that do not add to the value of the assets or materially extend asset lives are not capitalized.

Depreciation is computed utilizing the straight-line method over the following estimated useful lives:

Computer equipment and software	5 years
Office furniture and fixtures	7 years
Leasehold improvements	10 years
Automotive equipment	7 years

Use of Estimates

The preparation of financial statements requires management to make certain estimates and assumptions that affect the reported amounts of assts and liabilities, and disclosure of contingent assets and liabilities, at the date of the financial statements, as well as the reported amounts of revenue and expenses during the reporting period. Actual results could differ from those estimates.

Appropriative Interest Revenue Allocation

On August 30, 1979, the Appropriative Pool unanimously approved assessment procedures whereby any interest earned from the Watermaster assessments paid by Appropriative Pool members would reduce the total current assessment due from those members. Fiscal year 2008-09 interest revenue was allocated to the Appropriative Pool, resulting in a reduction of the 2009-10 assessments. The amount of administrative assessment received for the year ended June 30, 2010 was $7,404,003.

(1) Reporting Entity and Summary of Significant Accounting Policies, (Continued)

Prior Year Data

The information included in the accompanying financial statements for the prior year has been presented for comparison purposes only and does not represent a complete presentation in accordance with generally accepted accounting principles. Accordingly, such information should be read in conjunction with the Watermaster's prior year financial statements, from which the financial data was derived.

(2) Cash and Investments

Cash and investments as of June 30, 2010 are classified in the accompanying financial statements as follows:

Statement of net assets:	
Cash and investments	$10,578,034
Total cash and investments	$10,578,034

Cash and investments as of June 30, 2010 consist of the following:

Cash on hand	$ 500
Deposits with financial institutions	603,604
Investments	9,973,930
Total cash and investments	$10,578,034

(2) Cash and Investments, (Continued)

Investments Authorized by the California Government Code and the Watermaster's Investment Policy

The table below identifies the investment types that are authorized for the Watermaster by the California Government Code and the Watermaster's investment policy. The table also identifies certain provisions of the California Government Code (or the Watermaster's investment policy, if more restrictive) that address interest rate risk, credit risk, and concentration of credit risk.

Investment Types Authorized by State Law	Authorized By Investment Policy	*Maximum Maturity	*Maximum Percentage Of Portfolio	*Maximum Investment In One Issuer
Local Agency Bonds	Yes	5 years	None	None
U.S. Treasury Obligations	Yes	5 years	None	None
U.S. Agency Securities	Yes	5 years	None	None
Banker's Acceptances	Yes	180 days	40%	30%
Commercial Paper	Yes	270 days	25%	10%
Negotiable Certificates of Deposit	Yes	5 years	30%	None
Repurchase Agreements	Yes	1 year	None	None
Reverse Repurchase Agreements	Yes	92 days	20% of base value	None
Medium-Term Notes	Yes	5 years	30%	None
Mutual Funds	Yes	N/A	20%	10%
Money Market Mutual Funds	Yes	N/A	20%	10%
Mortgage Pass-Through Securities	Yes	5 years	20%	None
County Pooled Investment Funds	Yes	N/A	None	None
Local Agency Investment Fund (LAIF)	Yes	N/A	None	None
JPA Pools (other investment pools)	Yes	N/A	None	None

* Based on state law requirements or investment policy requirements, whichever is more restrictive.

(2) Cash and Investments, (Continued)

Disclosures Relating to Interest Rate Risk

Interest rate risk is the risk that changes in market interest rates will adversely affect the fair value of an investment. Generally, the longer the maturity of an investment, the greater the sensitivity of its fair value to changes in market interest rates. One of the ways that the Watermaster manages its exposure to interest rate risk is by purchasing a combination of shorter term and longer term investments and by timing cash flows from maturities so that a portion of the portfolio is maturing or coming close to maturity evenly over time as necessary to provide the cash flow and liquidity needed for operations.

Information about the sensitivity of the fair values of the Watermaster's investments to market interest rate fluctuations is provided by the following table that shows the distribution of the Watermaster's investment by maturity:

	Remaining Maturity (in Months)			
Investment Type	Total Amount	12 Months Or Less	13-24 Months	25-60 Months
Local Agency Investment Fund	$ 9,973,930	9,973,930	-	-
Total	$ 9,973,930	9,973,930	-	-

Disclosures Relating to Credit Risk

Generally, credit risk is the risk that an issuer of an investment will not fulfill its obligation to the holder of the investment. This is measured by the assignment of a rating by a nationally recognized statistical rating organization. Presented below is the minimum rating required by (where applicable) the California Government Code, the Watermaster's investment policy, and the actual rating as of year end for each investment type:

			Rating as of Year End		
Investment Type	Total Amount	Minimum Legal Rating	AAA	Aa	Not Rated
Local Agency Investment Fund	$9,973,930	N/A	-	-	9,973,930
Total	$9,973,930		-	-	9,973,930

(2) Cash and Investments, (Continued)

Custodial Credit Risk

Custodial credit risk for *deposits* is the risk that, in the event of the failure of a depository financial institution, a government will not be able to recover its deposits or will not be able to recover collateral securities that are in the possession of an outside party. The custodial credit risk for *investments* is the risk that, in the event of the failure of the counterparty (e.g., broker-dealer) to a transaction, a government will not be able to recover the value of its investment or collateral securities that are in the possession of another party. The California Government Code and the Watermaster's investment policy do not contain legal or policy requirements that would limit the exposure to custodial credit risk for deposits or investments, other than the following provision for deposits: The California Government Code requires that a financial institution secure deposits made by governmental units by pledging securities in an undivided collateral pool held by a depository regulated under state law (unless so waived by the governmental unit). The market value of the pledged securities in the collateral pool must equal at least 110% of the total amount deposited by the public agencies. California law also allows financial institutions to secure Watermaster deposits by pledging first trust deed mortgage notes having a value of 150% of the secured public deposits.

Investment in State Investment Pool

The Watermaster is a voluntary participant in the Local Agency Investment Fund (LAIF) that is regulated by the California Government Code under the oversight of the Treasurer of the State of California. The fair value of the Watermaster's investment in this pool is reported in the accompanying financial statements at amounts based upon the Watermaster's pro-rata share of the fair value provided by LAIF for the entire LAIF portfolio (in relation to the amortized cost of that portfolio). The balance available for withdrawal is based on the accounting records maintained by LAIF, which are recorded on an amortized cost basis.

(3) Capital Assets

Capital asset activity for the year ended June 30, 2010 is as follows:

	Balances at July 1, 2009	Additions	Deletions	Balances at June 30, 2010
Computer equipment and software	$ 94,774	22,816	-	117,590
Office furniture and fixtures	42,291	-	-	42,291
Leasehold improvements	23,443	-	-	23,443
Automotive equipment	90,484	-	-	90,484
Total costs of depreciable assets	250,992	22,816	-	273,808
Less accumulated depreciation:				
Computer equipment and software	(74,055)	(13,565)	-	(87,620)
Office furniture and fixtures	(36,953)	(5,339)	-	(42,292)
Leasehold improvements	(14,068)	(2,345)	-	(16,413)
Automotive equipment	(72,740)	(7,854)	-	(80,594)
Total accumulated depreciation	(197,816)	(29,103)	-	(226,919)
Net capital assets	$ 53,176	(6,287)	-	46,889

(4) Compensated Absences

Permanent Watermaster employees earn from 10 to 20 vacation days a year, depending upon their length of employment and 12 sick days a year. Employees may carry vacation days forward up to the equivalent number of days earned in the immediately preceding twenty-four (24) month period. There is no maximum accumulation of sick leave; and upon retirement or resignation at age 55 or greater, employees with continuous employment for a minimum of twenty (20) years are compensated for all accumulated sick leave at 50% of their rate of pay at termination. Other employees are paid based upon length of employment and age at time of retirement or resignation. The amount of compensated absences outstanding as of June 30, 2010 was $194,246.

(5) Deferred Compensation Plan

The Watermaster has established deferred compensation plans for all employees of Watermaster in accordance with Internal Revenue Code Section 457, whereby employees authorize the Watermaster to defer a portion of their salary to be deposited in individual investment accounts. Participation in the plans is voluntary and may be revoked at any time upon advance written notice. The amount of compensation subject to deferral until retirement, disability, or other termination by a participant may not exceed the maximum legal amounts for deferred compensation plans. Amounts withheld by Watermaster under this plan are deposited regularly with California Public Employees' Retirement System. The Watermaster makes no contribution under the plan. As of June 30, 2010, the deferred compensation plan assets were held in trust accounts for the sole benefit of the employees and their beneficiaries, and accordingly have been excluded from Watermaster's reported assets.

(6) Operating Lease

The Watermaster entered into a new lease for rent of office space on September 1, 2003, expiring August 30, 2018. The amount paid under this lease was $65,940 for the year ended June 30, 2010. The future minimum lease payments for this lease are as follows:

Year Ending June 30:	Amount
2011	69,504
2012	69,504
2013	69,504
2014	69,504
2015-2019	289,600
Total	$567,616

(7) Defined Benefit Pension Plan (PERS)

Plan Description

The Watermaster contributes to the California Public Employees Retirement System (PERS), a cost-sharing multiple-employer public employee defined benefit pension plan. PERS provides retirement, disability benefits, and death benefits to plan members and beneficiaries. Effective May 2009, the Watermaster changed from a 2% at 55 Risk Pool during year ending June 30, 2008 to a 2.5% at 55 Risk Pool. PERS acts as a common investment and administrative agent for participating public entities within the State of California. PERS issues a publicly available financial report that includes financial statements and required supplementary information for the cost sharing plans that are administered by PERS. Copies of PERS' annual financial report may be obtained from its executive office at 400 "P" Street, Sacramento, California 95814.

(7) Defined Benefit Pension Plan (PERS), (Continued)

Contributions

Participants are required to contribute 8% of their annual covered salary. The Watermaster makes the contributions required of the employees on their behalf and for their account. Benefit provisions and all other requirements are established by state statute and the Watermaster contract with employee bargaining groups.

For each of the fiscal years shown below, the Watermaster has contributed at the actuarially determined rate provided by PERS' actuaries. Under GASB 27, an employer reports an annual pension cost (APC) equal to the annual required contribution (ARC) plus an adjustment for the cumulative difference between the APC and the employer's actual plan contributions for the year. The cumulative difference is called the net pension obligation (NPO). The ARC for the period July 1, 2009 to June 30, 2010 has been determined by an actuarial valuation of the plan as of June 30, 2007. The Watermaster's covered payroll for PERS was $862,905.01 for the year ended June 30, 2010, while the Watermaster's total payroll for all employees was $862,905.01 during the same period. In order to calculate the dollar value of the ARC for inclusion in financial statements prepared as of June 30, 2010, the contribution rate is multiplied by the payroll of covered employees that were paid during the period from July 1, 2009 to June 30, 2010.

Three-Year Trend Information

Annual Pension cost (Safety)

Fiscal Year	Employer Contribution Rate	Employer Contribution	Percentage Contributed	Net Pension Obligation
6/30/08	10.345%	144,250	100%	-
6/30/09	11.346%	176,576	100%	-
6/30/10	11.417%	165,298	100%	-

(8) Project Commitments

Under a financing agreement developed pursuant to the OBMP Recharge Master Plan, the Watermaster is obligated to pay for one-half of the fixed project costs for certain recharge facilities in the Chino Basin area that are being constructed to increase the recharge of imported water, storm water, and recycled water to the Chino Groundwater Basin. The recharge facilities being constructed will be owned by the Inland Empire Utilities Agency pursuant to a Recharge Operations Agreement. When complete, the recharge project will enable the Watermaster to increase annual recharge supplemental water to the Chino Groundwater Basin. In addition, stormwater and recycled water recharge would be increased. Fixed project costs include construction costs, debt service on the related bond financing and reserves for repair, replacement, improvement and debt service. The Watermaster's share of the cost for 2009 is $515,006.

(9) Purchase of Water from Non-Agricultural Pool

As part of the Peace II Agreement, a purchase and sale agreement between the Overlying (Non-Agricultural) Pool and Watermaster was signed on September 27, 2007. The signed agreement (Attachment "G") was titled "PURCHASE AND SALE AGREEMENT FOR THE PURCHASE OF WATER BY WATERMASTER FROM THE OVERLYING (NON-AGRICULTURAL) POOL". Section D of the Agreement states:

"Commencing thirty (30) calendar days from the Notice of Intent to Purchase ("Payment Date") Watermaster will pay to the Non-Agricultural Overlying Pool for each acre-foot of the Storage Transfer Quantity in accordance with the following schedule as the schedule is adjusted for inflation by the consumers price index ("CPI") for San Bernardino County from May 31, 2006 until the Payment Date:

1. $215 times 1/4 of the Storage Transfer Quantity on the Payment Date.
2. $220 times 1/4 of the Storage Transfer Quantity on the first anniversary of the Payment Date.
3. $225 times 1/4 of the Storage Transfer Quantity on the second anniversary of the Payment Date.
4. $230 times 1/4 of the Storage Transfer Quantity on the third anniversary of the Payment Date.

However, all payments provided for herein, including inflation adjustments, are subject to an express price cap and will not exceed ninety-two (92) percent of the then prevailing MWD replenishment rate in any year".

The Notice of Intent to Purchase ("Payment Date") was December 18, 2009. On January 14, 2010 the first of four installment payments in the amount of $2,166,022 (adjusted for inflation as prescribed by Section D) were issued to the Non-Agricultural Overlying Pool. The future three payments (adjusted for inflation) will be issued in accordance to Section D.

SUPPLEMENTARY INFORMATION

CHINO BASIN WATERMASTER
COMBINING SCHEDULE OF REVENUE, EXPENSES AND CHANGES IN WORKING CAPITAL
FOR THE PERIOD JULY 1, 2009 THROUGH JUNE 30, 2010

			POOL ADMINISTRATION & SPECIAL PROJECTS			GROUNDWATER OPERATIONS				
	WATERMASTER ADMINISTRATION	OPTIMUM BASIN MANAGEMENT	APPROPRIATIVE POOL	AG POOL	NON-AG POOL	GROUNDWATER REPLENISHMENT	SB222 FUNDS	EDUCATION FUNDS	GRAND TOTALS	BUDGET 2009-2010
Administrative Revenues:										
Administrative Assessments	-	-	7,178,987	-	225,016	-	-	-	7,404,003	$7,340,839
Interest Revenue	-	-	39,009	2,764	1,744	-	-	6	43,523	191,540
Mutual Agency Project Revenue	-	-	-	-	-	-	-	-	-	148,410
Grant Income	-	-	-	-	-	-	-	-	-	-
Miscellaneous Income	111,000	-	188	-	-	-	-	-	111,188	-
Total Revenues	111,000	-	7,218,184	2,764	226,760	-	-	6	7,558,714	7,680,789
Administrative & Project Expenditures:										
Watermaster Administration	686,339								686,339	580,238
Watermaster Board-Advisory Committee	61,245								61,245	61,901
Pool Administration			22,731	186,478	6,596				215,805	229,860
Optimum Basin Mgnt Administration		1,710,617							1,710,617	1,557,820
OBMP Project Costs		3,726,777							3,726,777	4,109,362
Debt Service		890,006							890,006	1,131,233
Education Funds Use								-	-	375
Mutual Agency Project Costs		-							-	10,000
Total Administrative/OBMP Expenses	747,584	6,327,400	22,731	186,478	6,596			-	7,290,789	7,680,789
Net Administrative/OBMP Expenses	(636,584)	(6,327,400)								
Allocate Net Admin Expenses To Pools	636,584		444,765	168,751	23,069				-	
Allocate Net OBMP Expenses To Pools		5,437,394	3,798,965	1,441,388	197,041				-	
Allocate Debt Service to App Pool		890,006	890,006						-	
Agricultural Expense Transfer*			1,796,616	(1,796,616)					-	
Total Expenses			6,953,083	-	226,706	-	-	-	7,290,789	7,680,789
Net Administrative Income			265,101	2,764	54			6	267,925	-
Other Income/(Expense)										
Replenishment Water Assessments						7,073,805			7,073,805	-
Interest Revenue						34,990			34,990	-
Water Purchases									-	-
Balance Adjustment									-	-
Other Water Purchases			10,939			(2,176,961)			(2,166,022)	-
Groundwater Replenishment						(7,728,299)			(7,728,299)	-
Net Other Income			10,939	-	-	(2,796,465)	-	-	(2,785,526)	-
Net Transfers To/(From) Reserves			276,040	2,764	54	(2,796,465)	-	6	(2,517,601)	-
		-								
Working Capital, July 1, 2009			5,942,967	470,719	256,577	4,166,457	158,251	995	10,995,966	
Working Capital, End Of Period			6,219,007	473,483	256,631	1,369,992	158,251	1,001	8,478,365	8,478,365
08/09 Assessable Production			84,716.450	32,142.764	4,393.990				121,253.204	
08/09 Production Percentages			69.867%	26.509%	3.624%				100.000%	

*Fund balance transfer as agreed to in the Peace Agreement.

CHINO BASIN WATERMASTER
COMBINING SCHEDULE OF REVENUE, EXPENSES AND CHANGES IN WORKING CAPITAL
FOR THE
PERIOD JULY 1, 2008 THROUGH JUNE 30, 2009

	WATERMASTER ADMINISTRATION	OPTIMUM BASIN MANAGEMENT	POOL ADMINISTRATION AND SPECIAL PROJECTS APPROPRIATIVE POOL	AGRICULTURAL POOL	NON-AGRIC. POOL	GROUNDWATER OPERATIONS GROUNDWATER REPLENISHMENT	SB222 FUNDS	EDUCATION FUNDS	GRAND TOTALS	BUDGET 2008-2009
Administrative Revenues										
Administrative Assessments	-	-	7,993,307	-	172,817	-	-	-	$ 8,166,124	$ 7,992,648
Interest Revenue	-	-	111,927	10,198	2,825	-	-	27	124,977	174,368
Mutual Agency Project Revenue	-	-	49,935	-	1,282	-	-	-	51,217	148,410
Grant Income	-	-	-	-	-	-	-	-	-	-
Miscellaneous Income	-	-	-	-	-	-	-	-	-	-
Total Revenues	-	-	8,155,169	10,198	176,924	-	-	27	8,342,318	8,315,426
Administrative & Project Expenditures										
Watermaster Administration	536,190	-	-	-	-	-	-	-	536,190	619,960
Watermaster Board-Advisory Committee	58,265	-	-	-	-	-	-	-	58,265	61,201
Pool Administration	-	-	20,294	167,194	5,117	-	-	-	192,605	196,523
Optimum Basin Mgnt Administration	-	1,930,126	-	-	-	-	-	-	1,930,126	2,023,380
OBMP Project Costs	-	3,721,316	-	-	-	-	-	-	3,721,316	4,142,393
Debt Service	-	1,261,894	-	-	-	-	-	-	1,261,894	1,261,594
Education Funds Use	-	-	-	-	-	-	-	375	375	375
Mutual Agency Project Costs	-	10,000	-	-	-	-	-	-	10,000	10,000
Total Administrative/OBMP Expenses	594,455	6,923,336	20,294	167,194	5,117	-	-	375	7,710,771	8,315,426
Net Administrative/OBMP Expenses	(594,455)	(6,923,336)								
Allocate Net Admin Expenses To Pools	594,455		445,873	133,703	14,879	-	-	-	-	-
Allocate Net OBMP Expenses To Pools		5,661,442	4,344,583	1,273,351	43,508	-	-	-	-	-
Allocate Debt Service to App Pool		1,261,894	1,261,894	-	-	-	-	-	-	-
Agricultural Expense Transfer*			1,552,774	(1,552,774)	-	-	-	-	-	-
Total Expenses			7,625,418	21,474	63,504	-	-	375	7,710,771	8,315,426
Net Administrative Income			529,751	(11,276)	113,420	-	-	(348)	631,547	-
Other Income/(Expense)										
Replenishment Water Assessments			-	-	-	6,437,643	-	-	6,437,643	-
Interest Revenue			-	-	-	54,889	-	-	54,889	-
Water Purchases			-	-	-	(2,326,075)	-	-	(2,326,075)	-
Balance Adjustment			-	-	-	-	-	-	-	-
Groundwater Replenishment			-	-	-	-	-	-	-	-
Net Other Income			-	-	-	4,166,457	-	-	4,166,457	-
Revenues Over (Under) Expenditures			529,751	(11,276)	113,420	4,166,457	-	(348)	4,798,004	-
Working Capital, July 1, 2008			5,413,216	481,995	143,157	-	158,251	1,343	6,197,962	
Working Capital, End Of Period			5,942,967	470,719	256,577	4,166,457	158,251	995	$ 10,995,966	$ 10,995,966
07/08 Assessable Production			103,077.958	30,909.693	3,439.822				137,427.473	
07/08 Production Percentages			75.005%	22.492%	2.503%				100.000%	

*Fund balance transfer as agreed to in the Peace Agreement.

Appendix C

1978 Chino Basin Optimum Basin Management Program –

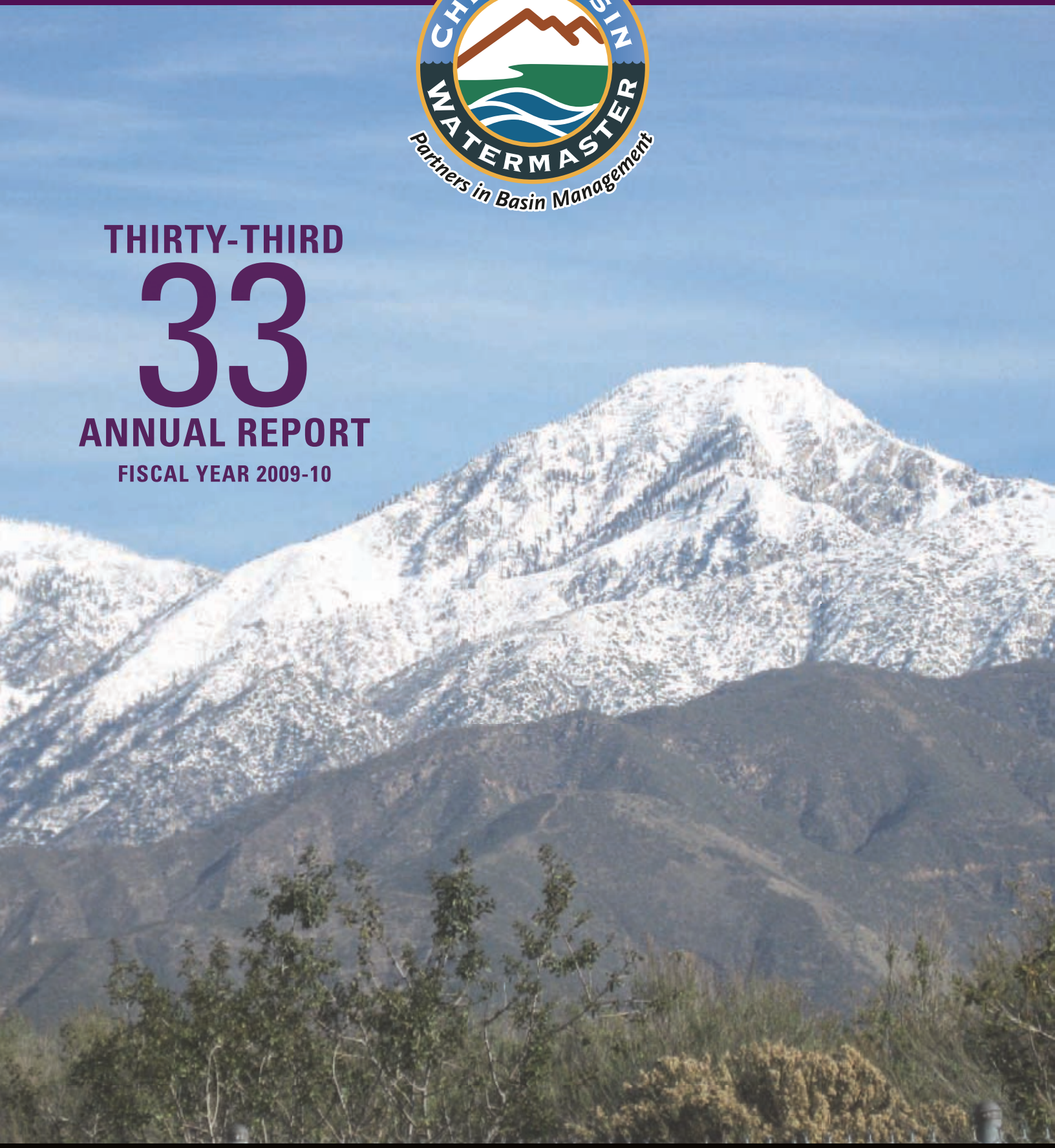
2008 State of the Basin Report

CHINO BASIN WATERMASTER

Partners in Basin Management

THIRTY-THIRD 33 ANNUAL REPORT

FISCAL YEAR 2009-10



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Chino Basin

Optimum Basin Management Program

2008 State of the Basin Report

Final Report

Prepared for

Chino Basin Watermaster

Prepared by

WILDERMUTH™
ENVIRONMENTAL INC.

NOVEMBER 2009

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Acronyms, Abbreviations, and Initialisms

µg/L	micrograms per liter
1,1,1-TCA	1,1,1-trichloroethane
1,1-DCE	1,1-dichloroethene
1,2,3-TCP	1,2,3-trichloropropane
1,2-DCA	1,2-dichloroethane
AF	acre-feet
AFY	acre-feet per year
B&V	Black & Veatch, Inc.
Basin Plan	Water Quality Control Plan for the Santa Ana River Basin
CAO	Cleanup and Abatement Order
CBWM ID	Chino Basin Watermaster Well Identification
CDA	Chino Desalter Authority
CDFM	cumulative departure from mean precipitation
CDPH	California Department of Public Health (formerly the Department of Health Services)
CIM	California Institution for Men
cis-1,2-DCE	cis-1,2-dichloroethene
COPC	Constituents of Potential Concern
CVWD	Cucamonga Valley Water District
DLR	detection limit for reporting
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
EMP	Evaluation Monitoring Program
EPA	US Environmental Protection Agency
ft	feet
ft-bgs	feet below ground surface
ft-brp	feet below reference point (*e.g.* static surveyed measurement point)
GE	General Electric
GIS	Geographic Information System
GRCC	Groundwater Recharge Coordination Committee
HCMP	Hydraulic Control Monitoring Program
IEUA	Inland Empire Utilities Agency

Acronyms, Abbreviations, and Initialisms

InSAR	Synthetic Aperture Radar Interferometry
ISOB	Initial State of the Basin
JCSD	Jurupa Community Services District
M&RP	Monitoring and Reporting Program
MCL	maximum contaminant level
mg/L	milligrams per liter
MSL	Milliken Sanitary Landfill
MVSL	Mid-Valley Sanitary Landfill
MVWD	Monte Vista Water District
MWDSC	Metropolitan Water District of Southern California
MZ	Management Zone
NDMA	N-nitrosodimethylamine
NO_3 - N	Nitrate expressed as nitrogen
NPL	National Priorities List
OBMP	Optimum Basin Management Program
OIA	Ontario International Airport
PBMZ	Prado Basin Management Zone
PCBs	polychlorinated biphenyls
PCE	tetrachloroethene
ROD	Records of Decision
RP	Regional Plant
RWQCB	Regional Water Quality Control Board
SARWC	Santa Ana River Water Company
SOB	State of the Basin
SWP	State Water Project
SWQIS	State Water Quality Information System
TCE	trichloroethene
TDS	total dissolved solids
TOC	total organic carbon
US EPA	US Environmental Protection Agency
USGS	US Geological Survey
USL	Upland Sanitary Landfill

Acronyms, Abbreviations, and Initialisms

VOC	volatile organic chemical
Watermaster	Chino Basin Watermaster
WEI	Wildermuth Environmental, Inc.
WQS	water quality standard

ES-1 Summary and Background

The baseline for the ISOB was on or about July 1, 2000—the point in time that represents the start of Optimum Basin Management Program (OBMP) implementation. The State of the Basin (SOB) reports serve as a metric for measuring OBMP implementation progress. This current SOB report contains water level, water quality, ground-level, and other data through 2007/08 and describes Watermaster activity through fall 2008.

The intent of this report is twofold:

- During Watermaster fiscal year 2000/01, several OBMP-spawned investigations and initiatives commenced, encompassing groundwater level and quality, ground level, annual recharge assessment, recharge master planning, hydraulic control, desalter planning and engineering, and meter installation. This report describes the progress made in these activities through the fall of 2008.
- This report also describes the general state of the basin with respect to groundwater levels, groundwater quality, subsidence, recharge, and hydraulic control.

ES-2 Section 2 – General Hydrologic Condition

The Chino Basin covers about 220 square miles. Figure 2-1 shows the location of the Chino Basin within the context of the Santa Ana River watershed. The watershed of the Chino Basin is almost identical to the Santa Ana River at Prado, the exception being the addition of the Temescal Creek watershed that enters the Prado Dam reservoir just upstream of the dam and for practical purposes contributes negligible inflow to the Chino Basin. In total, the watershed area for streams crossing the Chino Basin is about 1490 square miles.

The Chino Basin has a semi-arid Mediterranean climate. Precipitation is a major source of local groundwater recharge for the Basin and thus, the availability of this recharge can be understood by analyzing long-term precipitation records.

The hydrologic regime in the Chino Basin has important implications for water supply and groundwater management. The occurrence of long dry periods, characteristic of the region's climate, limit the recharge of precipitation and storm water recharge for years at a time and requires management strategies that conserve precipitation and storm water recharge whenever available. The amount of stormwater produced per unit of precipitation has increased over time due to urbanization and will continue to increase in the future as the remaining undeveloped and agricultural land uses are converted to developed uses.

ES-3 Section 3 – Basin Operations and Groundwater Monitoring

Future re-determinations of safe yield for the Chino Basin will be based largely on accurate estimations of groundwater production, artificial recharge, and basin storage changes over time. Watermaster is actively improving its programs to track production, recharge, and groundwater levels (storage). A meter installation program has improved production estimates in the agricultural areas. Watermaster continues to implement comprehensive, high-frequency,

groundwater-level monitoring programs across the basin to support various OBMP-related activities. Since 2003, Watermaster has been installing pressure transducers/data loggers in many of the wells it monitors for water levels to improve data quality. In addition, nine (9) nested sets of monitoring wells have been installed in the southern Chino Basin for the HCMP and provide highly detailed, depth-specific piezometric (and water quality) data. It is likely that additional monitoring wells will need to be constructed in southern Chino Basin as private wells (that are currently being used for monitoring by Watermaster) are destroyed as agricultural land uses convert to urban.

The following are the general trends in groundwater production:

- There was a basin-wide increase in the number of wells producing over 1,000 AFY between 1978 and 2008. This is consistent with (1) the land use transition from agricultural to urban, (2) the trend of increasing imported water costs, and (3) the use of desalters.
- Since the implementation of the OBMP in 2000, the number of active production wells just north of the Santa Ana River has decreased. This is consistent with the conversion of land use from agricultural to urban that has been occurring in the area.
- Since the implementation of the OBMP in 2000, desalter pumping has commenced and has progressively increased; in 2007/08, desalter pumping reached a historical high of 26,972 AF.
- Since the implementation of the OBMP in 2000, the number of wells that produce over 1,000 AFY on the west side of Chino Basin (west of Euclid Avenue) has decreased. This is consistent with (1) the implementation of the MZ1 Interim Management Plan, which reduced pumping by up to 3,000 AFY in the Chino area, and (2) the reduced pumping by the City of Pomona, the Monte Vista Water District, and the City of Chino Hills from 2003 to 2008 as these agencies have been participating in in-lieu recharge for the Dry Year Yield program.
- Agricultural Pool pumping continues to decline. In 2007/08, total production for the Agricultural Pool fell to 30,910 AF, the lowest production on record for the pool. In accordance with the hypothesis that urbanization is the cause of decreased agricultural production, Appropriative Pool production tends to increase at approximately the same rate that Agricultural Pool production decreases.

As required by the Peace Agreement and summarized in the OBMP Recharge Master Plan, Watermaster initiated the Chino Basin Groundwater Recharge Program. This is a comprehensive program to enhance water supply reliability and improve the groundwater quality of local drinking water wells throughout the Chino Basin by increasing the recharge of storm water, imported water, and recycled water.

There are 21 Chino Basin recharge facilities described in the OBMP Recharge Master Plan, Phase II Report (WEI, 2001).

The following are the general trends in groundwater recharge:

- Since 2000, total storm water recharge has averaged approximately 4,600 AFY. During 2006/07 and 2007/08, total storm water recharge in the Chino Basin was

approximately 4,600 and 9,900 AF, respectively.

- Since 2000, the total supplemental water recharge—consisting of imported and recycled waters—has averaged approximately 11,500 AFY. During 2006/07 and 2007/08, total supplemental water recharge in the Chino Basin was approximately 6,350 and 2,400 AF, respectively.

The Chino Basin groundwater level analysis for fall 2008 revealed notable pumping depressions in the groundwater level surface that interrupt the general flow pattern surrounding the Chino I & Chino II Desalter well fields. There are also discernible groundwater level depressions in the northern portion of MZ1 (Montclair and Pomona areas) and directly southwest of the Jurupa Hills due to local groundwater production.

Watermaster has developed a Geographic Information System model to estimate groundwater storage changes from groundwater level contour maps. This model was utilized to estimate storage changes during the period following OBMP implementation. During the 2006 to 08 period, storage changed by about -54,000 AF. The total change in storage since implementation of the OBMP (2000-08) is approximately -62,000 AF.

With regard to hydraulic control, since 2000, pumping at the Chino I Desalter well field has generally flattened the regional hydraulic gradient within the shallow aquifer system around the western half of the Chino I Desalter well field and has created a capture zone surrounding the eastern half of the well field. Piezometric data suggest a significant reduction in the southward component of the hydraulic gradient around the western half of the Chino I Desalter well field but do not indicate a gradient reversal (northward component) and, hence, do not yet provide compelling evidence for complete hydraulic control at the Chino I Desalter well field. The ultimate fate of groundwater that flows past the Chino I Desalter well field is continued flow southward toward Prado Basin where groundwater rises to become surface water in the tributaries of Prado Basin.

ES-4 Section 4 – Groundwater Quality

Watermaster continues to monitor water quality in the basin and stores these data in a relational database, which also includes all of the historical data that Watermaster has been able to acquire for wells in the region. Watermaster has instituted a cooperative process whereby water quality data are acquired on a routine basis from the appropriators. This alleviates some of the data quality control issues with downloading data from the state water quality database.

Groundwater quality in Chino Basin is generally very good with better groundwater quality found in the northern portion of Chino Basin where recharge occurs. Salinity (TDS) and nitrate-nitrogen concentrations increase in the southern portion of Chino Basin. Between July 2003 and June 2008, 32 percent of the wells south of Highway 60 had TDS concentrations below the secondary MCL, an improvement from the 20 percent reported in the 2006 State of the Basin Report (period of July 2001 through June 2006). In some places, wells with low TDS concentrations are proximate to wells with higher TDS concentrations, suggesting a vertical stratification of water quality. Between July 2003 and June 2008, about 69 percent of the wells

sampled south of Highway 60 had nitrate-nitrogen concentrations greater than the MCL, an improvement from the 80 percent reported in the 2006 State of the Basin Report (period of July 2001 through June 2006). However, please note that these statistical improvements may be an artifact of sampling occurrence and frequency.

Other constituents that impact groundwater quality from a regulatory or Basin Plan standpoint include certain VOCs, arsenic, and perchlorate. As discussed in Section 4.3.4, there are a number of point source releases of VOCs in the Chino Basin that are in various stages of investigation or cleanup. There are also known point source releases of perchlorate (Milliken Valley Sanitary Landfill, Stringfellow, etc.), and non-point source related perchlorate contamination appears to have resulted from natural and anthropogenic sources. Arsenic at levels above the WQS appears to be limited to the deeper aquifer zone near the City of Chino Hills. Hexavalent chromium, while not currently a groundwater quality issue in the Chino Basin, may become so, depending on the promulgation of future standards.

The Initial State of the Basin and subsequent State of the Basin Reports discussed the need for future long-term monitoring. Due to commercial and residential development in the Chino Basin area; many of the private agricultural wells south of State Route 60 that have been used for monitoring activities are being destroyed as land is developed. In response to the loss of historically utilized wells, Watermaster developed a water quality key well program. This program designates a series of wells across a wide areal distribution for long-term monitoring activities. This key well monitoring program provides a good representation of the areal groundwater quality in this portion of the basin. Watermaster's program relies on municipal producers, government agencies, and private consultants to supply their groundwater quality data on a cooperative basis. Watermaster supplements these data with data obtained through its own sampling and analysis program of private wells in the area generally south of State Route 60. As with past water quality monitoring, the results will be added to the Watermaster database.

Point sources of concern are critical to the overall quality of Chino Basin groundwater. To ensure that Chino Basin groundwater remains a sustainable resource, it is of the utmost importance that Watermaster closely monitor point sources and emerging contaminates. It is recommended that Watermaster continue to work closely with the RWQCB and potentially responsible parties within the Chino Basin. This will allow for up-to-date understanding of groundwater quality, investigations, remediation activities, and potential mutually beneficial remedial options through Chino Basin desalting facilities.

ES-5 Section 5 – Ground-Level Monitoring

Implementation of the MZ1 Plan began in 2008. The MZ1 Plan calls for (1) the continued scope and frequency of monitoring implemented during the IMP within the MZ1 Managed Area and (2) expanded monitoring of the aquifer system and land subsidence in other areas of the Chino Basin where the Interim Management Plan (IMP) indicated concern for future subsidence and ground fissuring. The expanded monitoring efforts outside of the MZ1 Managed Area are consistent with the requirements of PE1.

Watermaster's current ground-level monitoring program includes:

- *Piezometric Levels.* Piezometric levels are an important part of the ground-level monitoring program because piezometric changes are the mechanism for aquifer-system deformation and land subsidence.
- *Aquifer-System Deformation.* Watermaster records aquifer-system deformation at the Ayala Park Extensometer facility where two extensometers record the vertical component of aquifer-system compression and/or expansion once every 15 minutes.
- *Vertical Ground-Surface Deformation.* Watermaster monitors vertical ground-surface deformation via the ground-level surveying and remote sensing (InSAR) techniques established during the IMP.
- *Horizontal Ground-Surface Deformation.* Watermaster monitors horizontal ground-surface displacement across the eastern side of the subsidence trough and the adjacent area east of the barrier/fissure zone. These data, obtained by electronic distance measurements (EDMs), are used to characterize the horizontal component of land surface displacement caused by groundwater production on either side of the fissure zone.

The conclusions and recommendations for Watermaster's basin-wide ground-level monitoring program are provided below:

- Land subsidence does not appear to be a concern in the eastern and northernmost portions of Chino Basin. In these areas, the underlying aquifer system is composed primarily of coarse-grained sediments that are not prone to compaction.

- Land subsidence and the potential for ground fissuring are major concerns in the western and southern portions of the Chino Basin. In these areas, the underlying aquifer system consists of interbedded, fine-grained sediment layers (aquitards) that can drain and compact when groundwater levels decline in the adjacent coarse-grained aquifers. Ground fissuring has occurred in the past where land subsidence was differential (i.e. steep gradient of subsidence). Ground fissuring is the main subsidence-related threat to infrastructure.

- Land subsidence has been persistent across most of the western and southern portions of the Chino Basin since, at least, 1987 when land subsidence monitoring began. In many of these areas, land subsidence continues even during periods of groundwater level recovery, indicating that thick, slowly-draining aquitards are compacting in response to the large historical drawdowns of 1935 to 1978.

- Pumping-induced drawdown has caused accelerated occurrences of land subsidence in the recent past, including subsidence in the City of Chino during the early 1990s and, currently, in the vicinity of the Chino I Desalter well field. Watermaster should anticipate similar occurrences of land subsidence in areas (1) that are prone to subsidence and (2) where drawdown will occur in the future.

- Watermaster will continue its basin-wide ground-level monitoring program, using InSAR and ground-level surveys. Watermaster will consider expanding the ground-level surveys to cover the area of the proposed Chino Creek Desalter Well Field. This

is an area that is prone to subsidence, where drawdown is planned near where ground fissuring has occurred in the past, and where InSAR data is not currently available. Watermaster will also consider expanding the ground-level surveys to cover the Pomona and Ontario Areas. In general, InSAR data coverage is continuous and of high quality throughout both areas, so ground-level surveys would primarily provide supporting and confirmation data for the InSAR and would occur at a frequency of once every three to five years.

- Watermaster will consider installing low-cost piezometer/extensometer facilities at appropriate locations in all Areas of Subsidence Concern. This type of facility has been successfully constructed and tested at Ayala Park in Chino. Such facilities record the requisite data (1) to monitor land subsidence and groundwater levels at high resolution and accuracy, (2) to provide the information necessary to characterize the elastic and/or inelastic nature of any land subsidence occurring in an area, and (3) to provide the information necessary to characterize aquifer and aquitard properties that could be used in a predictive computer-simulation model of subsidence.

- Watermaster will consider building and calibrating predictive computer-simulation models of subsidence across all Areas of Subsidence Concern in the Chino Basin. These models would provide information on the rates and ultimate magnitude of land subsidence that could be associated with various basin management planning scenarios (i.e. pumping and recharge patterns). This information would be valuable to affected Watermaster parties.

- Because ground fissuring caused by differential land subsidence is the main threat to infrastructure, Watermaster will periodically inspect for signs of ground fissuring in areas that are experiencing differential land subsidence. In addition, Watermaster will consider monitoring the horizontal strain across these zones of potential ground fissuring in an effort to better understand and manage ground fissuring.

1.1 Background

The Chino Basin Watermaster (Watermaster) completed the *Initial State of the Basin* (ISOB) Report in October 2002. The baseline for the ISOB was on or about July 1, 2000—the point in time that represents the start of Optimum Basin Management Program (OBMP) implementation. The ISOB and subsequent State of the Basin (SOB) reports serve as a metric for measuring OBMP implementation progress. This current SOB report contains water level, water quality, ground-level, and other data through 2007/08 and describes Watermaster activity through fall 2008.

The OBMP was developed for the Chino Basin (see Figure 1-1 for the location of Chino Basin and its management zones) pursuant to the Judgment (Chino Basin Municipal Water District v. City of Chino, et al.) and the February 19, 1998 ruling (WEI, 1999). Pursuant to the OBMP Phase 1 Report, the Peace Agreement and associated Implementation Plan, and the November 15, 2001 Court Order, Watermaster staff has prepared this State of the Basin (SOB) Report. The intent of this report is twofold:

- During Watermaster fiscal year 2000/01, several OBMP-spawned investigations and initiatives commenced, encompassing groundwater level and quality, ground level, annual recharge assessment, recharge master planning, hydraulic control, desalter planning and engineering, and meter installation. This report describes the progress made in these activities through the fall of 2008.
- This report also describes the general state of the basin with respect to groundwater levels, groundwater quality, ground surface levels (subsidence), recharge, and hydraulic control.

1.2 Report Organization

Executive Summary: The Executive Summary provides a brief overview of the OBMP and its results.

Section 1 – Introduction: This section describes the project background, summarizes the project objectives, and provides an outline.

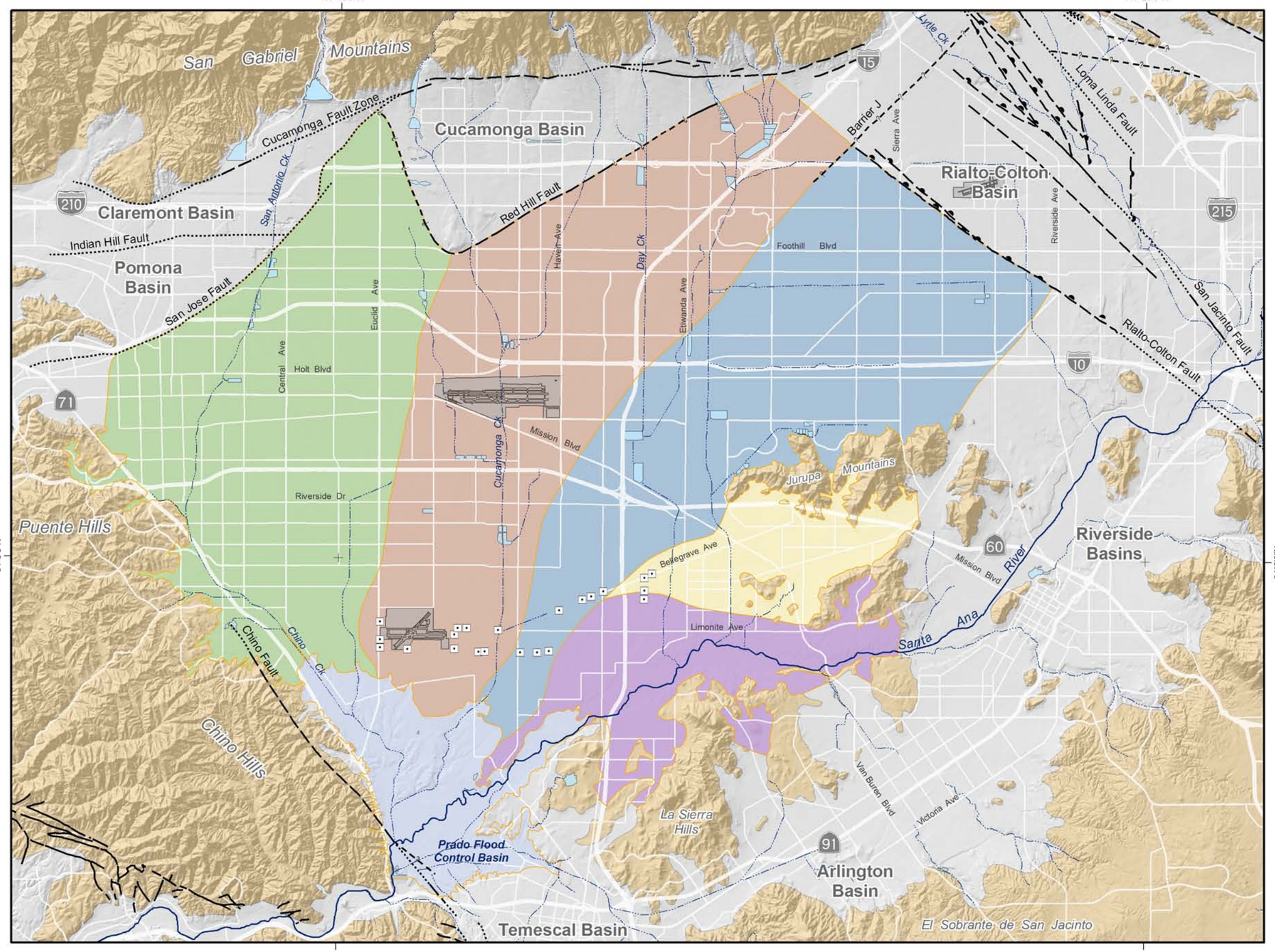
Section 2 – General Hydrologic Condition: Section 2 describes the general hydrologic condition of the Chino Basin.

Section 3 – Basin Operations and Groundwater Level Monitoring: Section 3 describes Basin operations, including groundwater level, groundwater quality, groundwater production, recharge, and ground surface monitoring efforts.

Section 4 – Groundwater Quality: Section 4 describes historical and current groundwater quality and lists and describes point sources of concern.

Section 5 – Ground Level Monitoring: Section 5 describes ground surface monitoring in the Basin using InSAR and traditional leveling surveys, describes areas of subsidence concern, and presents the results of the subsidence analyses.

Section 6 – References: Section 6 contains the references consulted in this investigation.



OBMP Management Zones

- MZ1
- MZ2
- MZ3
- Chino-East/MZ4
- Chino-South/MZ5

Other Features

- Management Zone Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Introduction

Chino Groundwater Basin

Management Zones

Figure 1-1

The Chino Basin covers about 220 square miles. Figure 2-1 shows the location of the Chino Basin within the context of the Santa Ana River watershed. The watershed of the Chino Basin is almost identical to the Santa Ana River at Prado, the exception being the addition of the Temescal Creek watershed that enters the Prado Dam reservoir just upstream of the dam and for practical purposes contributes negligible inflow to the Chino Basin. The Santa Ana River watershed area tributary to the Chino Basin at the MWD Crossing is about 852 square miles. The area tributary to the Chino Basin down stream of the MWD Crossing is about 414 square miles and includes the watershed areas of San Antonio and Chino Creeks, Cucamonga Creek, Day Creek, the East Etiwanda and San Sevaine Creeks, and small drainages from the Riverside and Arlington areas south of the Santa Ana River. In total, the watershed area for streams crossing the Chino Basin is about 1490 square miles. The time of concentration[1] for the Santa Ana River at the MWD Crossing is estimated to be between one to two days. By contrast the time of concentrations for streams discharging from north to south over the Chino Basin is a few hours.

2.1 Precipitation

The Chino Basin has a semi-arid Mediterranean climate. Precipitation is a major source of local groundwater recharge for the Basin and thus, the availability of this recharge can be understood by analyzing long-term precipitation records. Four precipitation stations in the Basin were used to characterize the long-term precipitation patterns in the Basin. The location of the precipitation station used herein to construct the Claremont/Montclair hybrid (combined records of 1034 and 1137)[2] station and the Ontario hybrid (combined records of 1017 and 1075) station records are shown in Figure 2-1. A third station of historical prominence in the Santa Ana watershed, the San Bernardino Hospital station, was used to characterize the historical precipitation upstream of the Chino Basin. The location of the San Bernardino Hospital station (2146) is shown in Figure 2-1. Table 2-1 lists annual statistics for the stations utilized in this characterization.

Figure 2-2 illustrates the annual precipitation time series and the cumulative departure from the mean (CDFM) precipitation for the 1900 to 2008 period at the Claremont/Montclair hybrid precipitation station. During this period, four series of dry-wet cycles are apparent: prior to 1904 through 1922; 1922 through 1946; 1946 through 1983, and 1983 through 1998. A fifth cycle appears to have started in 1998 and continues through present. The records of the Ontario hybrid and San Bernardino Hospital stations also show the same patterns of dry-wet cycles as the Claremont/Montclair hybrid station during the historic period (see Figures 2-3 and 2-4).

The long-term average annual precipitation for these stations are 17.8 inches at the Claremont/Montclair hybrid station (1900 through 2008), 15.4 inches at the Ontario hybrid

[1] The time of concentration is the time it takes for runoff from the most distant upstream part of the watershed to reach a specified point of interest.

[2] These two precipitation stations are close to each other, their overlapping records are highly correlated, and their records have been combined to produce a hybrid record of over 100 years duration.

station (1914 through 2008) and 16.4 inches at the and San Bernardino Hospital station (1900 through 2008). The ratio of dry years to wet years is about three to two. That is, for every ten years about six years will have below average precipitation and four years will have greater than average precipitation.

The safe yield of the Chino Basin is based on the hydrology during 1965 through 1974, a period of ten years (base period). This base period contains two wet years in 1965 and 1969 with annual precipitation depths of 24 and 26 inches, respectively, at the Claremont/Montclair hybrid station, and 19.8 and 25.6 inches, respectively at the Ontario hybrid station. This base period falls within the longest dry period on record (1946 to 1976). The average annual precipitation for the base period at the Claremont/Montclair hybrid station was 16.3 inches, or 1.5 inches less than the long-term annual average. The average annual precipitation for the base period at the Ontario hybrid station was 14.7 inches, or 0.6 inches less than the long-term annual average. The base period was preceded by a 20-year dry period that was punctuated with a few wet years (1952, 1954, 1957 and 1958).

The Peace Agreement period runs from 2000 to the present, an eight-year period. The Peace Agreement period contains three wet years in 2001, 2004, and 2005 with 19.7, 22.1, and 29.2 inches, respectively, as measured at the Claremont/Montclair hybrid station. The Peace Agreement period lies within a dry period that appears to have started in 1998 and continues to the present. The average annual precipitation for the Peace Agreement period at the Claremont/Montclair hybrid station was 16.6 inches, or 1.2 inches less than the long-term annual average.

2.2 Surface Water Discharge

The principal surface water features of the Chino Basin include the Santa Ana River and its tributaries in the reach between the MWD Crossing and Prado Dam. The main tributaries in this reach of the river include the San Antonio/Chino Creeks, Cucamonga Creek, Day Creek, and East Etiwanda/San Sevaine Creeks. Figure 2 1 shows the locations of these surface water features for the Chino Basin. Figure 2-1 shows the locations of two USGS discharge monitoring stations, one located at the MWD Upper Feeder Crossing of the Santa Ana River (11066460) that measures the discharge into the Chino Basin, and one located just downstream of Prado Dam (11074000) that measures the discharge exiting the watershed at the downstream end of the from the Chino and Temescal Basins.

Figure 2-5 shows the annual time history of storm flow for the Santa Ana River at below Prado Dam from water year 1919/20 to 2007/08 (October to September). Figure 2-5 also has a plot of the CDFM for precipitation at the Ontario hybrid station. Figure 2-5 demonstrates that that the relationship of precipitation to stormwater runoff changed significantly around water year 1977/78, such that more runoff per unit of precipitation was produced after 1977/78. To see this, note the positive slope of the CDFM (indicative of a wet period) during the 1936/37 to 1944/45 period. During this period, about 49 inches of precipitation occurred above the mean precipitation of 15.4 inches per year. From 1977/78 to 1982/83, another wet period, there was about 51 inches of precipitation above the mean but there was much more storm water discharge than occurred between 1937 and 1945. A similar observation can be

made about the 1991/92 to 1997/98 period.

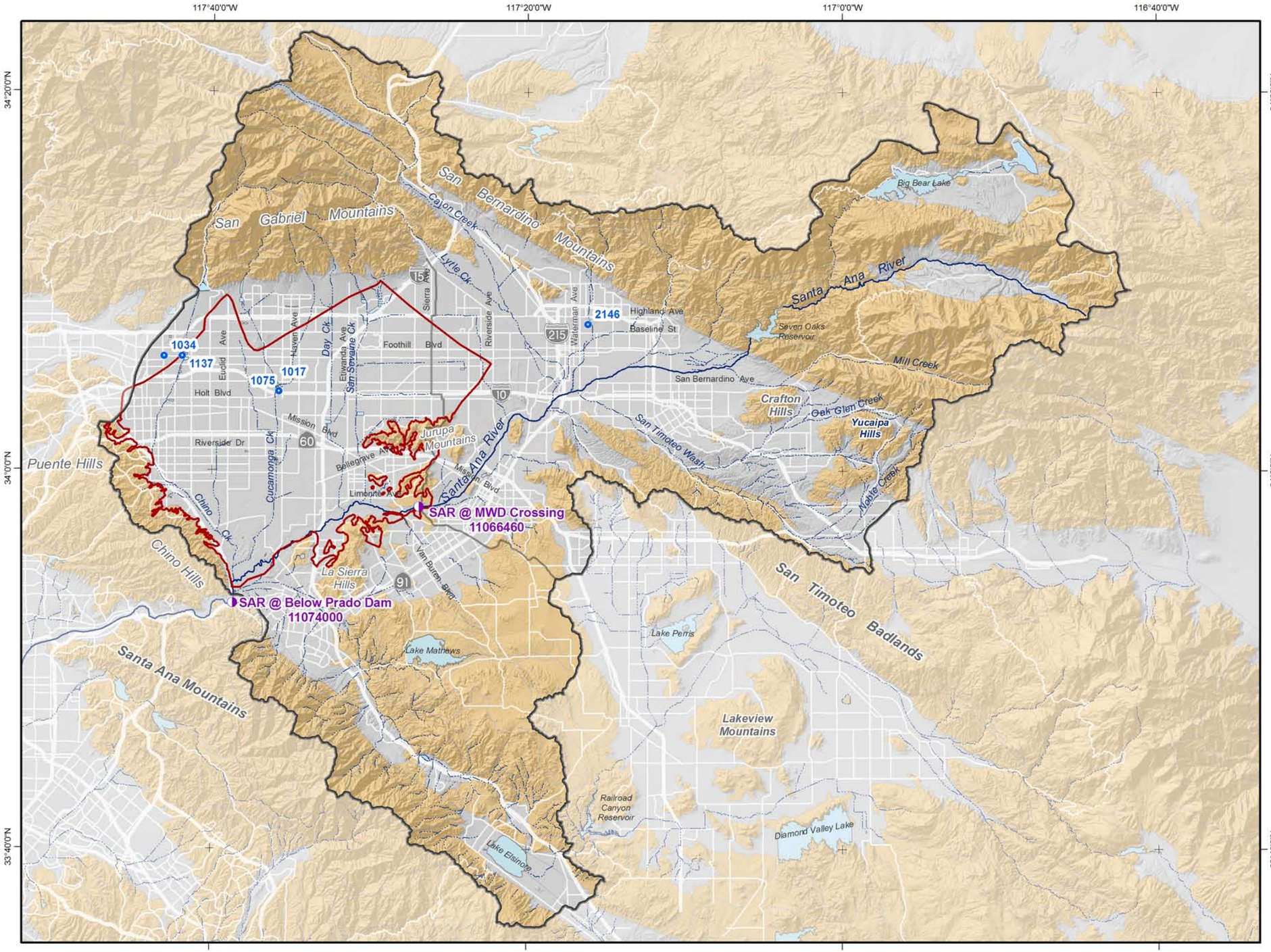
To further illustrate the change in rainfall-runoff relationship, a double mass analysis can be used. A double mass analysis is an arithmetic plot of the accumulated values of observations for two related variables that are paired in time and thought to be related. As long as the relationship between the two variables remains constant, the double mass curve will appear as a straight line (constant slope). A change in slope indicates that the relationship has changed where the break in slope denotes the timing of that change. Figure 2-6 is a double mass curve plot of precipitation at the Claremont/Montclair hybrid, Ontario, and San Bernardino Hospital precipitation stations versus storm water discharge at below Prado Dam for the 1919/20 through 2007/08 period. Note that the slope of the double mass curve after water year 1976/77 is much steeper than prior to 1976/77. The change in curvature denotes that a significant change occurred in the rainfall–runoff relationship. Figure 2-7 is a double mass curve plot of precipitation at the Claremont/Montclair hybrid station and Ontario precipitation stations versus storm water discharge generated in the watershed between the MWD Crossing and Prado Dam. The relationship of storm water discharge and precipitation in Figure 2-7 is similar to that shown in Figure 2-6 with Chino Basin producing about 75 percent of the storm water between the MWD Crossing and Prado Dam. Two observations can be regarding the time history of surface water discharge of the Santa Ana River: 1) there is a steady increase in the baseflow of the river starting around the 1970s and 2) there is an increase in the magnitude of storm water discharge starting in the late 1970s. These changes in discharge have occurred due to urbanization of the watershed. The increase in non-stormwater discharge is due to primarily to increases in recycled water discharges to the Santa Ana River. The increase in stormwater discharge is due to the modification of the land surface caused by the conversion from agricultural to urban uses, lining of stream channels, and other associated improvements in drainage systems.

2.3 Summary/Characterization of Current Hydrologic Regime

The hydrologic regime in the Chino Basin has important implications for water supply and groundwater management. The occurrence of long dry periods, characteristic of the region's climate, limit the recharge of precipitation and storm water recharge for years at a time and requires management strategies that conserve precipitation and storm water recharge whenever available. The amount of stormwater produced per unit of precipitation has increased over time due to urbanization and will continue to increase in the future as the remaining undeveloped and agricultural land uses are converted to developed uses.

Table 2-1
Annual Statistics of Long-Term Records at Precipitation Stations in the Chino Basin
(inches)

Area	Montclair/Claremont	S B Hospital	Ontario
Period of Record	1900 to 2008	1900 to 2008	1914 to 2008
Annual Average	17.78	16.36	15.38
Maximum	37.58	35.65	37.41
Minimum	5.39	5.95	3.84
Standard Deviation	7.66	6.83	7.05
Mean + 1 Standard Deviation	25.44	23.19	22.43
Coefficient of variation	43%	42%	46%



Main Features

- Precipitation Gauge Stations
- USGS Streamflow Stations
- Santa Ana River Watershed
- Chino Basin Boundary

Other Features

- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

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0 2 4 6 8 Miles
0 3 6 9 12 KM

2008 State of the Basin Report
General Hydrologic Condition

Santa Ana River Watershed Tributary to the Chino Basin

Figure 2-1

Figure 2-2
Annual Precipitation in the Claremont/Montclair Area

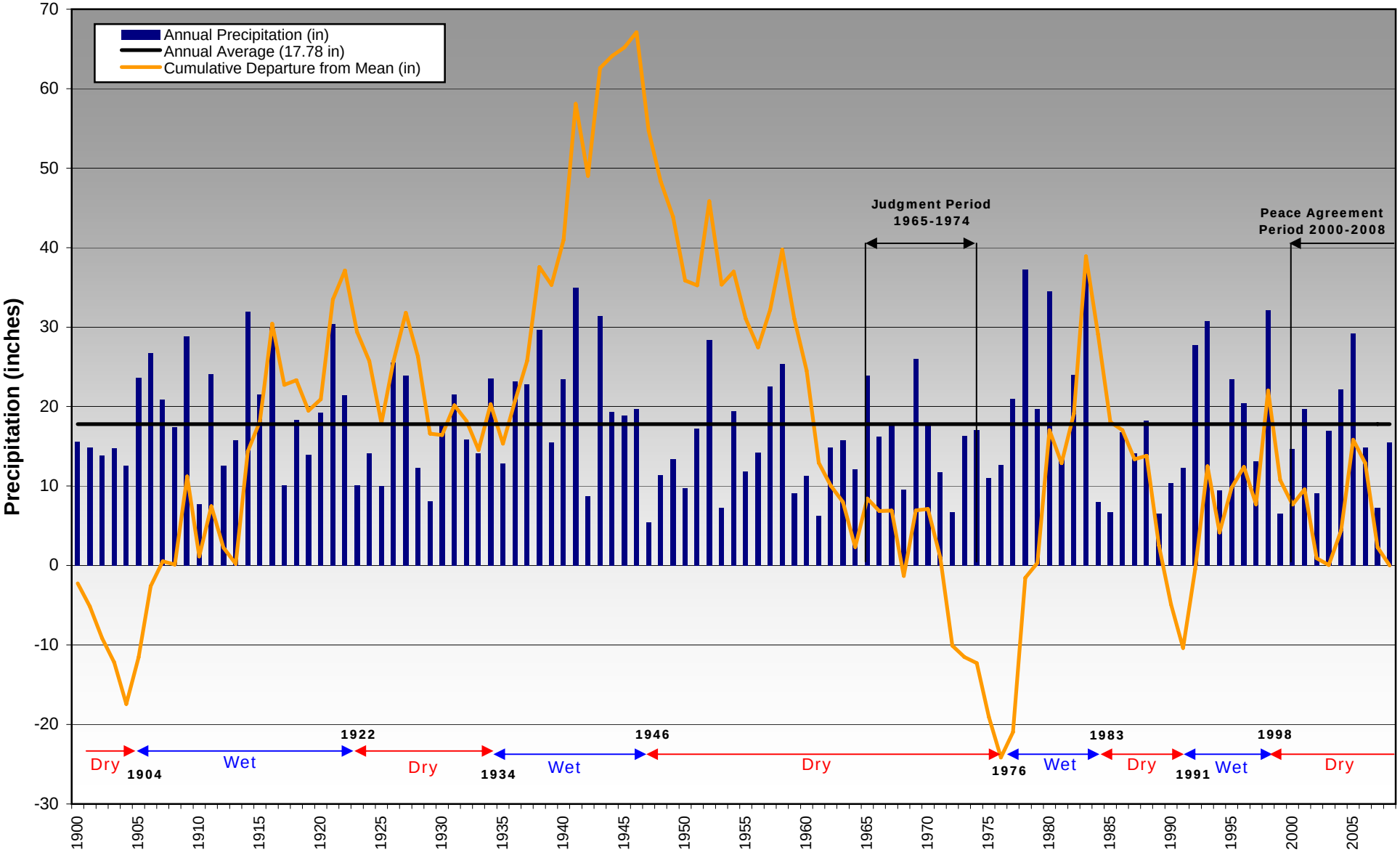

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Figure 2-3
Annual Precipitation in the Ontario Area

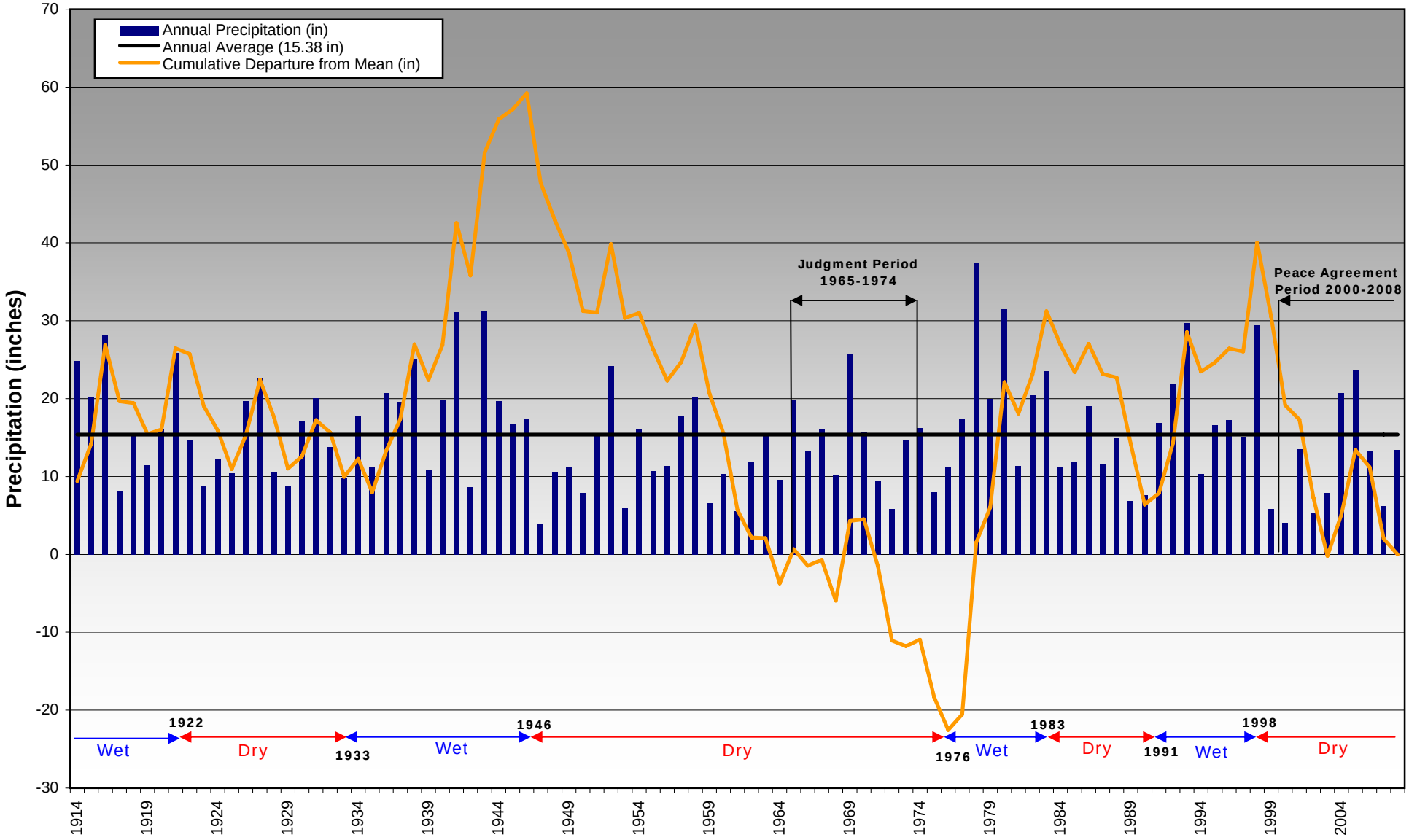

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Figure 2-4
Annual Precipitation at the San Bernardino Hospital Gauge

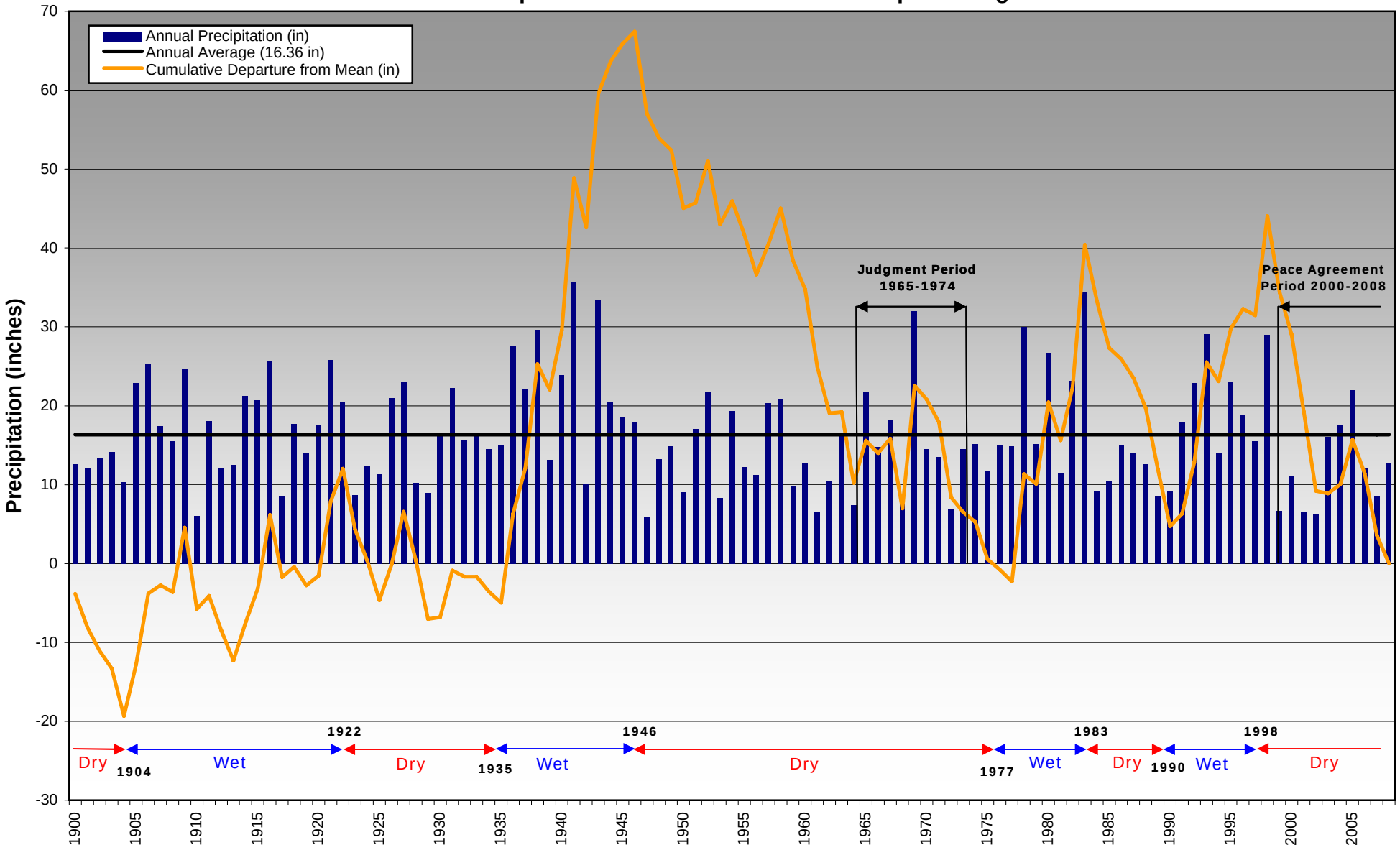

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Figure 2-5
Annual Stormflow Measured at below Prado Dam
Water Year 1919/20 - 2007/08

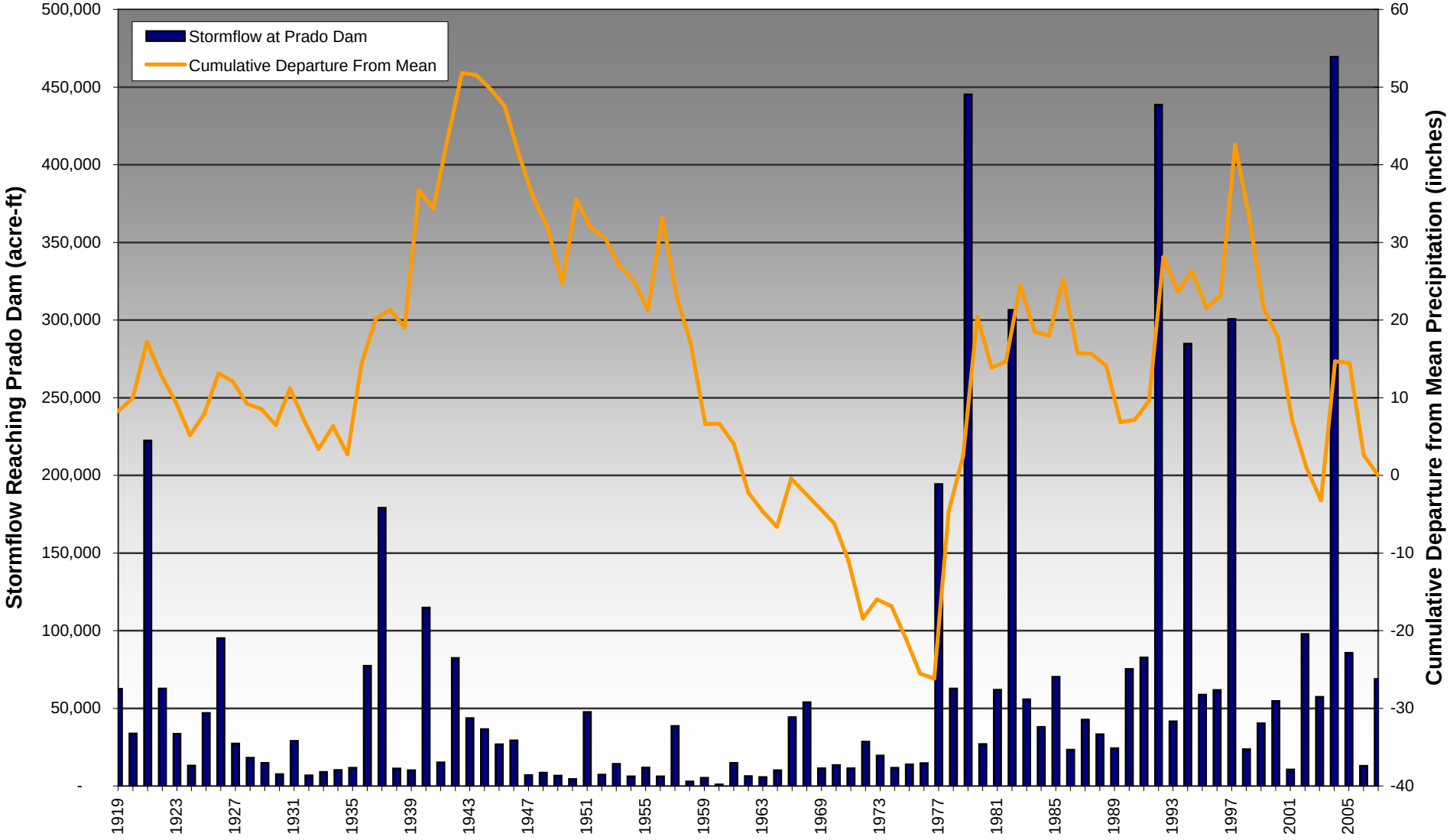

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Figure 2-6
Double Mass Curve of Precipitation
vs Storm Flow Measured at below Prado Dam
Water Years 1919/20 through 2007/08

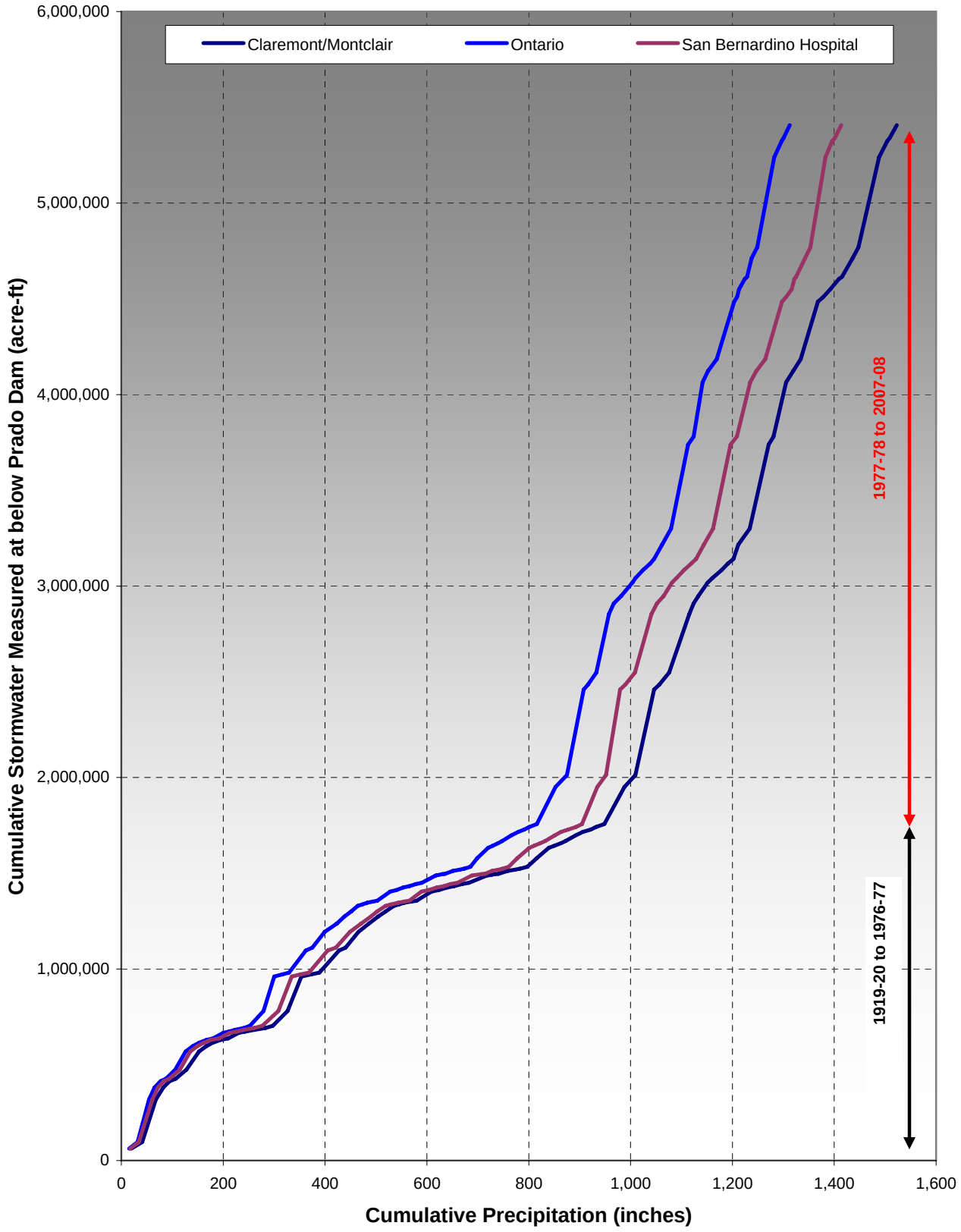

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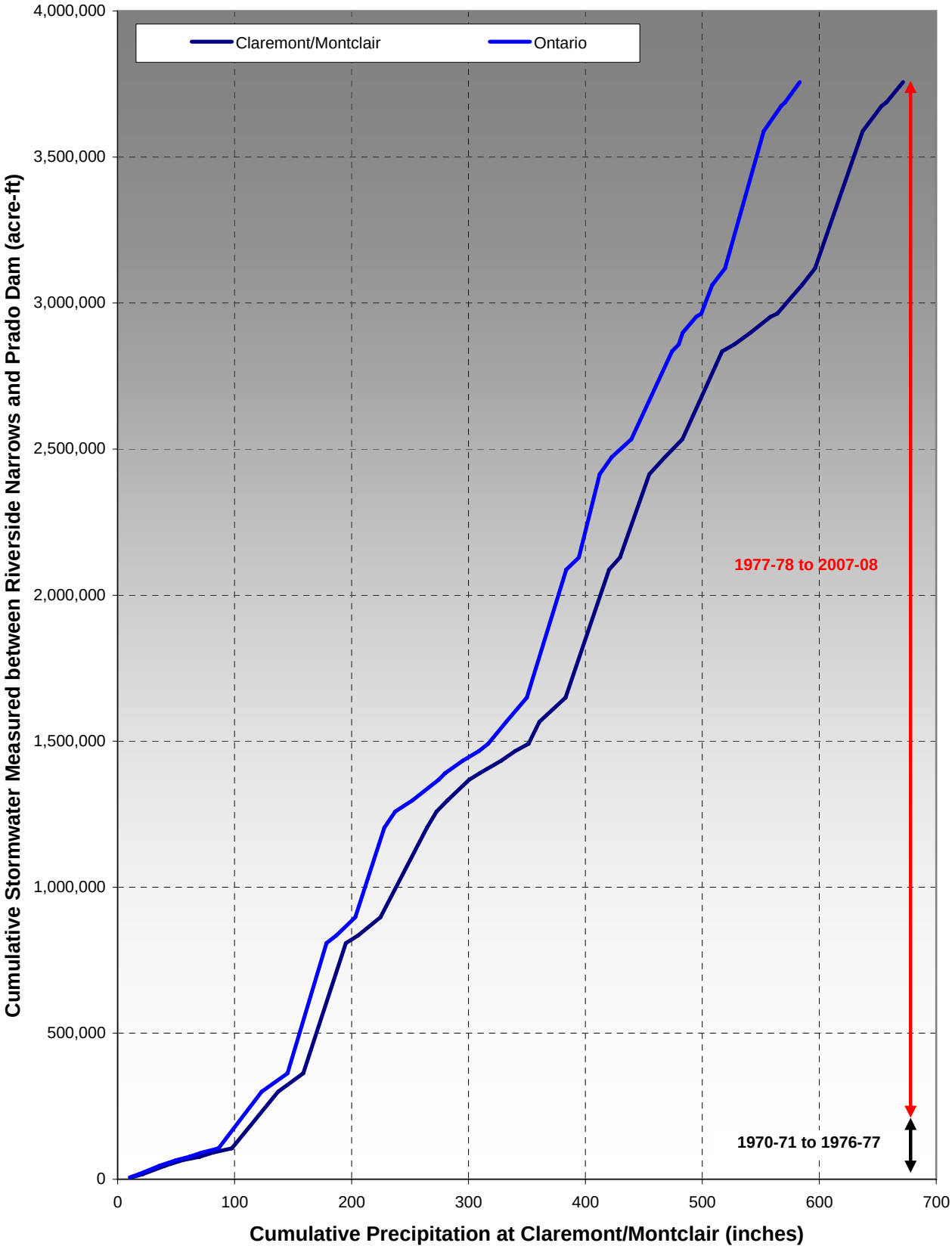
Figure 2-7
Double Mass Curve of Precipitation in Chino Basin vs
Storm Flow Generated between Riverside Narrows and Prado Dam
Water Years 1970/71 through 2007/08



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Section 3 – Basin Operations and Groundwater Monitoring

3.1 Background

The OBMP states that the re-determination of safe yield and the estimation of losses from groundwater storage programs require comprehensive groundwater-level mapping across the basin, analyses of groundwater level time histories at wells, and accurate estimations of groundwater production and artificial recharge activities. Pursuant to the Peace Agreement, Watermaster will re-determine safe yield and establish loss rates from storage in 2010.

The monitoring of basin activities—such as groundwater production and artificial recharge—and potential responses to those activities—such as changes in groundwater levels and storage—is a major component of *OBMP Program Element 1 – Develop and Implement a Comprehensive Monitoring Program*. Program Element 1 was developed, in part, to address the first impediment to *OBMP Goal 1 – Enhance Basin Water Supplies*: "Unless certain actions are taken, safe yield of the Basin will be reduced […] due to groundwater outflow from the southern part of the Basin." (WEI, 1999) This impediment speaks to the possibility of increased groundwater outflow to the Santa Ana River as a result of (1) reduced groundwater production in the southern part of the basin as agricultural land is converted to urban uses and (2) increased groundwater storage due to other management activities, such as artificial recharge and storage and recovery programs. That is, increased groundwater levels in the southern Chino Basin (via reduced groundwater production and/or increased groundwater storage) may result in increased groundwater discharge to the Santa Ana River (i.e. loss of basin yield). This potential loss of safe yield needs to be computed periodically and used in the administration of the Judgment; otherwise, the Chino Basin could be overdrafted.

This section describes the physical state of the Chino Basin with respect to groundwater pumping, artificial recharge, groundwater levels, and groundwater storage. Special attention is given to changes that have occurred since the implementation of the OBMP (2000) and since the last State of the Basin Report (2006).

3.2 Groundwater Flow System

The physical nature of groundwater occurrence and movement with regard to basin boundaries, recharge, groundwater flow, and discharge is described below.

3.2.1 Groundwater Recharge, Flow, and Discharge

While considered one basin from geologic and legal perspectives, the Chino Basin can be hydrologically subdivided into at least five flow systems that act as separate and distinct hydrologic units. Each flow system can be considered a management zone, and the management zones delineated in the OBMP were determined based on these hydrologic units (WEI, 1999), as shown in Figure 1-1. Each management zone has a unique hydrology, and water resource management activities that occur in one management zone have limited impacts on the other management zones.

The predominant sources of recharge to Chino Basin groundwater reservoirs are percolation

of direct precipitation and returns from applied water. The following is a list of other potential sources of recharge:

- Infiltration of flow within unlined stream channels overlying the basin
- Underflow from fractures within the bounding mountains and hills
- Artificial recharge of urban runoff, storm water, imported water, and recycled water at recharge basins
- Underflow from seepage across the bounding faults, including the Red Hill Fault (from Cucamonga basin), the San Jose Fault (from the Claremont Heights and Pomona basins), and the Rialto-Colton Fault (from the Rialto-Colton Basin)
- Deep percolation of precipitation and returns from use
- Intermittent underflow from the Temescal Basin

In general, groundwater flow mimics surface drainage patterns: groundwater flows from the forebay areas of high elevation (areas in the north and east flanking the San Gabriel and Jurupa Mountains) towards areas of discharge near the Santa Ana River within the Prado Flood Control Basin.

In detail, groundwater discharge throughout Chino Basin primarily occurs via:

- Groundwater production
- Rising water within Prado Basin (and potentially other locations along the Santa Ana River, depending on climate and season)
- Evapotranspiration within Prado Basin (and potentially other locations along the Santa Ana River, depending on climate and season) where groundwater is near or at the ground surface
- Intermittent underflow to the Temescal Basin

3.3 Monitoring Programs

3.3.1 Groundwater Pumping Monitoring

Since its establishment in 1978, Watermaster has collected information to develop groundwater production estimates. Appropriative Pool and Overlying Non-Agricultural Pool estimates are based on flow meter data that are provided by producers on a quarterly basis. Agricultural Pool estimates are based on water duty methods and meter data. The Watermaster Rules and Regulations require groundwater producers that produce in excess of 10 acre-feet per year (AFY) to install and maintain meters on their well(s). In 2000, Watermaster initiated a meter installation program for Agricultural Pool wells and a meter-reading program that required at least one reading per year.

In the OBMP Phase I Report (WEI, 1999), it was estimated that up to 600 private wells would need to be equipped with meters. Watermaster staff completed meter installation on the majority of these wells and began reading meters in 2003. Some agricultural wells were not metered due to the anticipated conversion of land from agricultural to urban uses. As of

December 2008, Watermaster had installed or repaired meters at 326 active agricultural wells. Watermaster records production data from these meters on a quarterly basis. These data are then entered into Watermaster's database. Figure 3-1 shows the locations of all active wells in fiscal 2007/08 by pool.

3.3.2 Artificial Recharge Monitoring

Figure 3-2 shows the locations of the basins used for artificial recharge in the Chino Basin. There are four types of water recharged within Chino Basin: imported water from the State Water Project (SWP), storm water, urban runoff, and recycled water. Deliveries of SWP water are monitored using water delivery records supplied by the Metropolitan Water District of Southern California (MWDSC) and the IEUA. Historically, the recharge of storm water and urban runoff was incidental to flood control operations, and many opportunities to measure and record this recharge were missed. Since the implementation of the OBMP, water level data sensors have been installed in each recharge basin. Recorded changes in recharge basin water levels during storm events coupled with elevation-area-volume curves and elevation-outflow relationships allow for the calculation of storm water and urban runoff recharge. Recycled water is recharged at seventeen of the recharge sites, most of which have multiple basins. The IEUA monitors and reports recycled water quality and recharge volumes. Groundwater quality within the vicinity of the recycled water recharge basins is measured and reported quarterly by the IEUA.

3.3.3 Groundwater Level Monitoring

Groundwater level monitoring was inadequate prior to OBMP implementation. Problems with historical groundwater level monitoring included an inadequate areal distribution of wells in monitoring programs, short time histories, questionable data quality, and insufficient resources to develop and conduct a comprehensive program.

The OBMP defined a new, comprehensive groundwater level monitoring program. The program start-up occurred in two steps: an initial survey from 1998 to 2001, followed by long-term monitoring at a set of key wells.

Watermaster has three active groundwater level monitoring programs operating in the Chino Basin: (1) a semiannual basin-wide well monitoring program, (2) a key well monitoring program that is associated with the Chino I/II Desalter well fields and the HCMP, and (3) a piezometric monitoring program that is associated with land subsidence and ground fissuring in Management Zone 1 (MZ1). Monitoring frequency varies with each program. Figure 3-3 shows the locations and measurement frequencies of all the wells that are currently used in Watermaster's groundwater level monitoring programs. In addition to its field programs, Watermaster collects groundwater level data from municipal producers, government agencies, and private entities. All collected water level measurements are entered into Watermaster's relational database.

3.3.3.1 Basin-wide Groundwater Level Monitoring Program

The objective of the basin-wide groundwater level monitoring program is to collect groundwater level data from all wells in the Chino Basin that can be reliably monitored. These wells are shown in Figure 3-2, symbolized by their measurement frequencies. Wells in the other groundwater level monitoring programs (see Sections 3.3.3.2 and 3.3.3.3 below) are, by definition, also part of the basin-wide monitoring program. In total, the basin-wide program consists of about 900 wells. Watermaster staff measures water levels at about 450 private wells at least twice per year (spring and fall). At the remaining wells, water levels are measured by other agencies, including:

- California Department of Toxic Substances and Control (Stringfellow Superfund Site)
- Orange County Water District (Prado Basin)
- Santa Ana Regional Water Quality Control Board (various remediation sites)
- USGS (special investigations)
- County of San Bernardino (landfill monitoring)
- Private Consultants (various remediation sites)

Watermaster collects data for these wells twice per year; though, for some of these wells, data are collected more frequently as part of other monitoring programs (see below).

3.3.3.2 Key Well Water Level Program

Watermaster developed and implemented a key well monitoring program in the southern portion of the Chino Basin. The objective of this program is to increase measurement frequency and data quality at a reduced but representative network of wells. This network of wells and the monitoring program must satisfy the requirements for monitoring desalter impacts to local producers and for determining hydraulic control (see Section 3.6.4 for a description of the HCMP).

In the Chino Basin, development has led to the conversion of land from agricultural to urban uses and has resulted in the destruction of wells that were previously included in Watermaster's key well water level monitoring program. As key wells are lost to development, nearby wells are evaluated for suitability as key well replacements. Currently, there are 159 wells in the key well water level monitoring program. Manual water levels measurements are done monthly at 95 of these wells. The remaining 64 wells contain pressure transducers/data loggers that automatically record water levels once every 15 minutes.

3.3.3.3 MZ1 Monitoring Program

The MZ1 monitoring program is an intensive aquifer-system monitoring program that was implemented beginning in Watermaster fiscal year 2001/02 to provide information that could be used by Watermaster to determine the causes of subsidence in MZ1 and develop a long-term subsidence management plan for MZ1. In fiscal 2002/03, an aquifer system monitoring facility was constructed at Ayala Park in the City of Chino. This facility includes multi-depth piezometers that record depth-specific head once every 15 minutes. In addition, about 30 production and monitoring wells that surround this facility are equipped with pressure transducers that record water levels once every 15 minutes. All of these data are

uploaded to Watermaster's water level database. Several of these wells are also included in the key well water level monitoring program.

3.4 Groundwater Pumping

3.4.1 Historical Groundwater Pumping

Table 3-1 lists Watermaster's records of Chino Basin production by pool for the period fiscal 1977/78 through fiscal 2007/08. Figure 3-4 depicts the distribution of production by pool. Over this period, annual groundwater production has ranged from a high of about 198,000 AF (fiscal 2006/07) to a low of about 123,000 AF (fiscal 1982/83) and has averaged about 154,000 AFY since fiscal 1977/78. The distribution of production by pool has shifted since 1977. Agricultural Pool production, which is mainly concentrated in the southern portion of the basin, dropped from about 54 percent of total production in 1977-78 to about 19 percent in 2007/08. During the same period, Appropriative Pool production, which is mainly concentrated in the northern half of the basin, increased from about 40 percent of total production in 1977-78 to about 79 percent in 2007/08 (sum of production for the appropriative pool and the Chino Desalter Authority [CDA]). Increases in Appropriative Pool production have approximately kept pace with declines in agricultural production. Production in the Overlying Non-Agricultural Pool declined from about 5 percent of total production in fiscal 1977/78 to about 2 percent in the mid-1980s, rose to about 4 percent through the 1990s, and recently decreased to about 2 percent in 2003-04 where it remained through fiscal 2007/08.

Figures 3-5 through 3-9 illustrate the location and magnitude of groundwater production at wells in the Chino Basin for fiscal years 1977/78, 1999/2000, 2005/06, 2006/07, and 2007/08, respectively. A close review of these figures indicates:

- There was a basin-wide increase in the number of wells producing over 1,000 AFY between 1978 and 2008. This is consistent with (1) the land use transition from agricultural to urban, (2) the trend of increasing imported water costs, and (3) the use of desalters.
- Since the implementation of the OBMP in 2000, the number of active production wells just north of the Santa Ana River has decreased. This is consistent with the land use transition from agricultural to urban that has been occurring in the area.
- Since the implementation of the OBMP in 2000, desalter pumping has commenced and progressively increased; in fiscal 2007/08, desalter pumping reached a historical high of 26,972 AFY.
- Since the implementation of the OBMP in 2000, the number of wells that produce over 1,000 AFY on the west side of Chino Basin (west of Euclid Avenue) has decreased. This is consistent with (1) the implementation of the MZ1 Interim Management Plan, which reduced pumping by up to 3,000 AFY in the Chino area, and (2) reduced pumping by the City of Pomona, the Monte Vista Water District, and the City of Chino Hills from 2003 to 2008, as these agencies have been participating in in-lieu recharge for the Dry-Year Yield Program.

3.4.2 Agricultural Pool Pumping

Agricultural Pool pumping has declined steadily since 1978 (see Figure 3-1). In fiscal 2007/08, total production for the Agricultural Pool fell to 30,910 AF—the Agricultural Pool's lowest production on record. Since OBMP implementation in 2000, Agricultural Pool production has decreased from about 40,000 AF in fiscal 2000/01 (24 percent of total basin production) to about 31,000 AF in fiscal 2007/08 (19 percent of total basin production).

3.4.3 Overlying Non-Agricultural Pool Pumping

Since OBMP implementation in 2000, Overlying Non-Agricultural Pool production has accounted for less than 5 percent of total basin production, ranging from about 2,300 AF (1 percent of total production in fiscal 2004/05) to 8,000 AF (5 percent of total production in fiscal 2000/01). In fiscal 2007/08, Overlying Non-Agricultural production of about 3,400 AF accounted for 2 percent of total basin production.

3.4.4 Appropriative Pool Pumping

Since OBMP implementation in 2000, average production by the Appropriative Pool, excluding desalter production, has been about 122,000 AFY, which accounts for about 70 percent of total basin production.

The CDA operates two desalter facilities (Chino I and Chino II) that are supplied with raw groundwater from 22 wells. The desalter facilities belong to the Appropriative Pool. In fiscal 2007/08, the CDA desalters produced more water than in any previous year (26,972 AF). Since the CDA began pumping in 2000, its production has accounted for about 16 percent of total Appropriative Pool production and about 8 percent of total basin production. During 2005/06, the Chino II Desalter facility became operational, and as a result, CDA groundwater production increased by about 60 percent from the previous year. Average annual production by the CDA since 2000 has been about 14,800 AFY.

Since OBMP implementation in 2000, average annual production by the Appropriative Pool, including desalter production, has been about 137,000 AFY. Approximately 130,000 AF were produced in fiscal 2007/08. As a percent of total basin production, Appropriative Pool production increased from about 72 percent in fiscal 2000/01 to about 79 percent in fiscal 2007/08.

3.5 Artificial Recharge

Watermaster initiated the Chino Basin Groundwater Recharge Program as required by the Peace Agreement. This program is an integral part of Watermaster's OBMP and is summarized in the OBMP Recharge Master Plan. This comprehensive program aims to enhance water supply reliability and improve the groundwater quality of local drinking water wells throughout the Chino Basin by increasing the recharge of storm water, imported water, and recycled water.

Below, the physical volumes of water percolated at recharge basins in the Chino Basin are

discussed. Specific source waters include storm water and supplemental water, which consists of State Water Project (SWP) water and recycled water.

3.5.1 Recharge Facilities

There are 21 recharge facilities described in the OBMP Recharge Master Plan, Phase II Report (B&V & WEI, 2001). Table 3-2 lists the operable recharge facilities in the Chino Basin and summarizes annual wet water recharge (by type) for the period of July 1, 2000 through June 30, 2008. Figure 3-2 shows the locations of the groundwater recharge facilities. Detailed descriptions of these facilities and their operating characteristics can be found in *Chino Basin Recharge Facilities Operating Procedures* (GRCC, 2006).

3.5.2 Regulatory Requirements for Recharge in the Chino Basin

The general recharge requirements for the Chino Basin are outlined in Section 5.1 of the Chino Basin Peace Agreement – Recharge and Replenishment. The requirements of the Peace Agreement are further discussed and expanded on in the OBMP Recharge Master Plan (WEI, 2001).

The Recycled Water Groundwater Recharge Program, which is being implemented by the IEUA and Watermaster, is subject to the following requirements:

- California Regional Water Quality Control Board, Santa Ana Region. Monitoring and Reporting Program (M&RP) No. R8-2005-0033 for IEUA and Chino Basin Watermaster. Phase 1 Chino Basin Recycled Water Groundwater Recharge Project, San Bernardino County. April 15, 2005.
- California Regional Water Quality Control Board, Santa Ana Region. Order No. R8-2007-0039. Water Recycling Requirements for Inland Empire Utilities Agency and Chino Basin Watermaster, Chino Basin Recycled Groundwater Recharge Program, Phase I and Phase II Projects, San Bernardino County. June 29, 2007.

3.5.3 Historical Recharge

3.5.3.1 Storm Water Recharge

Storm Water recharge is monitored by the IEUA pursuant to the Chino Basin Recharge Facilities Operating Procedures (GRCC, 2006). Transducers have been installed in each recharge basin that receives storm water. The percolation rate in each basin is measured directly and used in conjunction with established elevation-storage-area tables to calculate recharge.

Since 2000, total storm water recharge has averaged approximately 4,600 AFY. During fiscal years 2006/07 and 2007/08, total storm water recharge in Chino Basin was approximately 4,600 and 9,900 AF, respectively (see Table 3-2).

3.5.3.2 Supplemental Water Recharge

SWP water for artificial recharge is currently available to the region from the MWDSC. The MWDSC delivers SWP water into the Chino Basin from the Foothill Feeder, which flows from east to west across the northern half of the Chino Basin. During fiscal 2006/07, total SWP water recharge in Chino Basin was approximately 6,500 AF. During fiscal 2007/08, there was no SWP water recharge in the Chino Basin. The aggregate average SWP water recharge that has occurred since the OBMP was implemented is about 10,100 AFY.

During fiscal 2007/08, the Banana, Hickory, 7th and 8th Street, and Ely Basins were used to recharge recycled water. During fiscal years 2006/07 and 2007/08, total recycled water recharge in Chino Basin was approximately 3,000 and 2,400 AF, respectively. The aggregate average recycled water recharge that has occurred since the OBMP was implemented is about 1,000 AFY.

During fiscal years 2006/07 and 2007/08, supplemental water recharge—consisting of imported and recycled waters—was approximately 6,350 and 2,400 AF, respectively. The aggregate average supplemental water recharge that has occurred since the OBMP was implemented is about 11,500 AFY.

3.6 Groundwater Levels

This subsection analyzes groundwater levels at wells in the various management zones (MZs) throughout the Chino Basin and discusses changes in groundwater storage since the implementation of the OBMP in 2000 and since the 2006 State of the Basin report.

3.6.1 Historical Groundwater Level Trends

Figure 3-10 shows the locations of wells with groundwater level time histories discussed herein and the Chino Basin management zone boundaries. Wells were selected based on length of record, density of data points, quality of data, geographical distribution, and aquifer system. Wells are identified by their local name (usually owner abbreviation and well number) or their Watermaster ID (CBWM ID) if privately owned.

Figures 3-11 through 3-15 are groundwater level time history charts for the wells shown in Figure 3-10. Some of the short-term groundwater level fluctuations shown in these figures result from the inclusion of static and dynamic observations. Below, by management zone, the behavior of groundwater levels at specific wells is compared to climate, groundwater production, wet water recharge activities, and other factors as appropriate.

To compare groundwater levels to climate, a cumulative departure from mean precipitation (CDFM) curve has been plotted on the groundwater level time history charts. Positive sloping lines on the CDFM curve show wet years or wet periods. Negatively sloping lines show dry years or dry periods. For example, the period from 1978 to 1983 was an extremely wet period, and it is represented by a positively sloping line. To compare groundwater levels to pumping and recharge activities, bar charts that show groundwater production and wet water recharge by management zone have been superimposed on the groundwater level time history charts.

3.6.1.1 Management Zone 1

MZ1 is an elongate region, running generally north-south, and comprises the westernmost area of the Chino Basin. It is bounded by MZ2 to the east, various basin-boundary faults to the north, and sedimentary bedrock outcrops to the west and south.

Figure 3-11 shows groundwater level time histories for the following wells: Monte Vista Water District Well 10 (MVWD-10), City of Pomona Well 11 (P-11), City of Chino Well 10 (C-10), and Chino Hills Wells 15A and 16 (CH-15A and CH-16). The Montclair, College Heights, Upland, and Brooks Street Basins are located in the northern portion of MZ1 and are the primary sites for artificial recharge.

Wells MVWD-10 and P-11 exhibit representative groundwater levels for the northern portion of MZ1. An analysis of static groundwater levels at these wells shows a decline from 1995 to 2001, a period of increased groundwater production in MZ1. Since 2001, water levels have risen by about 100 feet at MVWD-10 and by about 45 feet at P-11. This increase is most likely attributed to a decrease in local production and an increase in wet water recharge in MZ1 since 2001.

Well C-10 is located in central MZ1. Water levels at C-10 peak in the mid-1990s but decline by about 20 feet from 1995 to 2000, which is likely due to increased groundwater production in MZ1. Unlike other wells in MZ1 that experienced significant water level recovery from 2000 to 2006, C-10's water levels remained essentially unchanged. Since 2006, water levels have risen by approximately 20 feet. This increase is due to a decrease in local production and an increase in wet water recharge.

Water levels measured at CH-15A are representative of the shallow aquifer system in the southern portion of MZ1. The recent land subsidence investigation (Section 5) has shown that in southern MZ1, the aquifer system is hydrologically stratified. The shallow aquifer system is unconfined to semi-confined while the deep aquifer system is confined. Water levels in CH-15A have historically been stable at around 80-90 ft-bgs and have experienced small variations in response to nearby pumping. Though, since 2000, water levels have risen by about 10 feet. This is primarily due to the decrease in local production associated with the MZ1 Interim Management Plan.

CH-16 is perforated in the confined deep aquifer system, which is characterized by large changes in piezometric pressure due to nearby pumping. In 2003 and 2004, during a series of pumping tests conducted by Watermaster in southern MZ1, water levels in CH-16 dropped by approximately 100 feet, and the period of recovery lasted several months. These tests demonstrated that piezometric levels in CH-16 (and the deep aquifer system in general) are heavily influenced by changes in pumping from local wells screened within the deep aquifer system. The static water levels at CH-16 declined by about 100 feet from 1995 to 2000 and subsequently recovered by about 140 feet from 2000 to 2006. At the end of 2008, static water levels had declined by about 30 feet from the 2006 highs with a maximum drawdown of about 60 feet observed in the summer of 2008.

3.6.1.2 Management Zone 2

Management Zone 2 (MZ2) is a large, central, elongate area of the Chino Basin (see Figure 3-10). Figure 3-12 shows groundwater level time histories for Cucamonga Valley Water District (CVWD) Wells CB-3 and CB-5 (CVWD CB-3 and CVWD CB-5), City of Ontario Well 16 (O-16), CBWM ID 600394, and Hydraulic Control Monitoring Program Wells 2/1 and 2/2 (HCMP-2/1, and HCMP-2/2). These wells are aligned north to south, approximately along a groundwater flow line. The San Sevaine, Etiwanda, Lower Day, Victoria, Turner, and Ely Basins are located in the northern and central regions of MZ2 and are the primary sites for artificial recharge.

The groundwater level time histories for the northernmost wells—CVWD CB-3 and CB-5 and O-16—show a general water level increase following 1978, which is likely due to a combination of the 1978 to 1983 wet period, the reduction in overdraft following the implementation of the Chino Basin Judgment, and the start of artificial replenishment with imported water in the San Sevaine and Etiwanda Basins. Following the early 1990s, water levels at these wells began to decrease and have continued to decrease to present. The static water levels at CB-3 and CB-5 decreased by approximately 30 feet between 2003 and 2006. Long-term water level decreases in this area of MZ2 are likely due to decreased wet water recharge from 1996 to 2003 and increased groundwater production from 1995 to present.

Well CBWM ID 600394 is located in the central portion of MZ2, north of the Chino I Desalter well field. Water levels at this well have decreased by about 15 feet since 2000.

Wells HCMP 2/1 and HCMP 2/2 are located at the southern end of MZ2 near the Chino I Desalter well field. These wells were completed and the first measurements were recorded in early 2005. HCMP 2/1 is perforated in the shallow aquifer system, and HCMP 2/2 is perforated in the deep aquifer system. Contrary to that of of MZ1, the deeper aquifer in this MZ behaves much more like the shallow, unconfined aquifer, which is indicative of a greater degree of hydraulic communication between the two aquifer systems. Both wells exhibited similar groundwater level increases (15-20 feet) from 2005 to 2006. It is likely that this was due to changes in local production—especially at some of the nearby Chino I Desalter wells, which experienced a production decrease in 2005 and 2006. Since 2006, water levels have decreased by 5-10 feet in both wells.

3.6.1.3 Management Zone 3

Management Zone 3 (MZ3) consists of the area along the eastern boundary of the Chino Basin. It is bounded by MZ2 to the west, Chino-East (MZ4) and Chino-South (MZ5) to the south, and the Rialto-Colton Fault to the east (see Figure 3-10). Figure 3-13 shows water level time histories for Fontana Water Company Wells F30A and F35A (F30A and F35A), Milliken Landfill Well M-3 (M-3), County of San Bernardino MIL M-06B, CBWM ID 3602468, and HCMP Well 7/1 (HCMP 7/1). These wells are aligned northeast to southwest, approximately along a groundwater flow line. The RP-3 and Declez Basins are located in the central region of MZ3 and are the primary sites for artificial recharge.

Wells F30A and F35A are located in the northeastern portion of MZ3. The groundwater level time histories of these two wells show relatively stable water levels from 1978 until the late

1990s. From 2000 to 2006, the wells experienced a progressive decline in water levels of about 25 feet. This decline is likely due to increased production in MZ3. Their lack of responsiveness to climate is likely due to the absence of significant sources of recharge. Since 2006, water levels at F35A have remained relatively unchanged, and water levels at F30A have fluctuated ±5 to 10 feet.

Wells M-3/M-06B and CBWM ID 3602468 are located in the central portion of MZ3. From 2000 to 2006, a groundwater decline of about 30 feet was observed at these wells.

The southernmost well, HCMP-7/1, experienced a groundwater level decline of about 20 feet from 2005 to the end of 2008. Similar water level declines can be observed in most wells throughout MZ3. This regional drawdown in MZ3 is likely due to the steady increase in production within MZ3 over the past 30 years and a lack of artificial recharge.

3.6.1.4 Management Zone 4

MZ4 – also known as Chino-East – is bounded by the Jurupa Hills to the north, the Pedley Hills to the east, MZ5 to the south, and MZ3 to the west (see Figure 3-10). Figure 3-14 shows groundwater level time histories for HCMP Well 9/1 (HCMP-9/1), Jurupa Community Services District Well 10 (JCSD-10), and CBWM ID 3300718. There are no major recharge basins in MZ4, and very little groundwater production occurs in this area.

Groundwater levels at these wells decreased by about 30 feet between 2000 and 2008. These declines are likely due to groundwater production at nearby wells, including the Chino II desalter well field, which is located near the western boundary of the MZ.

3.6.1.5 Management Zone 5

MZ5 – also known as Chino-South – is bounded by MZ4 to the north, MZ3 to the west, the Riverside Narrows to the east, and various unnamed hills to the south (see Figure 3-10). Figure 3-15 shows groundwater level time histories for USGS Well Archibald-1, HCMP Well 8/1 (HCMP 8/1), and Santa Ana River Water Company Well 07 (SARWC-07). There are no groundwater recharge basins in MZ5, but the Santa Ana River is a major source of groundwater recharge.

These wells exhibit very little groundwater level variation due to the stabilizing effects of the Santa Ana River. Production in MZ5 decreased steadily from 1978 to 2008 due to the destruction of many private agricultural wells. Current production is approximately 3,000 AFY (see Figure 3-15). Groundwater levels in HCMP-8/1 and SARWC-07 have declined about 10-15 feet since 2006. This decline is likely due to the onset of pumping at nearby Chino II Desalter wells.

3.6.2 Current Groundwater Levels

The groundwater level data collected from the various monitoring programs described in Section 3.3 were used to create groundwater level elevation contour maps of the Chino Basin for fall 2000 (Figure 3-16), fall 2003 (Figure 3-17), fall 2006 (Figure 3-18), and fall 2008 (Figure 3-19). Appendix A is an E-sized water level map that includes the point data used to

contour the fall 2008 groundwater levels. The following procedures were used in the creation of these maps:

- Extract the entire time history of groundwater level data from Watermaster's groundwater level database for all wells in the Chino Basin.
- Plot and explore groundwater elevation time histories for all wells.
- Choose one "static" groundwater level elevation data point per well that is representative of the fall 2008 period.
- Plot groundwater level elevation data on maps with background geologic/hydrologic features.
- Contour and digitize groundwater elevation data.

The groundwater elevation contours for fall 2008 (Figure 3-19) are generally consistent with past groundwater elevation contour maps (see, for example, Figures 3-16, 3-17, and 3-18). These maps show that groundwater generally flows in a south-southwest direction from the primary areas of recharge in the northern parts of the basin toward the Prado Flood Control Basin in the south. There are notable pumping depressions in the groundwater level surface that interrupt the general flow patterns in the northern portion of MZ1 (Montclair and Pomona areas) and directly southwest of the Jurupa Hills. There is a discernible depression in groundwater levels surrounding the Chino I & Chino II Desalter well fields.

Close inspection of the groundwater level data used to construct these maps suggests the existence of hydraulically distinct aquifer systems—primarily in MZ1 and the western parts of MZ2. Previous investigations have concluded that two distinct aquifer systems exist in these areas: a shallow unconfined to semi-confined aquifer and deeper confined aquifer. The groundwater levels shown in these maps correspond to the shallow aquifer system and do not reflect the piezometric levels of the deeper aquifers.

3.6.3 Changes in Groundwater Storage

Watermaster developed a GIS model to estimate groundwater storage changes from the groundwater level contour maps discussed above. In preparing this model, Watermaster compiled a comprehensive library of well driller's logs for wells in the Chino Basin. Lithologic descriptions of borehole cuttings and associated depth intervals were digitized and added to Watermaster's database. All lithologic descriptions were then assigned a value of specific yield based on USGS investigations (Johnson, 1967). These data were then used to estimate the average specific yield across each hydrostratigraphic layer in the Chino Basin (see Section 2 of this report for additional details).

The storage change model and the procedures for estimating storage change include:

- Create groundwater elevation contour maps of the Chino Basin for the beginning and ending of the period for which a storage change will be estimated (e.g. fall 2000, fall 2003, and fall 2006).
- Create three-dimensional raster surfaces (ESRI grids) of the groundwater elevation contour maps.

- Create a 400-meter by 400-meter grid (polygon shapefile) of the Chino Basin.
- Assign attributes to each grid cell for (1) surface area, (2) overlying management zone, (3) beginning groundwater elevation surface (e.g. fall 2003), (4) ending groundwater elevation surface (e.g. fall 2006), (5) top and bottom elevations for the model layers, and (6) the specific yield of sediments for each model layer.
- Export the attribute table of the 400-meter grid to spreadsheet format to calculate the volumetric storage change.

Figure 3-20 shows the 400x400-meter grid, symbolized by the storage change between fall 2000 and fall 2003. Basin-wide, the groundwater storage model estimates a change in storage of about -93,400 AF over this three-year period. Based on this figure, the following sub-areas experienced a decrease in storage:

- In the northwest near Pomona and Montclair
- In the northeast near Fontana and eastern Ontario and Rancho Cucamonga
- Near the Chino I Desalter well field, which began producing groundwater in 2000

And, the following sub-areas experienced an increase in storage:

- In the southwest within the City of Chino where pumping decreased in association with the land subsidence investigation and the Forbearance Agreement
- In the south, just north of the Santa Ana River, where many agricultural wells are being destroyed as land use transitions from agricultural to urban

Figure 3-21 shows the 400x400-meter grid, symbolized by the storage change between fall 2003 and fall 2006. Basin-wide, the groundwater storage model estimates a change in storage of about +46,500 AF over this three-year period. Based on this figure, the following sub-areas experienced a decrease in storage:

- In the northeast near Fontana as well as in eastern Ontario and Rancho Cucamonga in MZ2 and MZ3
- In the area directly west of the Jurupa Mountains in MZ3
- In the area immediately surrounding the eastern portions of the Chino I Desalter well field (During this period, increased production in this area was mainly due to the onset of pumping at the Chino I Desalter expansion wells.)

And, the following sub-areas experienced an increase in storage:

- In the northwest near Pomona and Montclair in MZ1 where pumping decreased in association with in-lieu recharge for the Dry-Year Yield program
- In the southwest within the City of Chino where pumping decreased in association with the land subsidence investigation and the Forbearance Agreement
- In the southern region of MZ2 on the west side of the Chino I Desalter well field
- In the south, just north of the Santa Ana River, where many agricultural wells are being destroyed as land use transitions from agricultural to urban

Figure 3-22 shows the 400x400-meter grid, symbolized by the storage change between

fall 2006 and fall 2008. Basin-wide, the groundwater storage model estimates a change in storage of about -53,600 AF over this two-year period. Based on this figure, the following sub-areas experienced a decrease in storage:

- In the area directly west and southwest of the Jurupa Mountains in MZ3 (This area is influenced by groundwater production at wells owned by the Jurupa Community Services District.)
- In the area immediately surrounding the eastern portion of the Chino I Desalter well field (During this period, increased production in this area was mainly due to the continued pumping at the Chino I Desalter expansion wells.)
- In the area immediately surrounding the Chino II Desalter well field (During this period, increased production in this area was due to increased pumping at the Chino II Desalter wells.)

And, the following sub-areas experienced an increase in storage:

- In the northwest near Pomona and Montclair in MZ1 where pumping decreased in association with in-lieu recharge for the Dry-Year Yield program
- In the southwest where pumping decreased in association with the land subsidence investigation and the Forbearance Agreement
- In the south, just north of the Santa Ana River, where many agricultural wells are being destroyed as land use transitions from agricultural to urban

The total change in storage since implementation of the OBMP (2000-08) is approximately -62,000 AF.

3.6.4 Assessment of Hydraulic Control

The hydrologic conceptual model of Chino Basin describes an aquifer system where groundwater flows from areas of recharge in the Chino-North MZ (a grouping of the northern portions of MZs 1, 2, and 3) toward areas of historical surface discharge in the south near the Prado Basin and the Santa Ana River (WEI, 2006a). One of the intended purposes of the Chino Desalter well fields is to intercept (capture) groundwater originating in the Chino-North MZ before discharges to the Prado Basin or the Santa Ana River as surface water.

Piezometric data collected from monitoring and production wells in the southern portion of the Chino Basin during the period of 1997 through 2008 were analyzed to determine the state of hydraulic control. For a full discussion of hydraulic control, see the *Chino Basin Maximum Benefit Monitoring Program 2008 Annual Report* (WEI, 2009). Figure 3-23 shows groundwater elevation contours and data for the shallow aquifer system in spring 2000—prior to any significant pumping by the Chino I Desalter wells. The contours depict regional groundwater flow from the northeast to the southwest. Figure 3-24 shows groundwater elevation contours and data for the shallow aquifer system in spring 2006—after six years of pumping from the Chino I Desalter wells but prior to any significant pumping from the Chino II Desalter wells. Note that desalter pumping in 2006 interrupts the regional flow pattern of 2000. Specifically, the contours to the north and southeast of the desalter well field swing in towards the eastern

half of the well field where the desalter wells are perforated primarily within the shallow aquifer system. Figure 3-26 shows groundwater elevation contours and data for the shallow aquifer system in spring 2008, approximately eight years after the commencement of Chino I Desalter pumping and two years after the commencement of Chino II Desalter pumping. The Chino II Desalter well field began producing groundwater in mid-2006, causing the contours to swing in toward the well field from the north and the southeast. The data continue to suggest a reduction in the southward component of the hydraulic gradient around the western half of the Chino I Desalter well field; however, the contours do not indicate a gradient reversal and, hence, do not provide compelling evidence for hydraulic control in this region.

Since 2000, pumping at the Chino I Desalter well field has generally flattened the regional hydraulic gradient within the shallow aquifer system around the western half of the Chino I Desalter well field and has created a capture zone surrounding the eastern half of the well field. Around the western half of the Chino I Desalter well field, piezometric data suggest a significant reduction in the southward component of the hydraulic gradient but do not indicate a gradient reversal (northward component) and, hence, do not yet provide compelling evidence for complete hydraulic control at the Chino I Desalter well field. Pumping at the Chino II Desalter well field, where all wells are perforated within the shallow and deep aquifer systems, began in mid-2006. A depression continues to develop in the piezometric surface. The ultimate fate of groundwater that flows past the western portion of the Chino I Desalter well field is continued flow southward toward the Prado Basin where groundwater rises to become surface water in the tributaries of the Prado Basin.

Table 3-1
Summary of Recharge and Discharge
(acre-ft)

Fiscal Year	Safe Yield	Wet Water Recharge to the Chino Basin: Wet Water Recharge[1]							Total Inflow	Discharge[7]: Pumping						Pumping Distribution (% of Total)				
		Replenish	Cyclic or Conj Use	MZ1 Program	Recycled	New Storm Water[5]	Desalter Induced SAR Inflow[6]	Total		Appropriative Pool less CDA Desalters[2, 3, 4]	Chino Desalter Authority	Total Appropriative Pool	Agricultural Pool	Overlying Non-Ag Pool	Total	Appropriative Pool less CDA Desalters[2, 3, 4]	Chino Desalter Authority	Total Appropriative Pool	Agricultural Pool	Overlying Non-Ag Pool
1977 - 1978	140,000	10,680	0	0	0	0	0	10,680	150,680	60,659	0	60,659	83,934	10,082	154,675	39%	0%	39%	54%	7%
1978 - 1979	140,000	12,638	15,757	0	0	0	0	28,395	168,395	60,597	0	60,597	73,688	7,127	141,412	43%	0%	43%	52%	5%
1979 - 1980	140,000	2,507	14,243	0	0	0	0	16,751	156,751	63,834	0	63,834	69,369	7,363	140,566	45%	0%	45%	49%	5%
1980 - 1981	140,000	12,228	8,662	0	0	0	0	20,890	160,890	70,726	0	70,726	68,040	5,650	144,416	49%	0%	49%	47%	4%
1981 - 1982	140,000	16,609	5,047	0	0	0	0	21,656	161,656	66,731	0	66,731	65,117	5,684	137,532	49%	0%	49%	47%	4%
1982 - 1983	140,000	13,188	15,501	0	0	0	0	28,689	168,689	63,481	0	63,481	56,759	2,395	122,635	52%	0%	52%	46%	2%
1983 - 1984	140,000	13,777	7,960	0	0	0	0	21,737	161,737	70,558	0	70,558	59,033	3,208	132,799	53%	0%	53%	44%	2%
1984 - 1985	140,000	12,188	8,709	0	0	0	0	20,897	160,897	76,912	0	76,912	55,543	2,415	134,870	57%	0%	57%	41%	2%
1985 - 1986	140,000	16,332	2,095	0	0	0	0	18,427	158,427	80,859	0	80,859	52,061	3,193	136,113	59%	0%	59%	38%	2%
1986 - 1987	140,000	10,086	9,921	0	0	0	0	20,007	160,007	84,662	0	84,662	59,847	2,559	147,068	58%	0%	58%	41%	2%
1987 - 1988	140,000	2,494	0	0	0	0	0	2,494	142,494	91,579	0	91,579	57,865	2,958	152,402	60%	0%	60%	38%	2%
1988 - 1989	140,000	7,407	0	0	0	0	0	7,407	147,407	93,617	0	93,617	46,762	3,619	143,998	65%	0%	65%	32%	3%
1989 - 1990	140,000	0	0	0	0	0	0	0	140,000	101,344	0	101,344	48,420	4,856	154,620	66%	0%	66%	31%	3%
1990 - 1991	140,000	3,291	503	0	0	0	0	3,793	143,793	86,658	0	86,658	48,085	5,407	140,150	62%	0%	62%	34%	4%
1991 - 1992	140,000	3,790	1,761	0	0	0	0	5,551	145,551	91,982	0	91,982	44,682	5,240	141,904	65%	0%	65%	31%	4%
1992 - 1993	140,000	12,535	1,677	0	0	9,041	0	23,253	163,253	86,367	0	86,367	44,092	5,464	135,923	64%	0%	64%	32%	4%
1993 - 1994	140,000	8,859	7,634	0	0	0	0	16,493	156,493	80,798	0	80,798	44,298	4,586	129,682	62%	0%	62%	34%	4%
1994 - 1995	140,000	0	10,300	0	0	0	0	10,300	150,300	93,419	0	93,419	55,022	4,327	152,768	61%	0%	61%	36%	3%
1995 - 1996	140,000	82	0	0	0	0	0	82	140,082	101,606	0	101,606	43,639	5,424	150,669	67%	0%	67%	29%	4%
1996 - 1997	140,000	0	17	0	0	0	0	17	140,017	110,163	0	110,163	44,809	6,309	161,281	68%	0%	68%	28%	4%
1997 - 1998	140,000	8,323	0	0	0	0	0	8,323	148,323	97,435	0	97,435	43,344	4,955	145,734	67%	0%	67%	30%	3%
1998 - 1999	140,000	5,697	0	0	0	0	0	5,697	145,697	107,723	0	107,723	47,538	7,006	162,267	66%	0%	66%	29%	4%
1999 - 2000	140,000	1,001	0	0	507	0	0	1,508	141,508	126,645	0	126,645	44,401	7,774	178,820	71%	0%	71%	25%	4%
2000 - 2001	140,000	30	0	6,500	500	0	3,995	7,030	147,030	113,437	7,989	121,426	39,954	8,084	169,464	67%	5%	72%	24%	5%
2001 - 2002	140,000	0	0	6,500	505	0	4,729	7,005	147,005	121,489	9,458	130,947	39,494	5,548	175,989	69%	5%	74%	22%	3%
2002 - 2003	140,000	0	0	6,499	185	0	5,220	6,684	146,684	120,557	10,439	130,996	38,487	4,853	174,336	69%	6%	75%	22%	3%
2003 - 2004	140,000	4,020	2,463	3,558	48	0	5,303	10,089	150,089	136,834	10,605	147,439	41,978	2,915	192,332	71%	6%	77%	22%	2%
2004 - 2005	140,000	4,380	0	7,877	158	12,500	4,927	24,915	164,915	127,811	9,854	137,665	34,450	2,327	174,441	73%	6%	79%	20%	1%
2005 - 2006	140,000	33,756	0	1,554	1,304	12,999	4,944	49,613	189,613	124,315	16,479	140,794	33,900	3,026	177,720	70%	9%	79%	19%	2%
2006 - 2007	140,000	32,991	0	0	2,989	4,770	7,907	40,750	180,750	130,826	26,356	157,182	37,295	3,369	197,846	66%	13%	79%	19%	2%
2007 - 2008	140,000	0	0	0	2,340	10,243	8,092	12,583	152,583	103,078	26,972	130,050	30,910	3,440	164,400	63%	16%	79%	19%	2%
Totals	4,340,000	248,888	112,249	32,489	8,536	49,553	45,114	451,715	4,791,715	2,946,702	118,152	3,064,853	1,552,816	151,162	4,768,832					
Average	140,000	8,029	3,621	1,048	275	1,598	1,455	14,571	154,571	95,055	14,769	98,866	50,091	4,876	153,833	59%	8%	63%	35%	3%
Max	140,000	33,756	15,757	7,877	2,989	12,999	8,092	49,613	189,613	136,834	26,972	157,182	83,934	10,082	197,846	73%	16%	79%	55%	7%
Min	140,000	0	0	0	0	0	0	0	140,000	60,597	0	60,597	33,900	2,327	122,635	39%	0%	39%	19%	1%

[1] Includes only water actually spread
[2] Includes only actual water produced and does not include MWD exchanges
[3] Includes adjustment for Ontario production of 633 AF in FY 2001-02
[4] Includes adjustment for Jurupa, Niagara, and Chino production correction of 1,030 AF in FY 2002-03
[5] Includes 9,041 acre-ft of surface water recharge in the Chino Basin that would otherwise have recharged the Claremont Heights Basin in FY 1992-93; and CBFIP stormwater capture of 12,500 acre-ft/yr beginning in FY 2004-05.
[6] Watermaster has assumed that half of the desalter pumping has been replenished by induced recharge in the Santa Ana River through FY 2004-05 and that 30 percent of the desalter pumping has been replenished by induced recharge in the Santa Ana River in FY 2005-06
[7] The only discharge considered herein is pumping, the other discharges are assumed netted out in the safe yield

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Table 3-2
Summary of Annual Wet Water Recharge in the Chino Basin

Basin Name	2000/2001				2001/2002				2002/2003				2003/2004			
	Storm Water	Imported Water	Recycled Water	Total Recharge	Storm Water	Imported Water	Recycled Water	Total Recharge	Storm Water	Imported Water	Recycled Water	Total Recharge	Storm Water	Imported Water	Recycled Water	Total Recharge
Banana Basin	390	0	0	390	184	0	0	184	366	0	0	366	188	0	0	188
Declez Basin	--	0	0	0	--	0	0	0	--	0	0	0	--	0	0	0
Etiwanda Conservation Ponds	--	0	0	0	--	0	0	0	--	0	0	0	--	0	0	0
Hickory Basin	37	0	0	37	105	0	0	105	551	0	0	551	224	0	0	224
Jurupa Basin	--	0	0	0	--	0	0	0	--	0	0	0	--	0	0	0
RP-3 Basins	--	0	0	0	--	0	0	0	--	0	0	0	--	0	0	0
Turner Basin	167	0	0	167	100	0	0	100	192	0	0	192	0	0	0	0
7th and 8th Street Basins	--	0	0	0	--	0	0	0	--	0	0	0	--	0	0	0
Brooks Street Basin	0	0	0	0	104	0	0	104	676	0	0	676	--	0	0	0
College Heights Basins	--	0	0	0	--	0	0	0	--	0	0	0	--	0	0	0
Ely Basins	--	0	500	500	--	0	505	505	--	0	185	185	--	0	48	48
Etiwanda Spreading Basins	--	0	0	0	--	0	0	0	--	0	0	0	--	2,812	0	2,812
Lower Day Basin	--	0	0	0	--	0	0	0	--	0	0	0	--	0	0	0
Montclair Basins	2,890	6,530	0	9,420	773	6,500	0	7,273	1,328	6,499	0	7,827	--	3,558	0	3,558
San Sevaine	--	0	0	0	--	0	0	0	--	0	0	0	--	1,211	0	1,211
Upland Basin	--	0	0	0	--	0	0	0	--	0	0	0	--	0	0	0
Victoria Basin	--	0	0	0	--	0	0	0	--	0	0	0	--	0	0	0
Totals:	3,484	6,530	500	10,514	1,266	6,500	505	8,271	3,113	6,499	185	9,797	412	7,582	48	8,042

Basin Name	2004/2005				2005/2006				2006/2007				2007/2008			
	Storm Water	Imported Water	Recycled Water	Total Recharge	Storm Water	Imported Water	Recycled Water	Total Recharge	Storm Water	Imported Water	Recycled Water	Total Recharge	Storm Water	Imported Water	Recycled Water	Total Recharge
Banana Basin	459	0	0	459	221	206	529	956	226	783	643	1,652	278	0	157	435
Declez Basin	--	0	0	0	737	0	0	737	0	0	0	0	730	0	0	730
Etiwanda Conservation Ponds	--	197	0	197	--	0	0	0	0	0	0	0	0	0	0	0
Hickory Basin	653	0	0	653	517	623	586	1,726	536	212	646	1,394	949	0	625	1,574
Jurupa Basin	--	0	0	0	--	0	0	0	0	0	0	0	0	0	0	0
RP-3 Basins	--	0	0	0	767	0	0	767	802	0	0	802	511	0	0	511
Turner Basin	297	310	0	607	2,575	346	0	2,921	406	313	1237	1,956	1542	0	0	1,542
7th and 8th Street Basins	--	0	0	0	1,271	0	0	1,271	640	0	0	640	959	0	1,054	2,013
Brooks Street Basin	--	0	0	0	524	2033	0	2,557	205	1604	0	1,809	475	0	0	475
College Heights Basins	--	0	0	0	108	5,432	0	5,540	1	3,125	0	3,126	172	0	0	172
Ely Basins	--	0	158	158	1,531	0	188	1,719	631	0	466	1,097	1,603	0	562	2,165
Etiwanda Spreading Basins	--	2,137	0	2,137	20	2,488	0	2,508	0	1,160	0	1,160	10	0	0	10
Lower Day Basin	--	107	0	107	624	2,810	0	3,434	78	2,266	0	2,344	303	0	0	303
Montclair Basins	--	7,887	0	7,887	1,296	5,536	0	6,832	355	10,681	0	11,036	859	0	0	859
San Sevaine	--	1,621	0	1,621	2,072	9,172	0	11,244	244	5,749	0	5,993	749	0	0	749
Upland Basin	--	0	0	0	214	5,922	0	6,136	195	7068	0	7,263	312	0	0	312
Victoria Basin	--	0	0	0	330	0	0	330	260	0	0	260	427	0	0	427
Totals:	1,409	12,258	158	13,825	12,807	34,568	1,303	48,678	4,579	32,961	2,992	40,532	9,879	0	2,398	12,277

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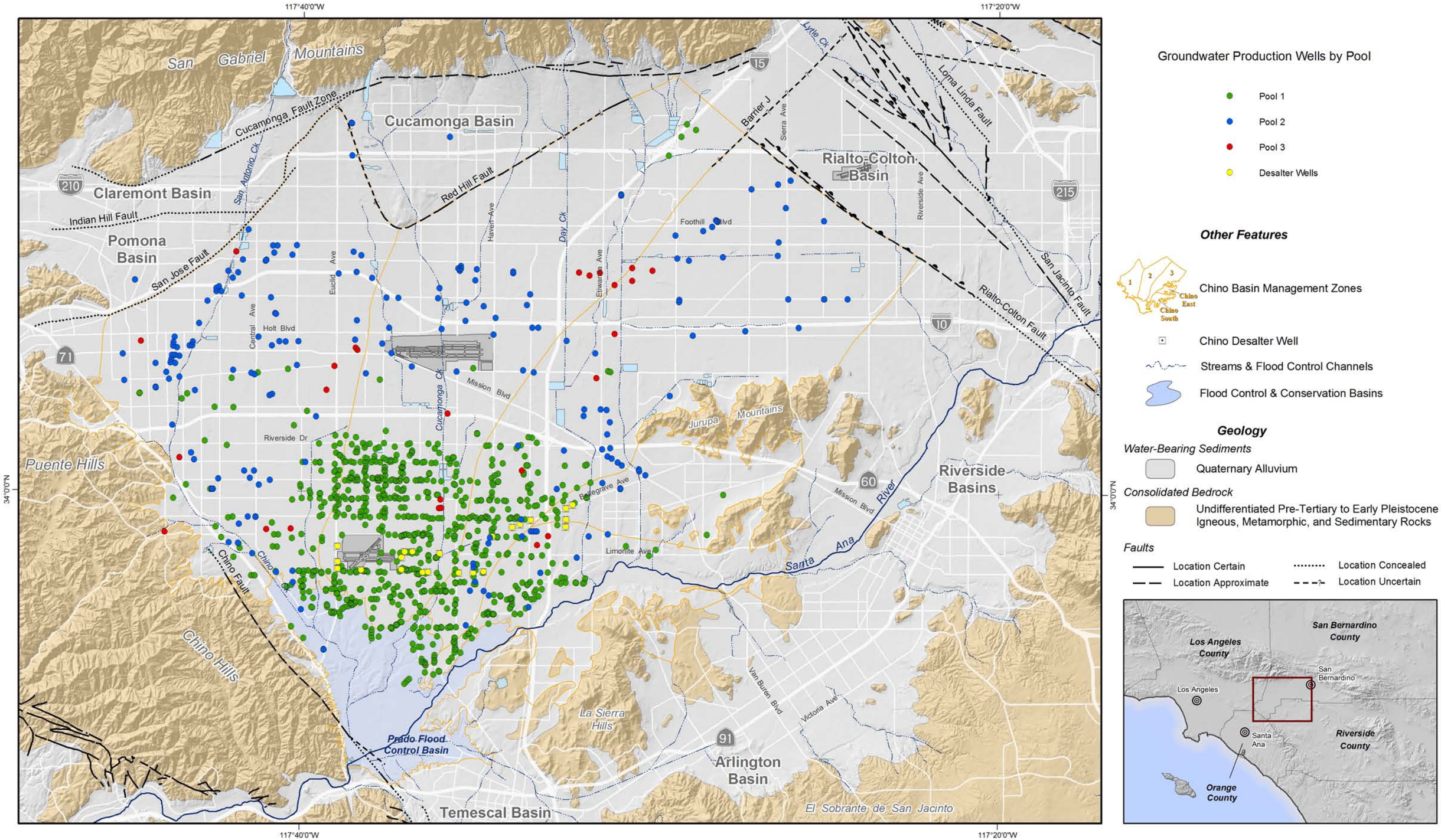

Groundwater Production Wells by Pool

- Pool 1
- Pool 2
- Pool 3
- Desalter Wells

Other Features

- Chino Basin Management Zones
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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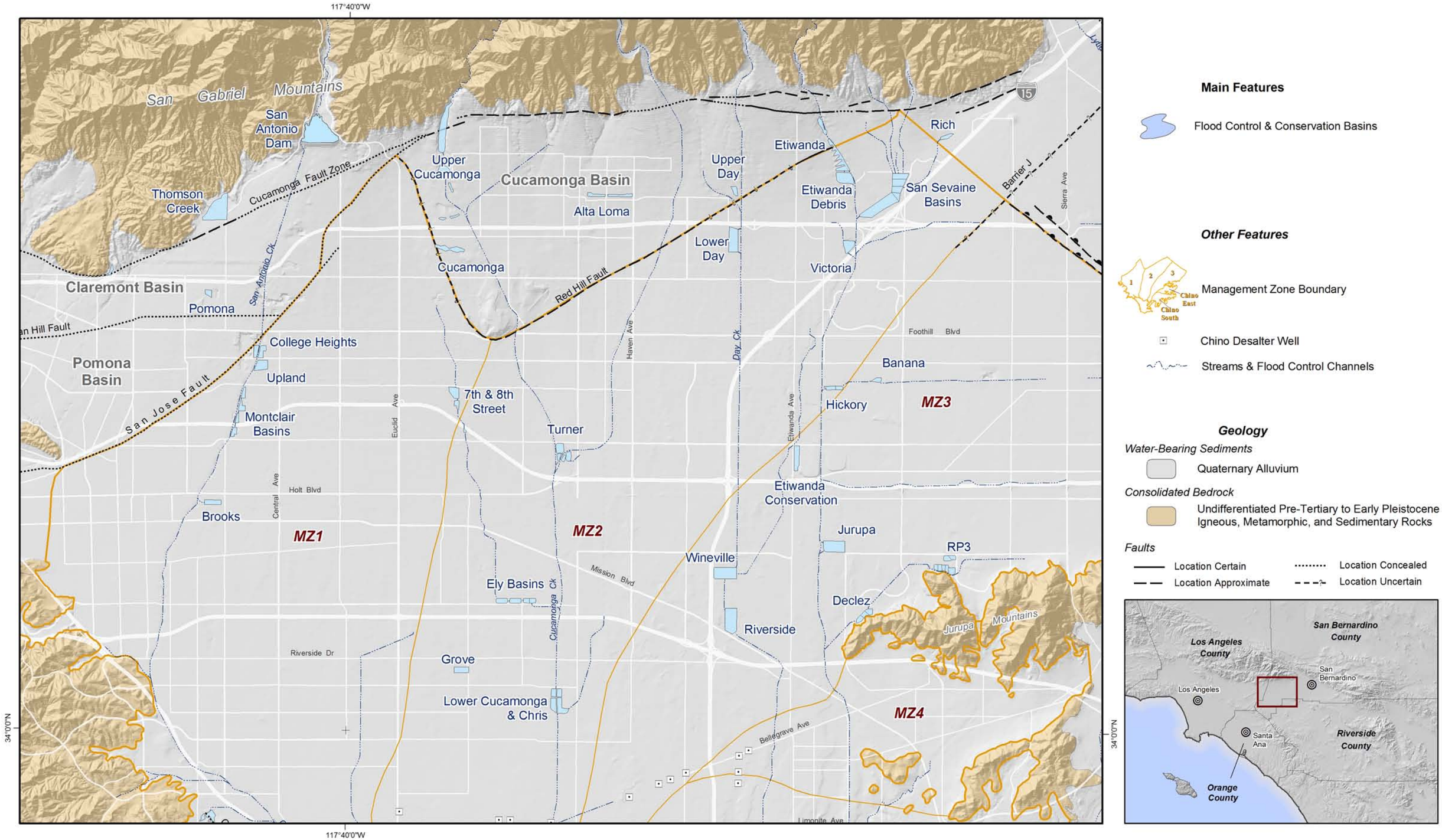
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Basin Operations and Groundwater Level Monitoring

Active Production Wells by Pool

Production Wells as of Fiscal Year 2007-08

Figure 3-1



Main Features

Flood Control & Conservation Basins

Other Features

Management Zone Boundary

Chino Desalter Well

Streams & Flood Control Channels

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

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0 1 2 3 4 5 Miles

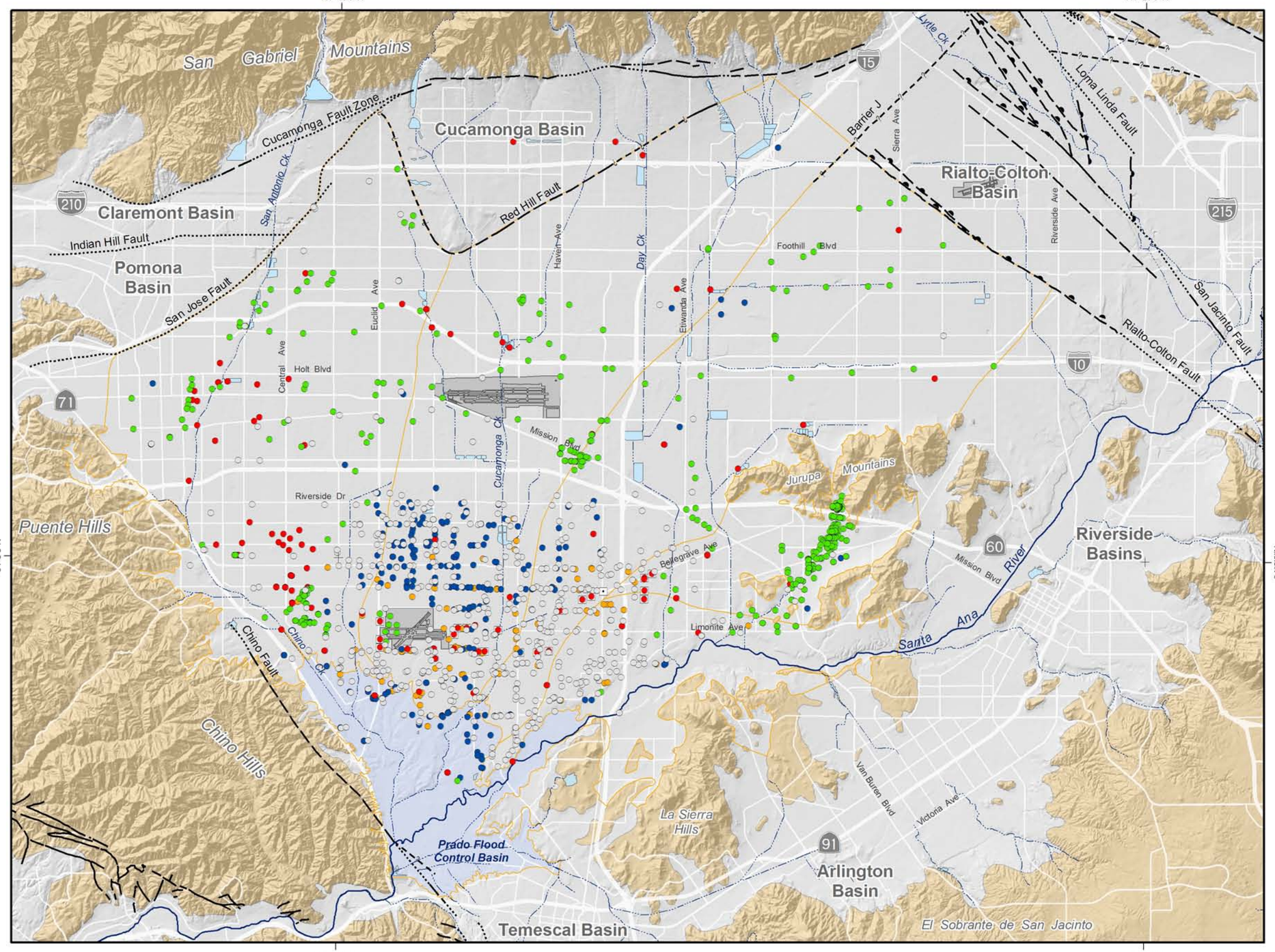
0 2 4 6 8 KM

2008 State of the Basin Report

Basin Operations and Groundwater Level Monitoring

Recharge Basin Locations

Figure 3-2



Basin-Wide Monitoring Program
by Measurement Frequency

- Monthly Measurement (84 wells)
- Semi-Annual Measurement (212 wells)
- Measurement by Transducer (134 wells)
- Owner Measures Water Level (476 wells)
- Unable to Obtain Water Level (510 wells)

Other Features

Management Zone Boundary

Chino Desalter Well

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

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

Faults

Location Certain
Location Approximate
Location Concealed
Location Uncertain

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0 1 2 3 4 5 Miles
0 2 4 6 8 KM

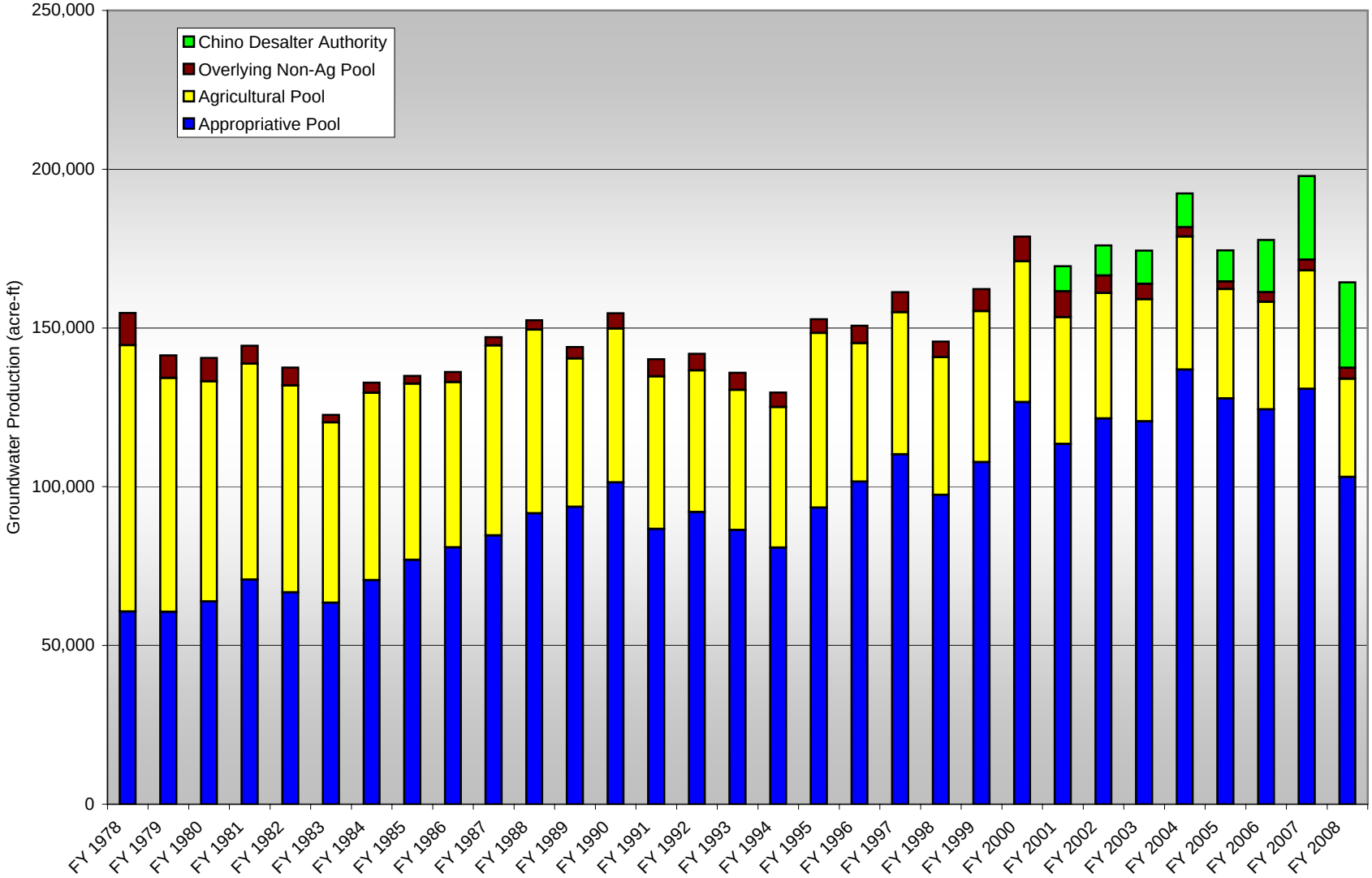
2008 State of the Basin Report
Basic Operations and Groundwater Level Monitoring

Groundwater Level Monitoring Network

Well Locations and Measurement Frequency

Figure 3-3

Figure 3-4
Distribution of Groundwater Production by Pool



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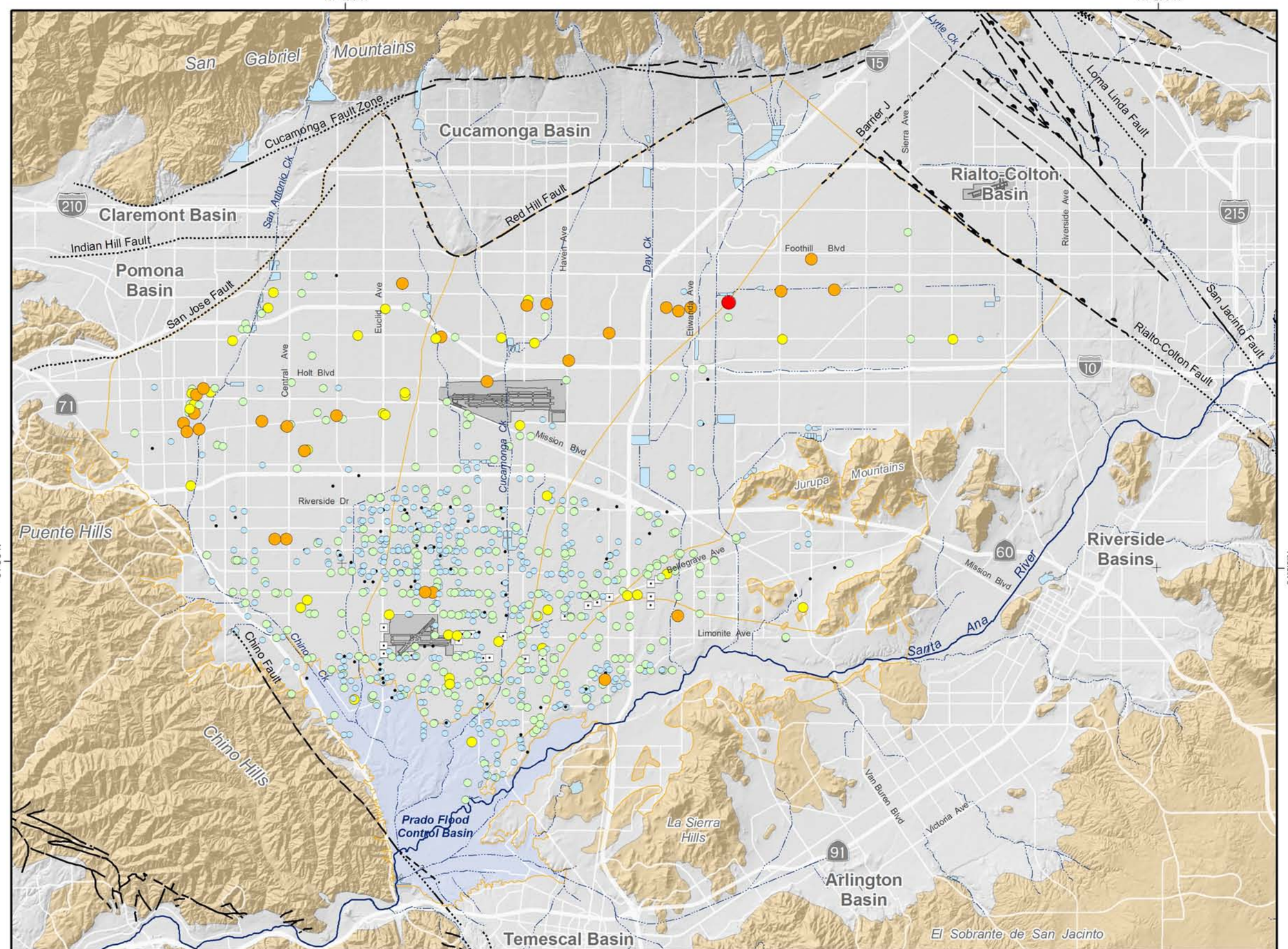

Groundwater Production (July-77 to June-78)

acre-ft

- < 10
- 10 - 100
- 100 - 500
- 500 - 1,000
- 1,000 - 2,500
- 2,500 - 5,000
- > 5,000

Other Features

Management Zone Boundary

Chino Desalter Well

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

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

Faults

Location Certain

Location Approximate

Location Concealed

Location Uncertain

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0 1 2 3 4 5 Miles

0 2 4 6 8 KM

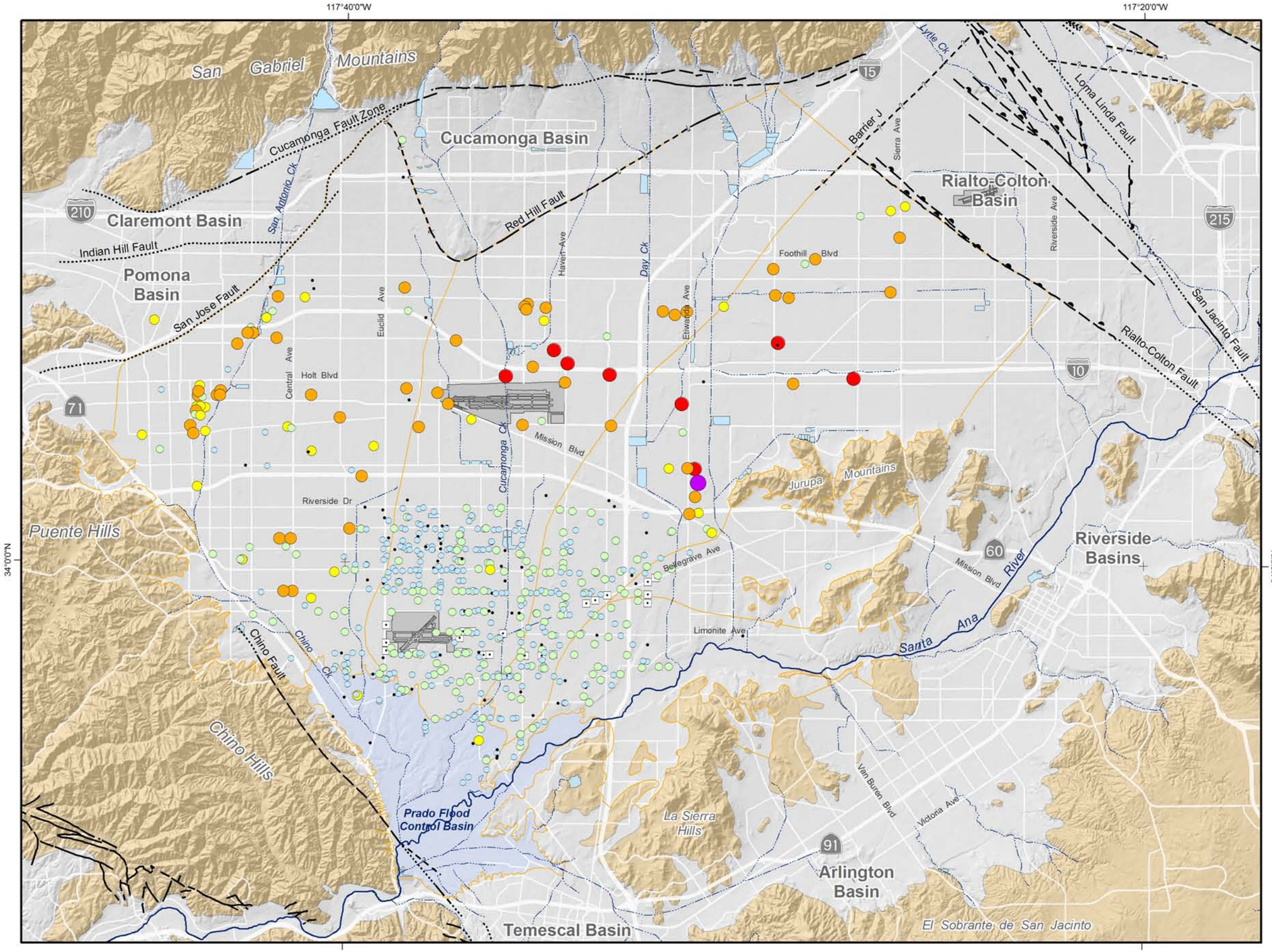
2008 State of the Basin Report

Groundwater Pumping

Groundwater Production by Well

Fiscal Year 1977-1978

Figure 3-5



Groundwater Production (July-99 to June-00)

acre-ft

- < 10
- 10 - 100
- 100 - 500
- 500 - 1,000
- 1,000 - 2,500
- 2,500 - 5,000
- > 5,000

Other Features

Management Zone Boundary

Chino Desalter Well

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

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

Faults

Location Certain

Location Approximate

Location Concealed

Location Uncertain

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0 1 2 3 4 5 Miles

0 2 4 6 8 KM

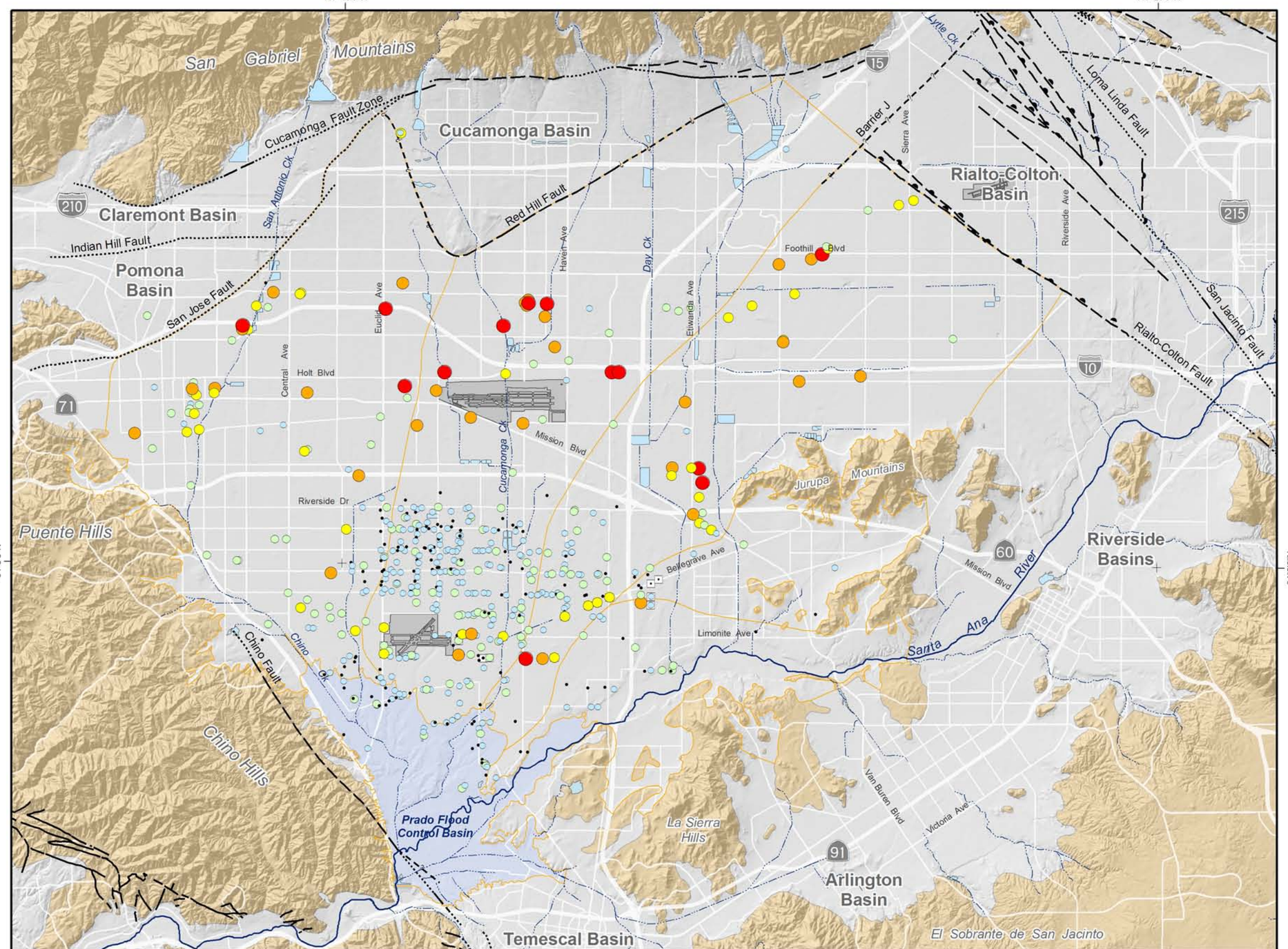
2008 State of the Basin Report

Groundwater Pumping

Groundwater Production by Well

Fiscal Year 1999-2000

Figure 3-6



Groundwater Production (July-05 to June-06)

acre-ft

- < 10
- 10 - 100
- 100 - 500
- 500 - 1,000
- 1,000 - 2,500
- 2,500 - 5,000
- > 5,000

Other Features

- Management Zone Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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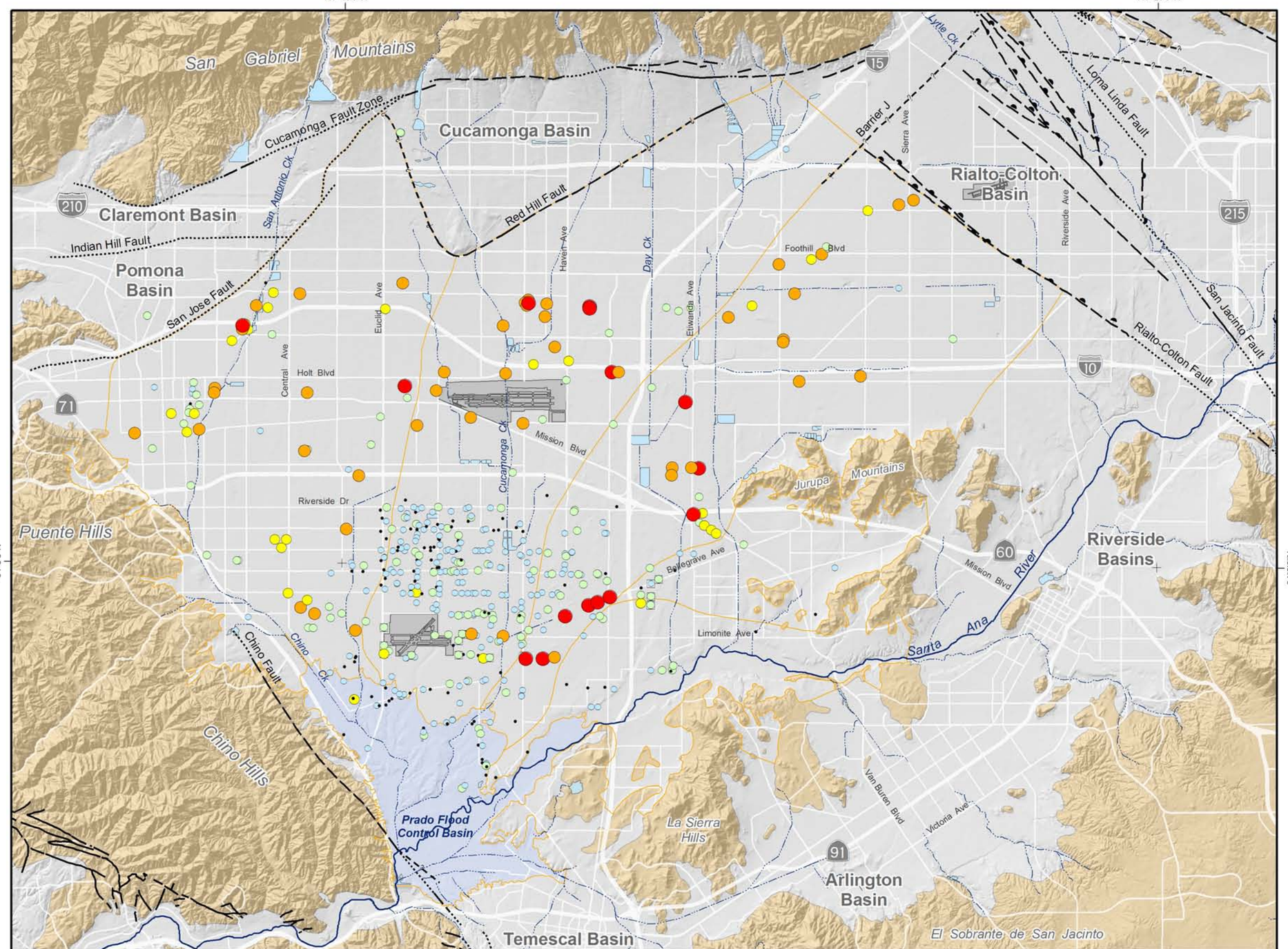
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Pumping

Groundwater Production by Well

Fiscal Year 2005-2006

Figure 3-7



Groundwater Production (July-06 to June-07)

acre-ft

- < 10
- 10 - 100
- 100 - 500
- 500 - 1,000
- 1,000 - 2,500
- 2,500 - 5,000
- > 5,000

Other Features

Management Zone Boundary

Chino Desalter Well

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

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

Faults

Location Certain

Location Approximate

Location Concealed

Location Uncertain

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0 1 2 3 4 5 Miles

0 2 4 6 8 KM

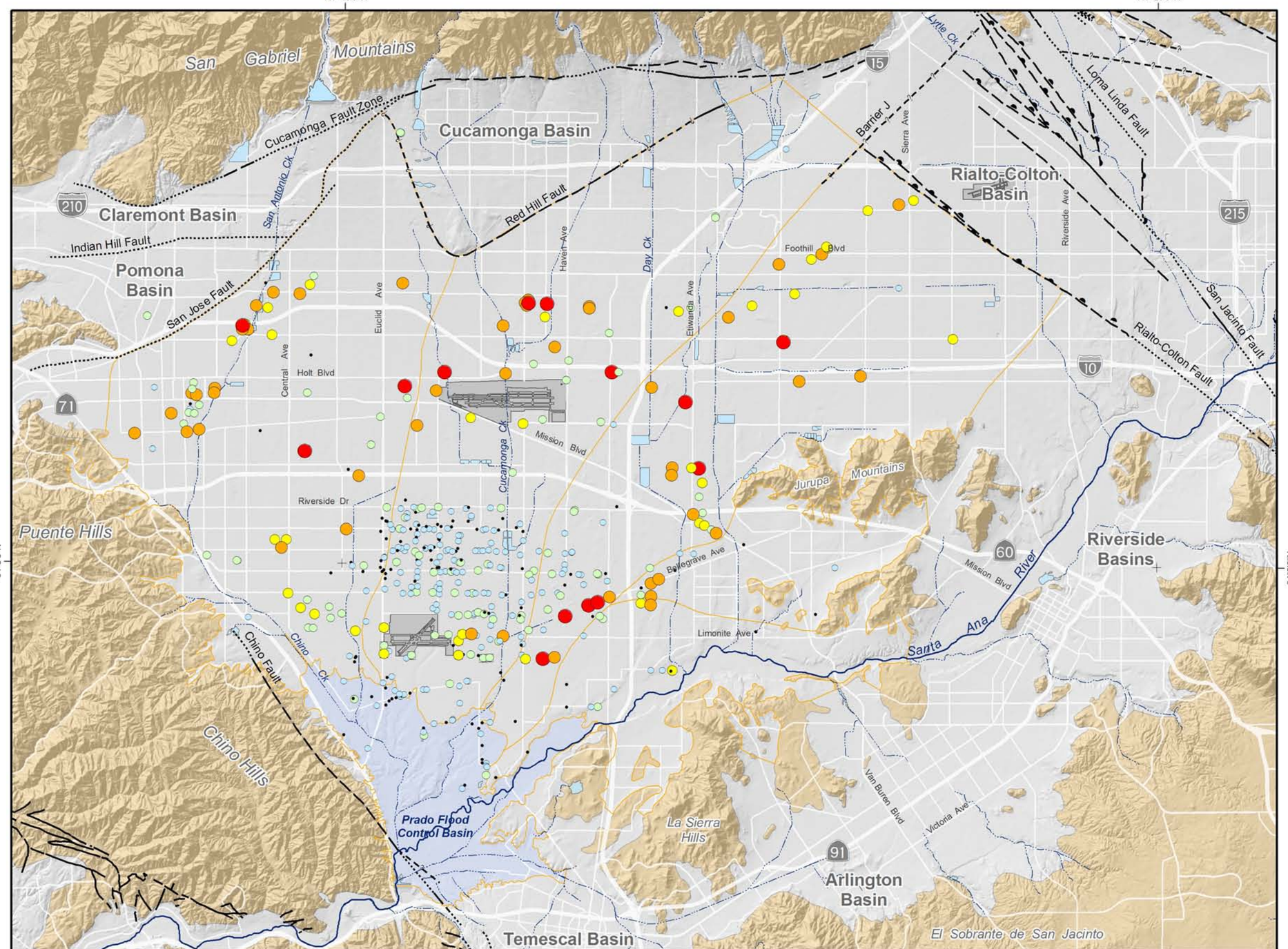
2008 State of the Basin Report

Groundwater Pumping

Groundwater Production by Well

Fiscal Year 2006-2007

Figure 3-8



Groundwater Production (July-07 to June-08)

acre-ft

- < 10
- 10 - 100
- 100 - 500
- 500 - 1,000
- 1,000 - 2,500
- 2,500 - 5,000
- > 5,000

Other Features

Management Zone Boundary

Chino Desalter Well

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

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

Faults

Location Certain — Location Concealed

Location Approximate — Location Uncertain

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Date: 20090420

File: Figure_3-9.mxd

0 1 2 3 4 5 Miles

0 2 4 6 8 KM

2008 State of the Basin Report

Groundwater Pumping

Groundwater Production by Well

Fiscal Year 2007-2008

Figure 3-9

Wells Used in Historical Groundwater Analyses

Management Zone

- MZ-1
- MZ-2
- MZ-3
- MZ-4
- MZ-5

Other Features

Management Zone Boundary

Chino Desalter Well

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

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Faults

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Location Approximate

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0 1 2 3 4 5 Miles

0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Levels

Historical Groundwater Level Trends
Well Location Map

Wells Used in Historical Groundwater Level Analyses

Figure 3-10

Figure 3-11 - Time History of Production, Recharge, and Groundwater Levels in MZ1

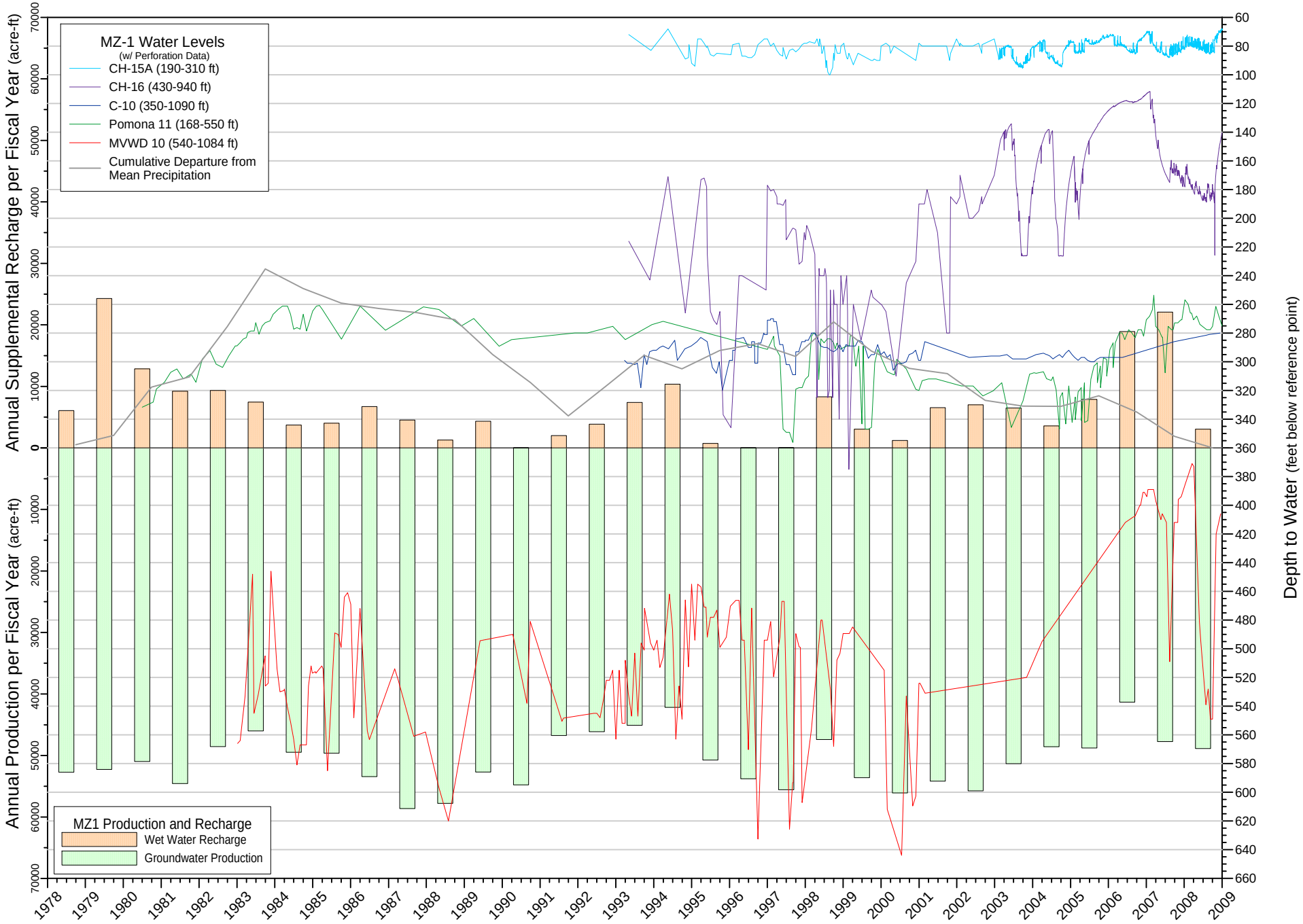

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Figure 3-12 - Time History of Production, Recharge, and Groundwater Levels in MZ2

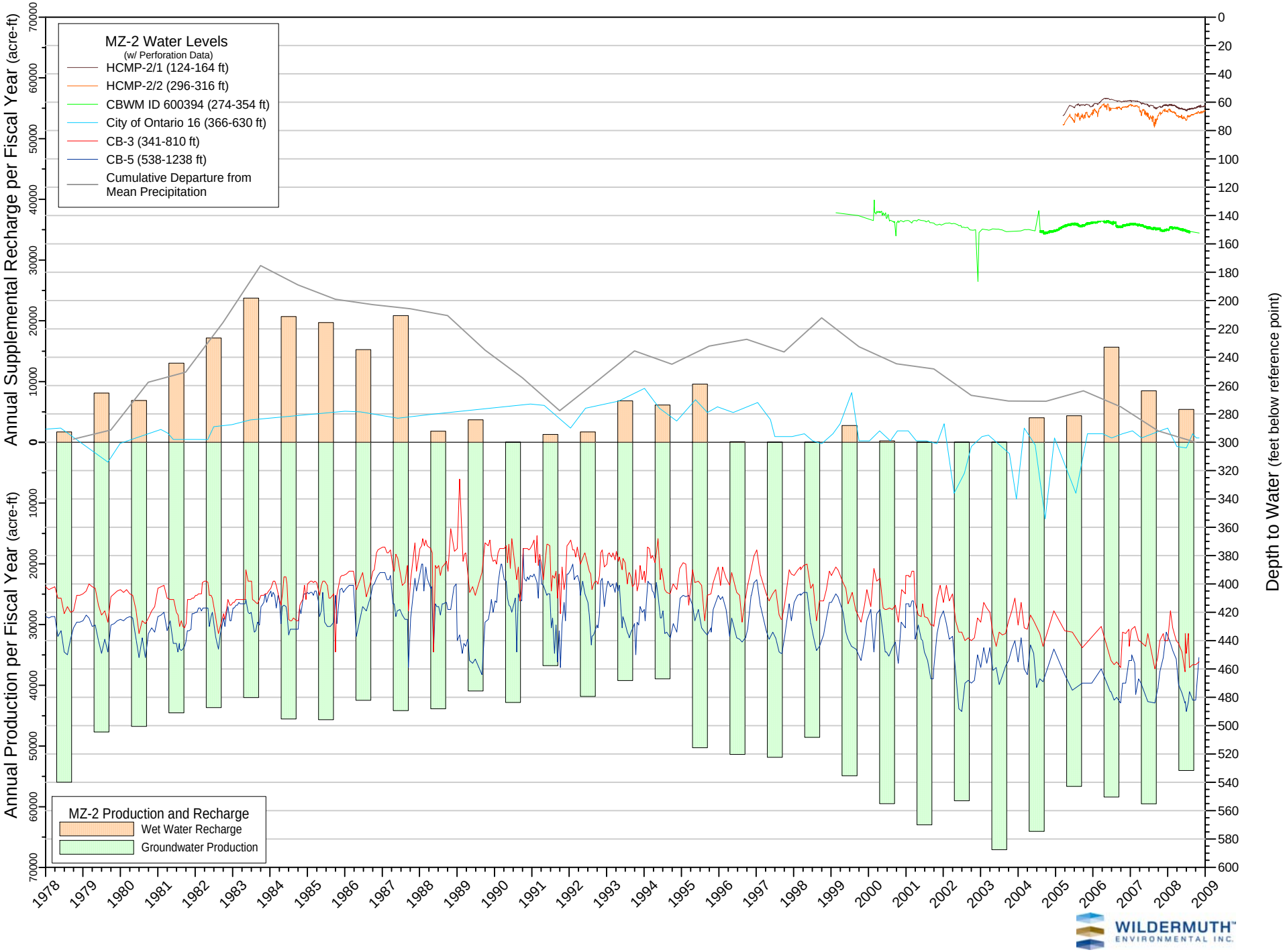

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Figure 3-13 - Time History of Production, Recharge, and Groundwater Levels in MZ3

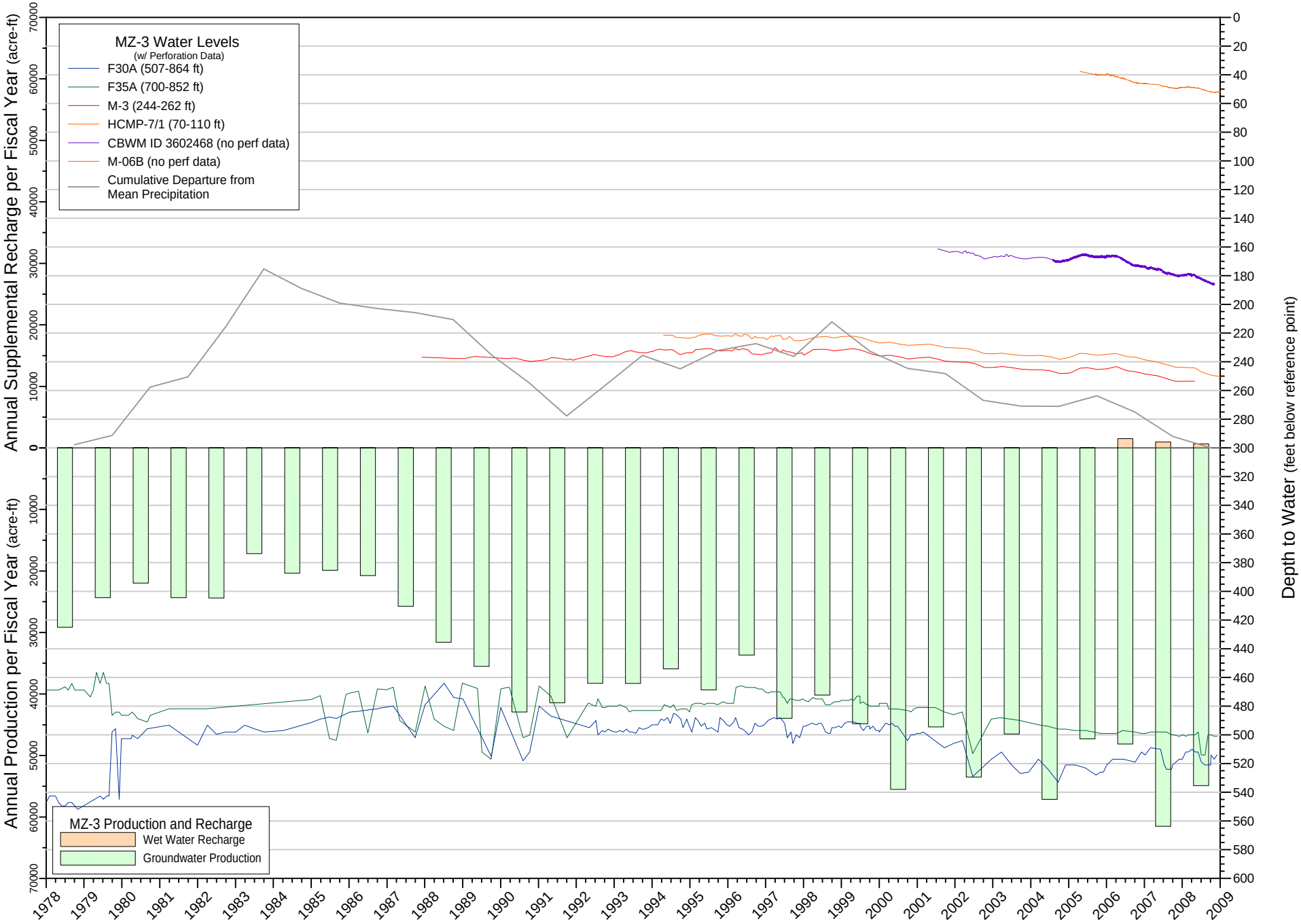

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Figure 3-14 - Time History of Production, Recharge, and Groundwater Levels in Chino-East MZ

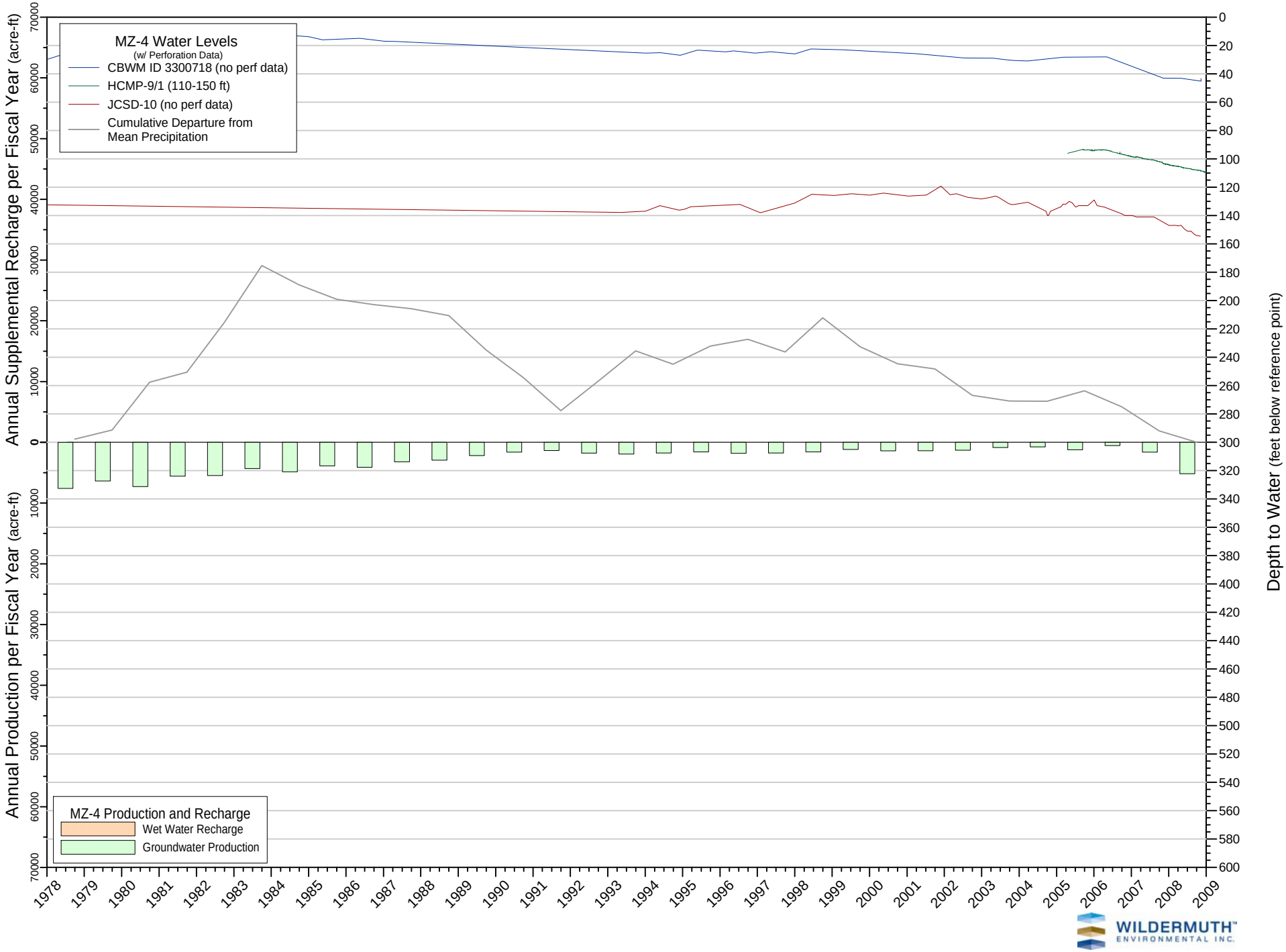

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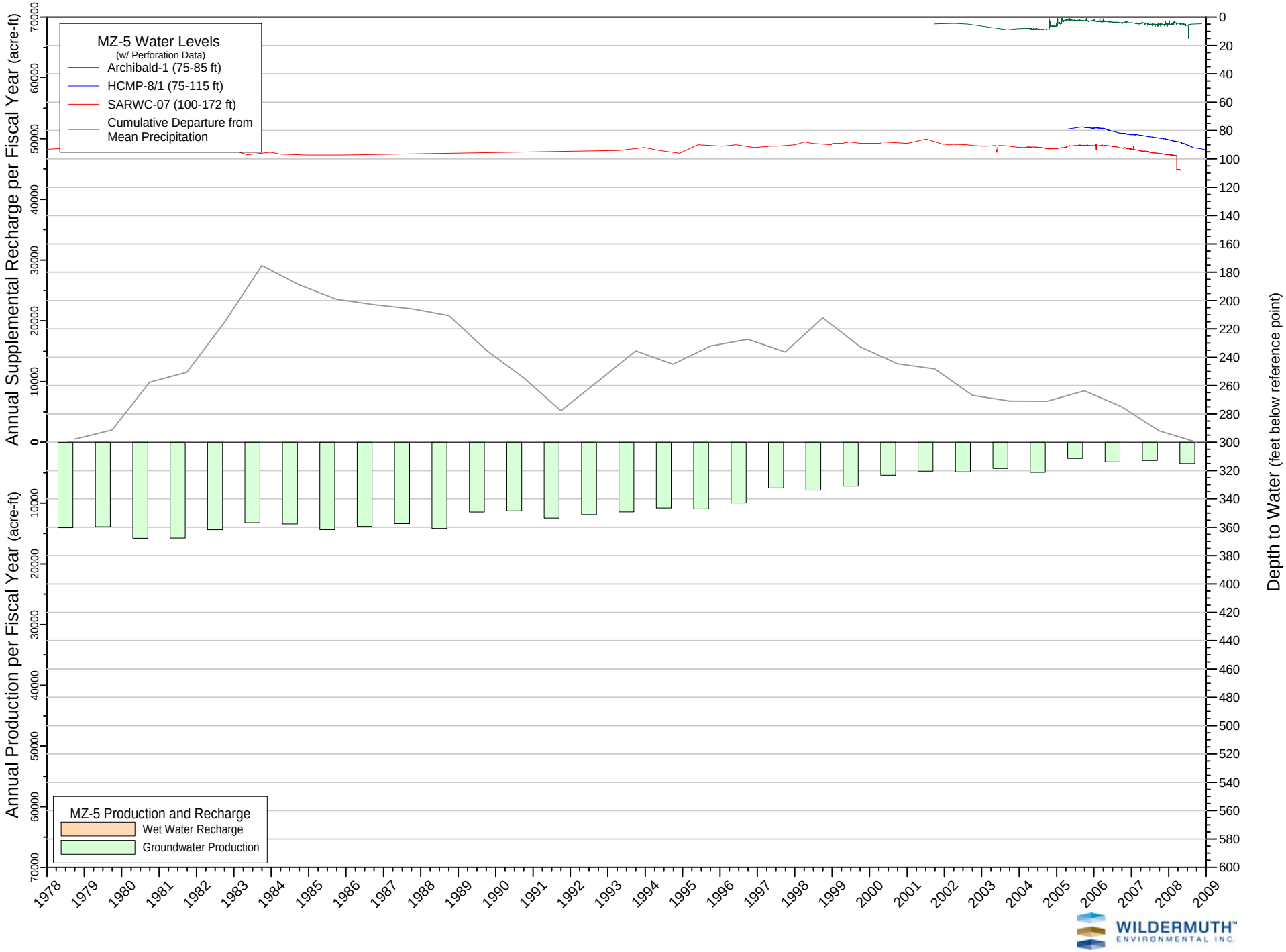
Figure 3-15 - Time History of Production, Recharge, and Groundwater Levels in Chino-South MZ



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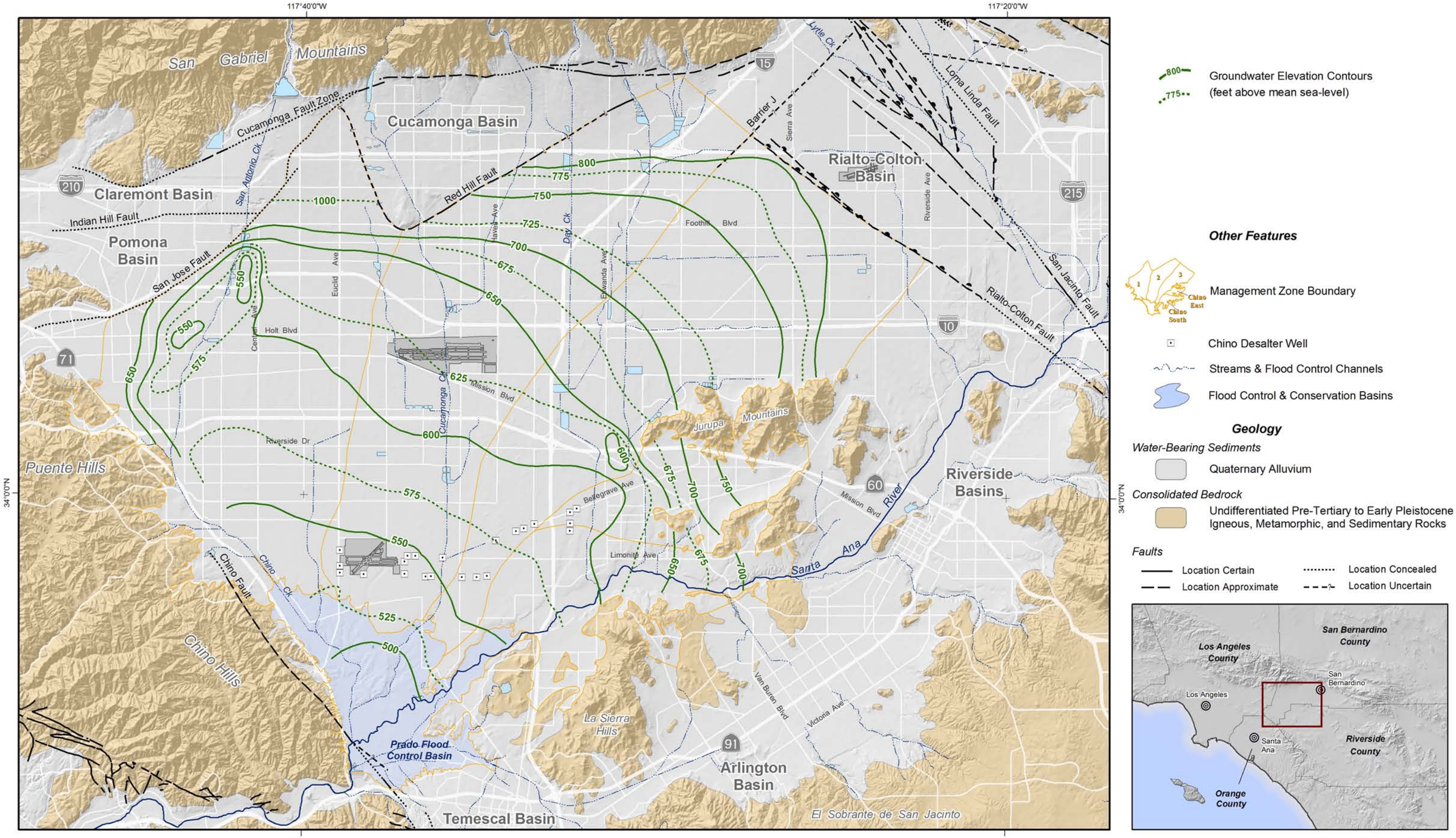

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Author: ETL

Date: 20090401

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0 1 2 3 4 5 Miles

0 2 4 6 8 KM

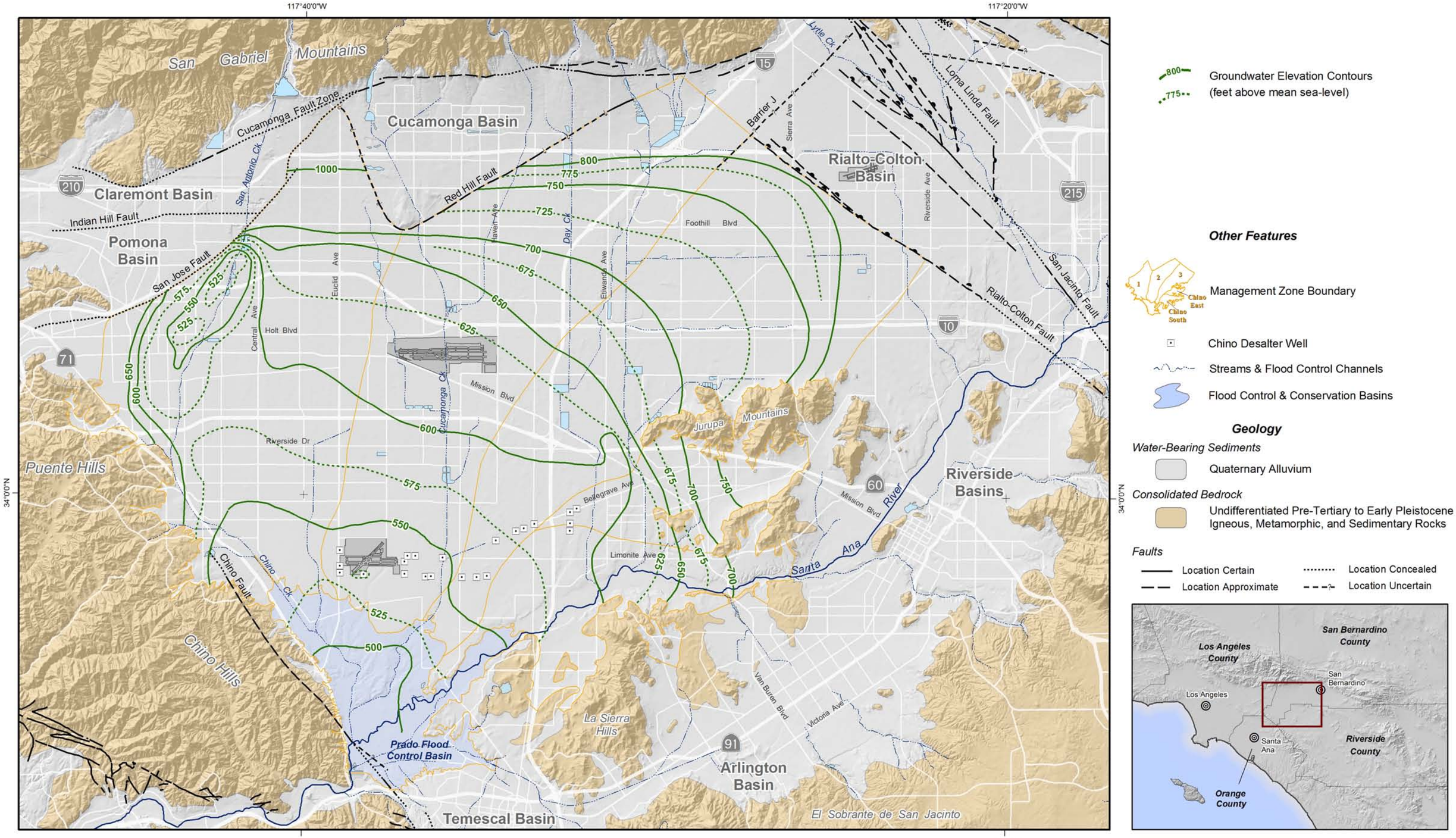
2008 State of the Basin Report

Groundwater Levels

Groundwater Elevation Contours

Fall 2000 -- Chino Basin

Figure 3-16



Groundwater Elevation Contours (feet above mean sea-level)

Other Features

Management Zone Boundary

Chino Desalter Well

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

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

Faults

Location Certain

Location Approximate

Location Concealed

Location Uncertain

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0 1 2 3 4 5 Miles

0 2 4 6 8 KM

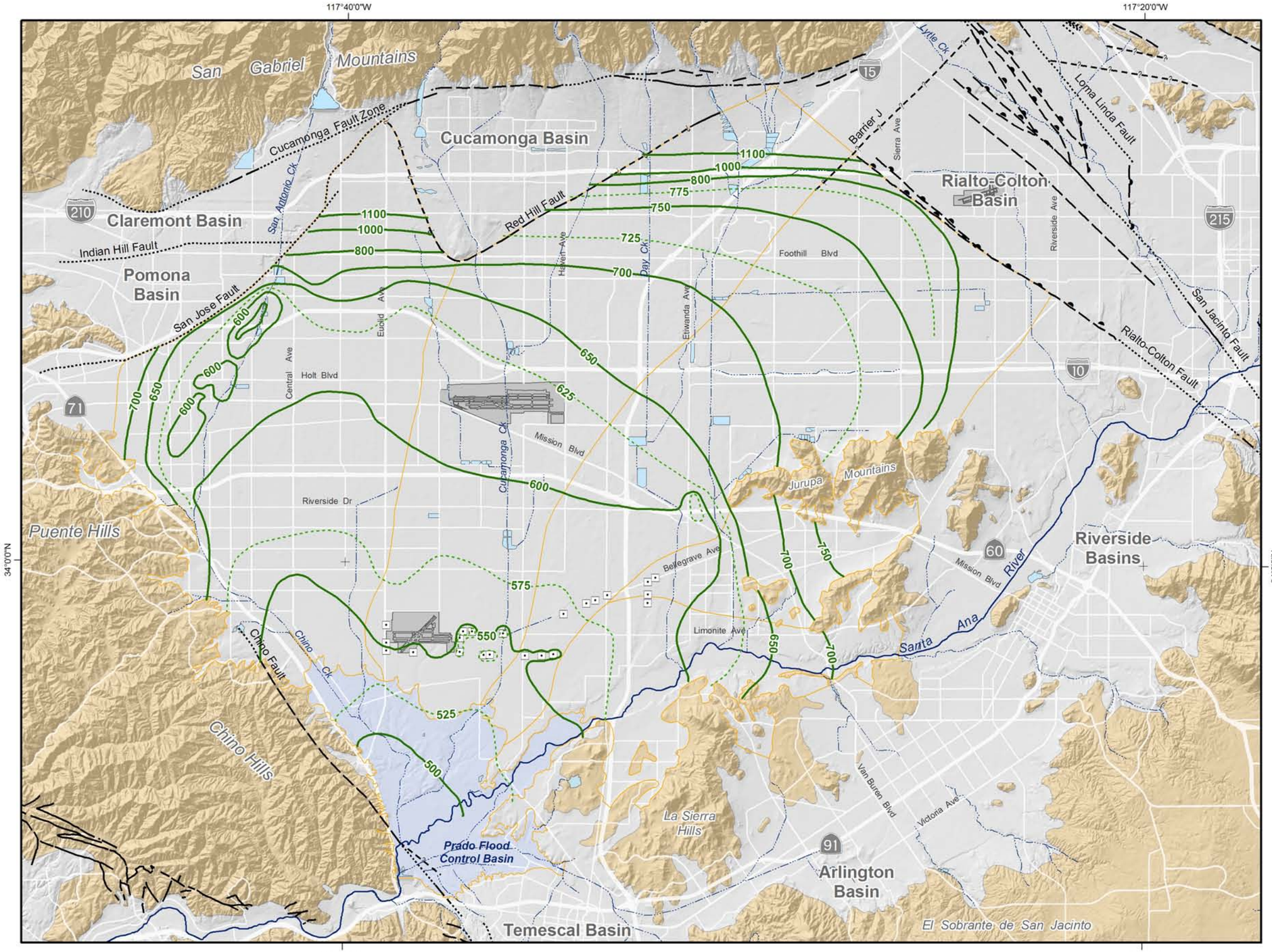
2008 State of the Basin Report

Groundwater Levels

Groundwater Elevation Contours

Fall 2003 -- Chino Basin

Figure 3-17



Groundwater Elevation Contours (feet above mean sea-level)

Other Features

Management Zone Boundary

Chino Desalter Well

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

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

Faults

Location Certain

Location Approximate

Location Concealed

Location Uncertain

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Date: 20090401
File: Figure_3-18.mxd

0 1 2 3 4 5 Miles

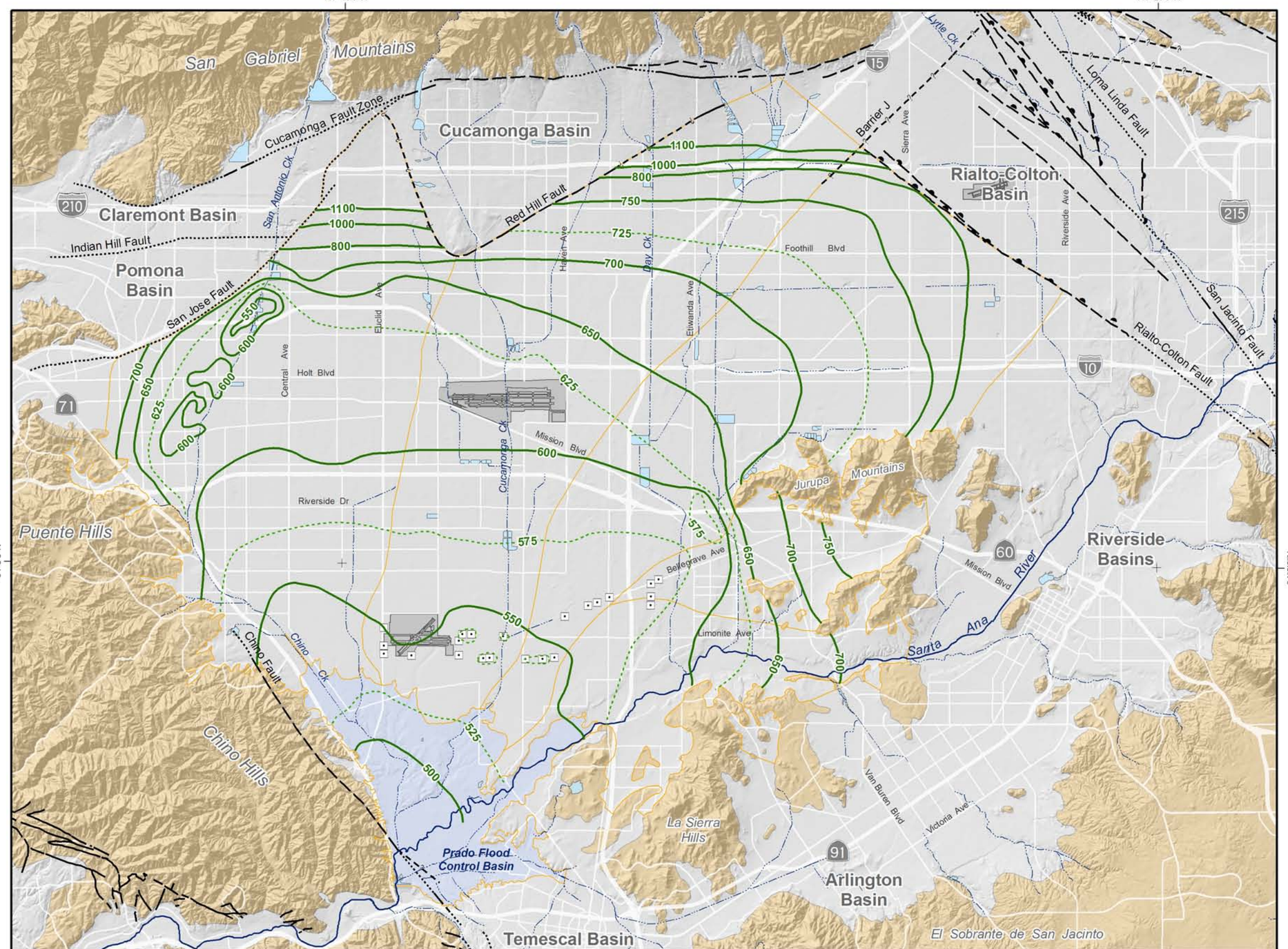
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Levels

Groundwater Elevation Contours

Fall 2006 -- Chino Basin

Figure 3-18



800 Groundwater Elevation Contours (feet above mean sea-level)

775

Other Features

Management Zone Boundary

Chino Desalter Well

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

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

Faults

Location Certain

Location Approximate

Location Concealed

Location Uncertain

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0 1 2 3 4 5 Miles

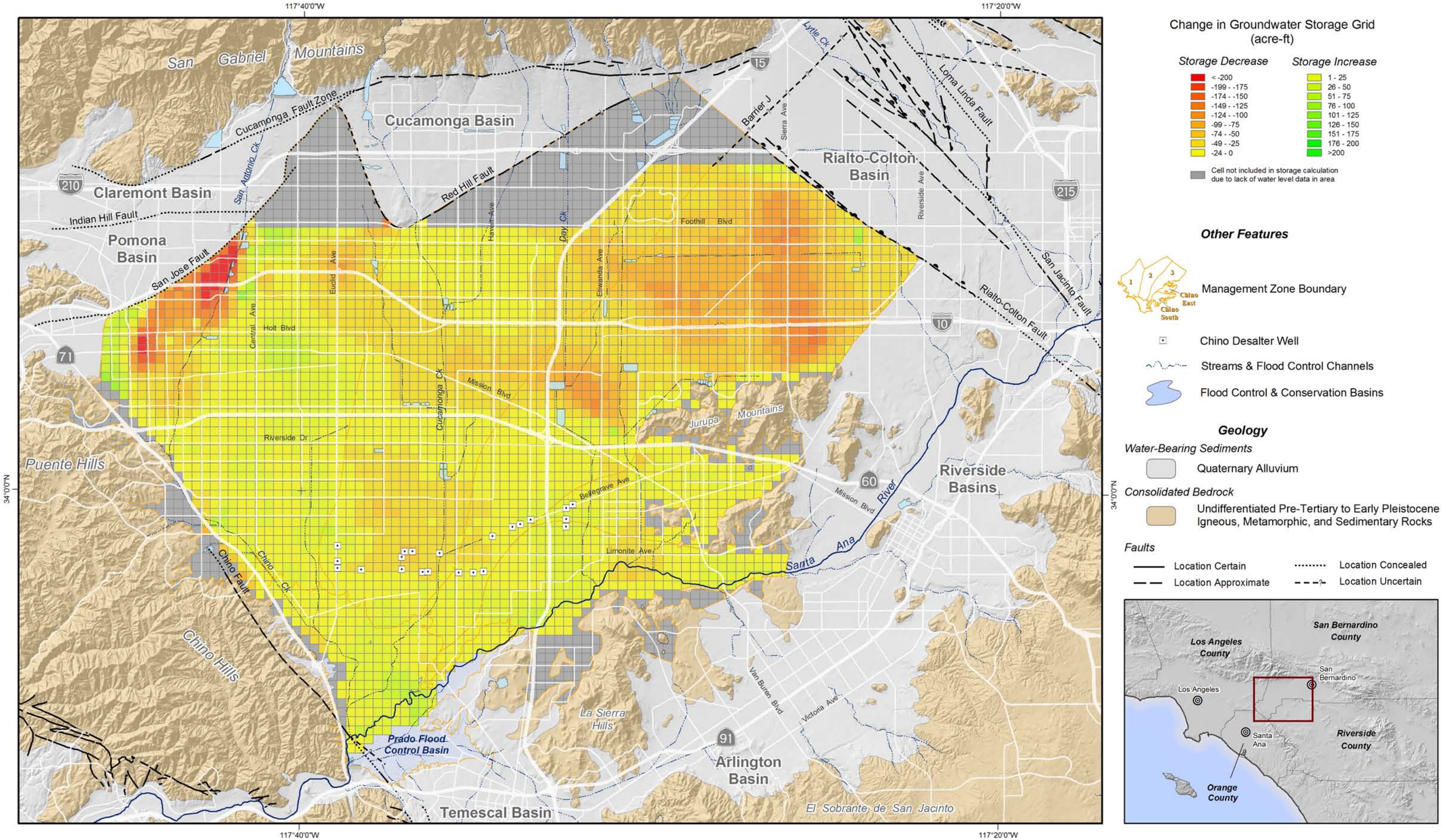
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Levels

Groundwater Elevation Contours

Fall 2008 -- Chino Basin

Figure 3-19



Change in Groundwater Storage Grid (acre-ft)

Storage Decrease	Storage Increase
< -200	1 - 25
-199 - -175	26 - 50
-174 - -150	51 - 75
-149 - -125	76 - 100
-124 - -100	101 - 125
-99 - -75	126 - 150
-74 - -50	151 - 175
-49 - -25	176 - 200
-24 - 0	>200

Cell not included in storage calculation due to lack of water level data in area

Other Features

Management Zone Boundary

Chino Desalter Well

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

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

Faults

Location Certain

Location Approximate

Location Concealed

Location Uncertain

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0 1 2 3 4 5 Miles

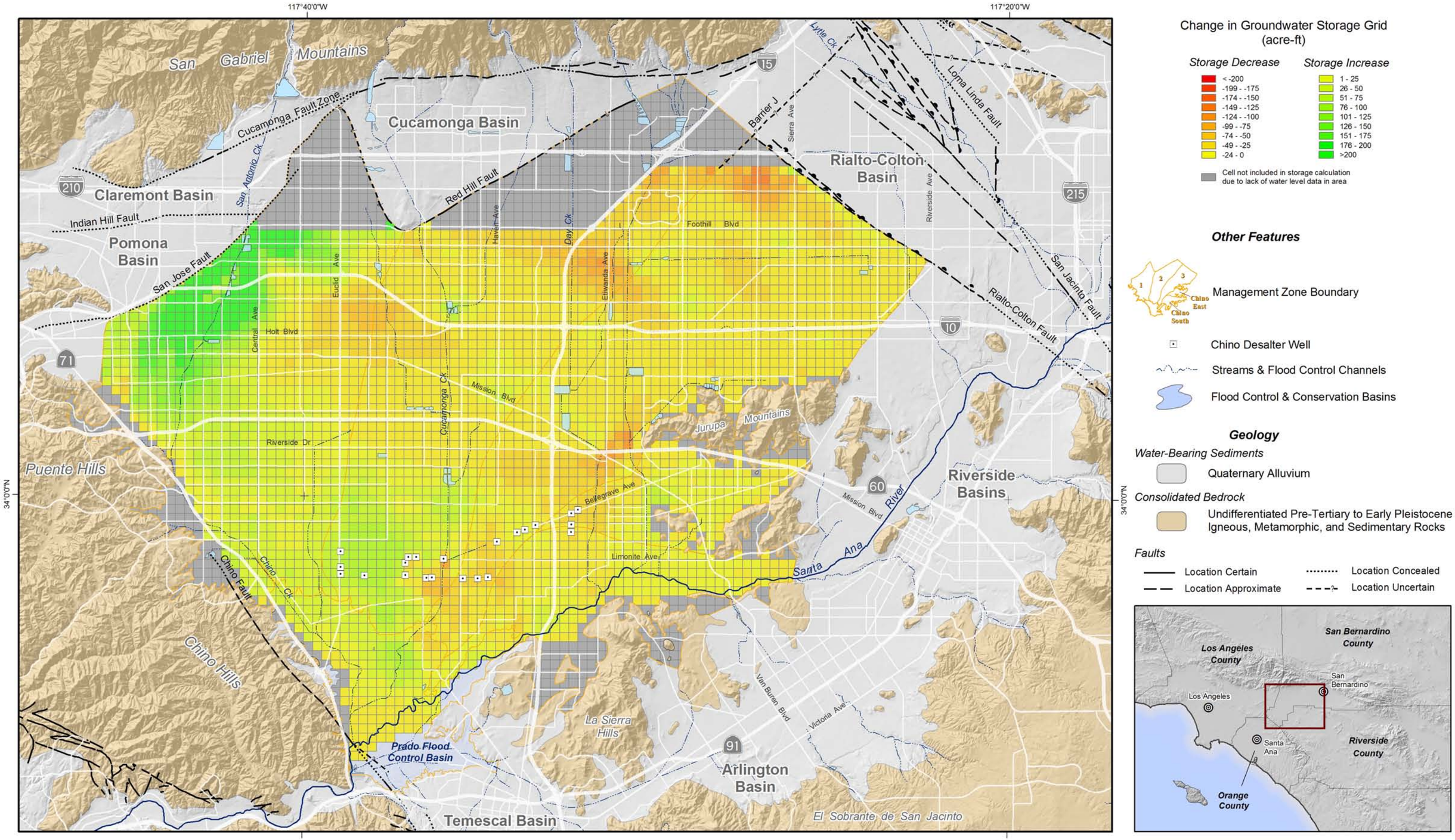
0 2 4 6 8 KM

2008 State of the Basin Report
Changes in Groundwater Storage

Change in Groundwater Storage

Fall 2000 to Fall 2003

Figure 3-20



Change in Groundwater Storage Grid (acre-ft)

Storage Decrease	Storage Increase
< -200	1 - 25
-199 - -175	26 - 50
-174 - -150	51 - 75
-149 - -125	76 - 100
-124 - -100	101 - 125
-99 - -75	126 - 150
-74 - -50	151 - 175
-49 - -25	176 - 200
-24 - 0	>200

Cell not included in storage calculation due to lack of water level data in area

Other Features

Management Zone Boundary

Chino Desalter Well

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

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

Faults

Location Certain

Location Approximate

Location Concealed

Location Uncertain

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File: Figure_3-21.mxd

0 1 2 3 4 5 Miles

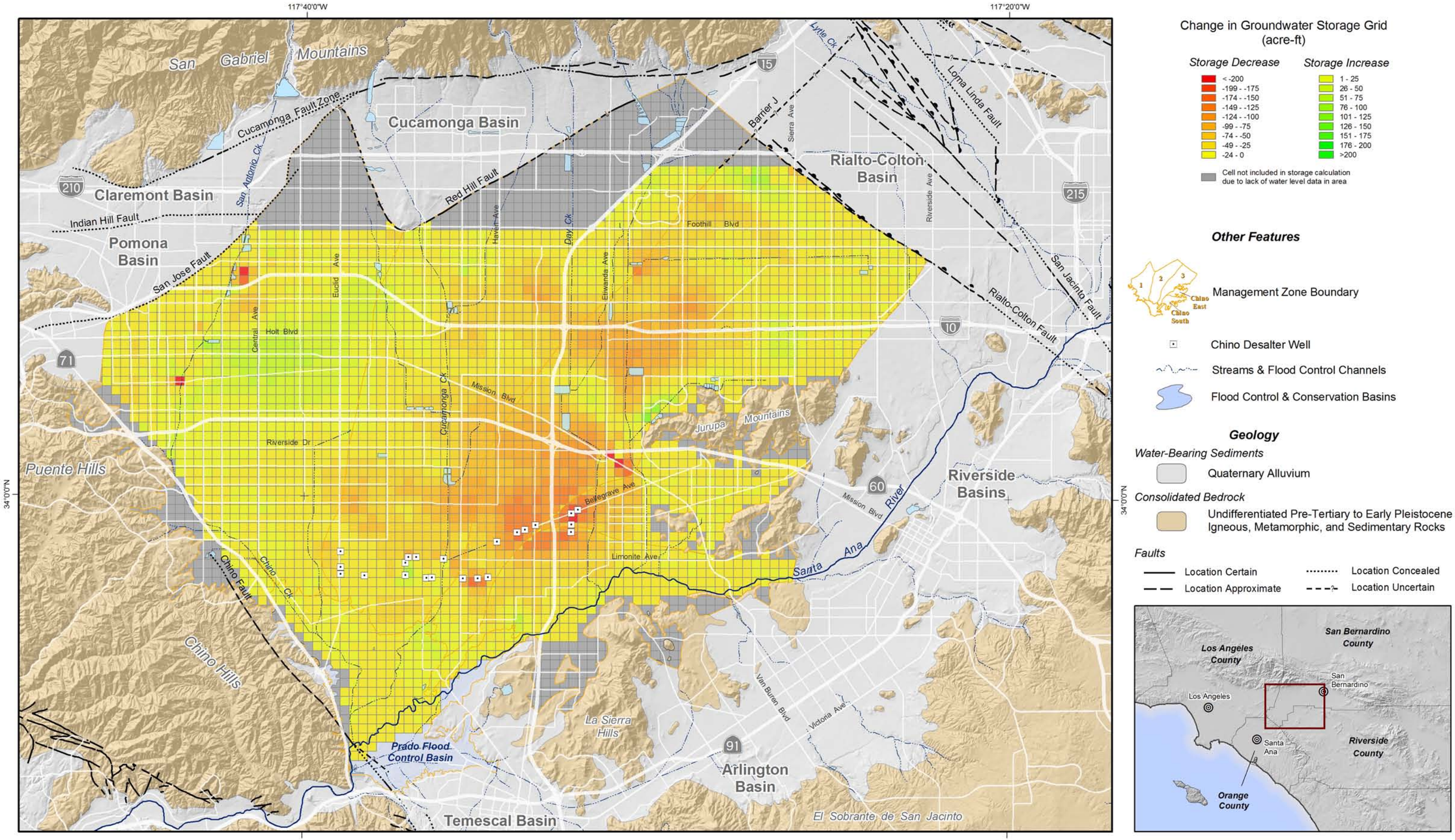
0 2 4 6 8 KM

2008 State of the Basin Report
Changes in Groundwater Storage

Change in Groundwater Storage

Fall 2003 to Fall 2006

Figure 3-21



Change in Groundwater Storage Grid (acre-ft)

Storage Decrease	*Storage Increase*
< -200	1 - 25
-199 - -175	26 - 50
-174 - -150	51 - 75
-149 - -125	76 - 100
-124 - -100	101 - 125
-99 - -75	126 - 150
-74 - -50	151 - 175
-49 - -25	176 - 200
-24 - 0	>200

Cell not included in storage calculation due to lack of water level data in area

Other Features

Management Zone Boundary

Chino Desalter Well

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

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

Faults

Location Certain

Location Approximate

Location Concealed

Location Uncertain

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0 1 2 3 4 5 Miles

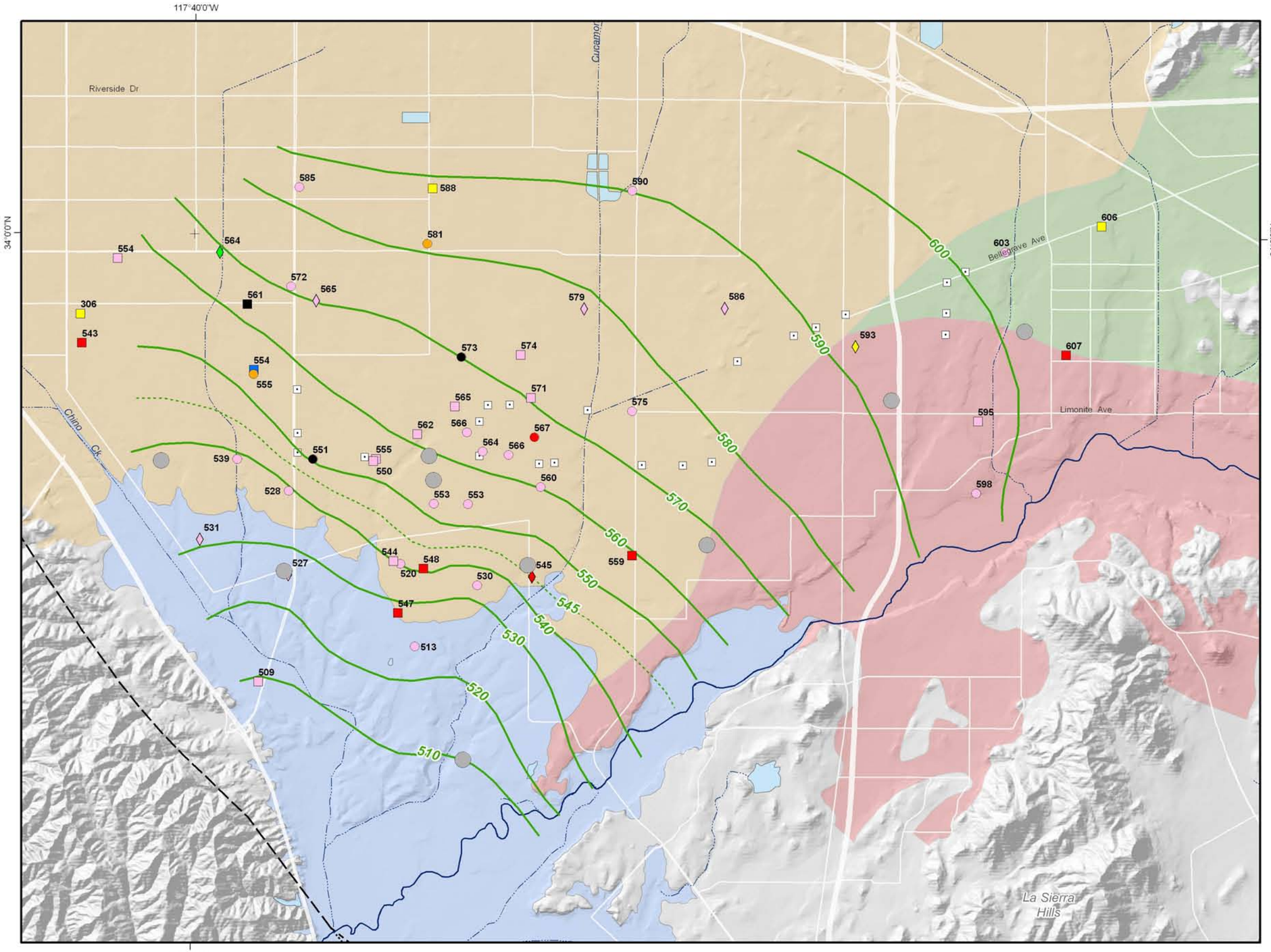
0 2 4 6 8 KM

2008 State of the Basin Report
Changes in Groundwater Storage

Change in Groundwater Storage

Fall 2006 to Fall 2008

Figure 3-22



Groundwater Elevation Contours (feet above mean sea-level)

Other Features

- Chino Desalter Well
- HCMP Piezometric Monitoring Well
- Flood Control and Conservation Basins

Maximum Benefit Management Zones

- Chino-North
- Chino-East
- Chino-South
- PBMZ

Faults

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

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Date: 20090401
File: Figure_3-23.mxd

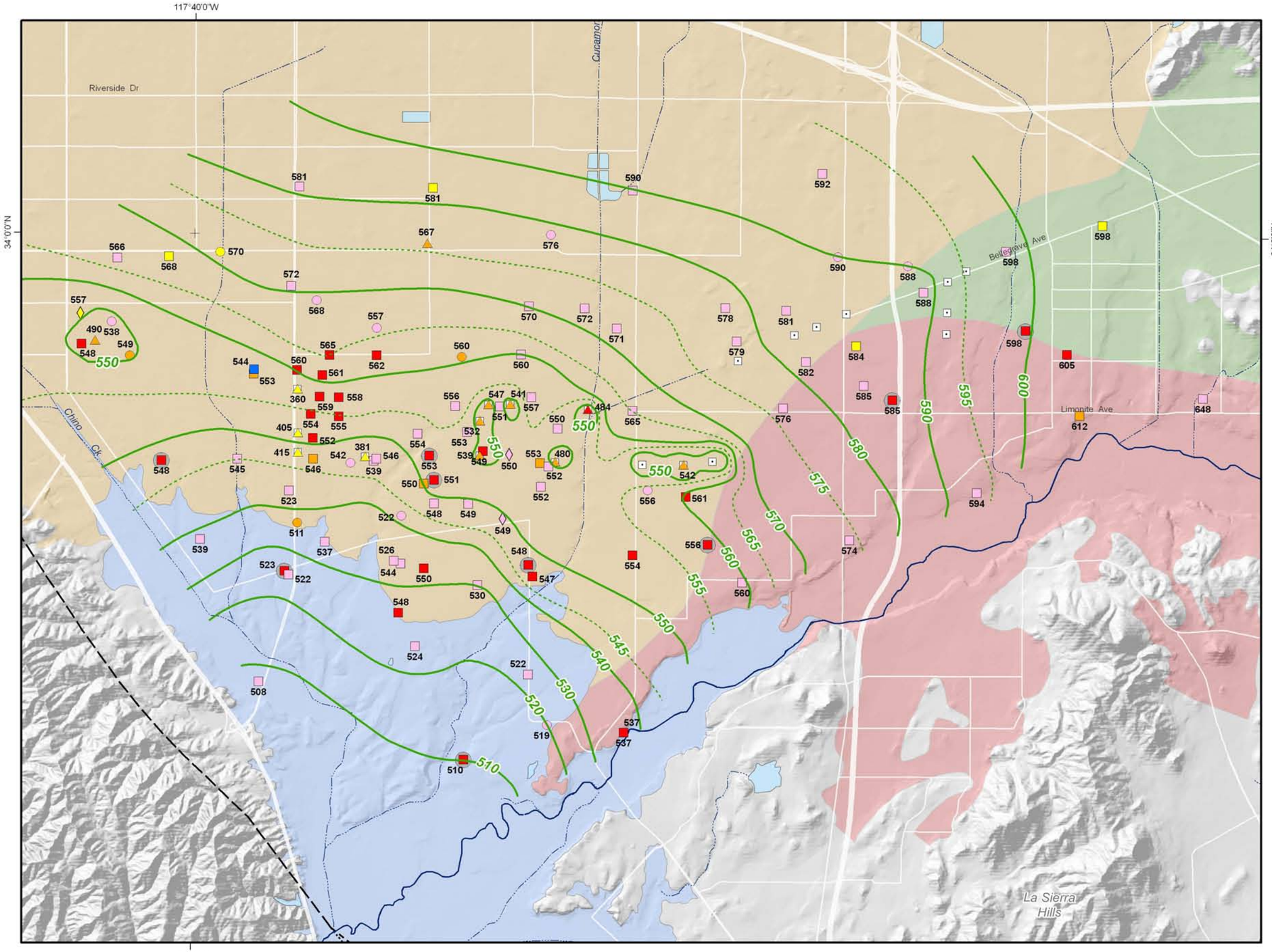
0 1 2 Miles
0 1 2 3 KM

2008 State of the Basin Report
Assessment of Hydraulic Control

State of Hydraulic Control -- Spring 2000

Groundwater Contours -- South Chino Basin Shallow Aquifer System

Figure 3-23



Groundwater Elevation Contours (feet above mean sea-level)

Other Features

- Chino Desalter Well
- HCMP Piezometric Monitoring Well
- Flood Control and Conservation Basins

Maximum Benefit Management Zones

- Chino-North
- Chino-East
- Chino-South
- PBMZ

Faults

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

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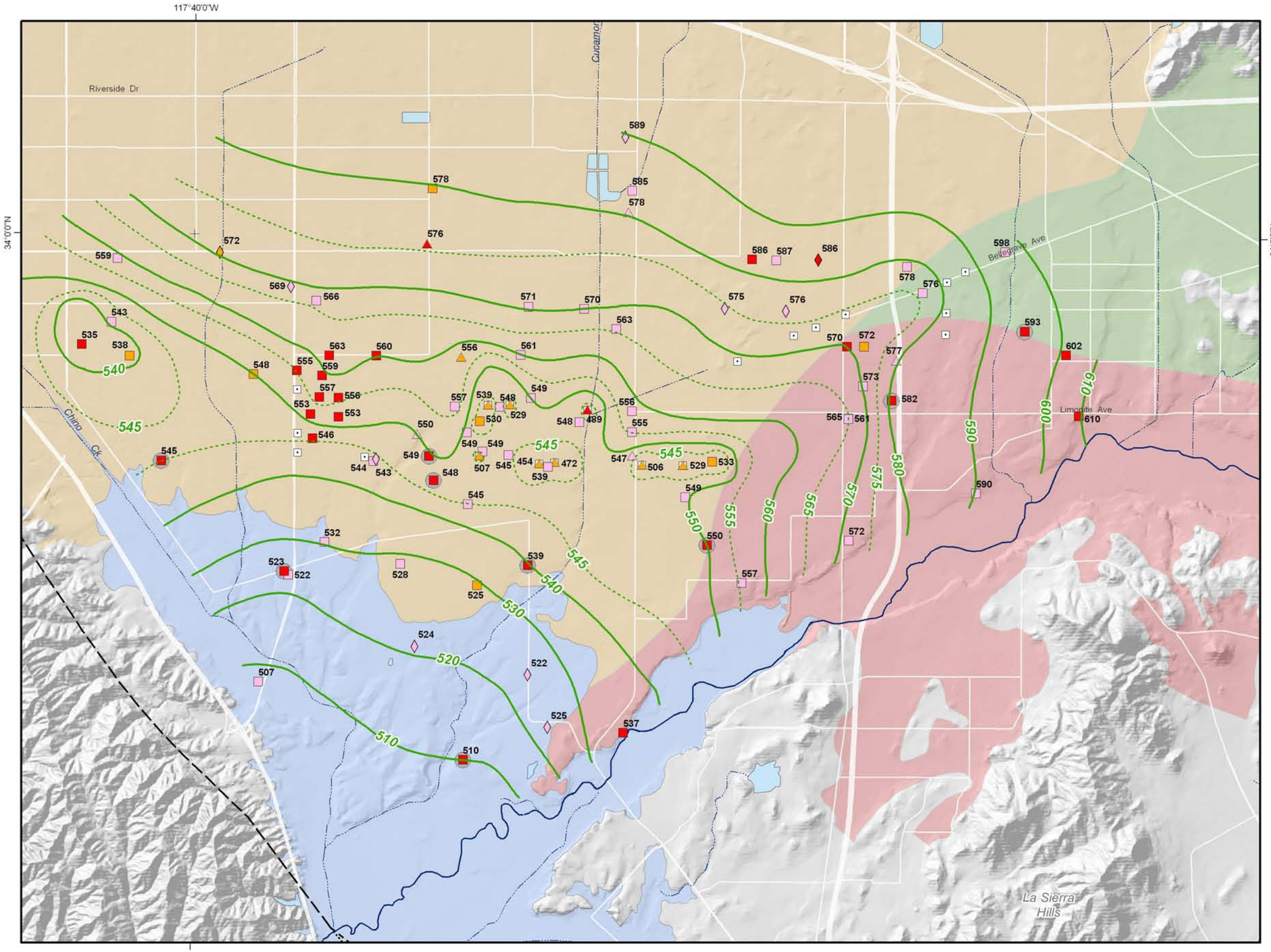
0 1 2 Miles
0 1 2 3 KM

2008 State of the Basin Report
Assessment of Hydraulic Control

State of Hydraulic Control -- Spring 2006

Groundwater Contours -- South Chino Basin Shallow Aquifer System

Figure 3-24



Groundwater Elevation Contours (feet above mean sea-level)

Other Features

- Chino Desalter Well
- HCMP Piezometric Monitoring Well
- Flood Control and Conservation Basins

Maximum Benefit Management Zones

- Chino-North
- Chino-East
- Chino-South
- PBMZ

Faults

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

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Date: 20090401
File: Figure_3-25.mxd

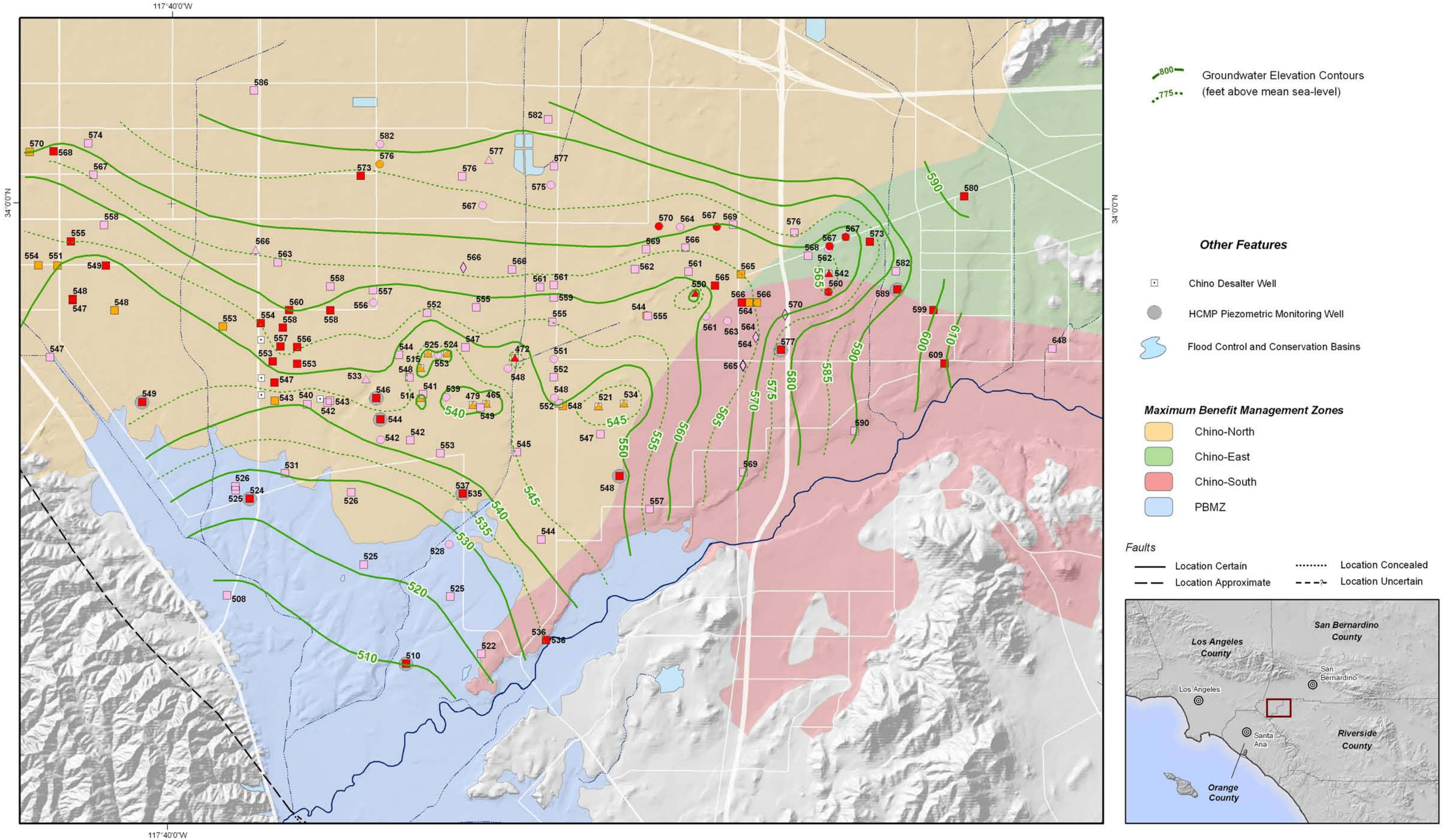
0 1 2 Miles
0 1 2 3 KM

2008 State of the Basin Report
Assessment of Hydraulic Control

State of Hydraulic Control -- Spring 2007

Groundwater Contours -- South Chino Basin Shallow Aquifer System

Figure 3-25



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Date: 20090401
File: Figure_3-26.mxd

0 1 2 Miles
0 1 2 3 KM

2008 State of the Basin Report
Assessment of Hydraulic Control

State of Hydraulic Control -- Spring 2008

Groundwater Contours -- South Chino Basin Shallow Aquifer System

Figure 3-26

4.1 Background

Chino Basin groundwater is not only a critical resource to overlying water producers; it is a critical resource to the entire Santa Ana Watershed. From a regulatory perspective, the use of Chino Basin groundwater to serve potable demands is limited by drinking water standards, groundwater basin water quality objectives, and Santa Ana River water quality objectives. In August 1999, Phase 1 of the OBMP established that groundwater monitoring must be conducted in order to obtain current water quality and water level data in Chino Basin (WEI, 1999). These data are necessary for defining and evaluating specific strategies and locations for the mitigation of nitrate, TDS, and other Constituents of Potential Concern (COPCs); new recharge sites; and pumping patterns that result from the implementation of the OBMP.

In the past, various entities have collected groundwater quality data. Municipal and agricultural water supply entities have collected groundwater quality data to comply with the Department of Health Services' requirements in the California Code of Regulations, Title 22, or for programs that range from irregular study-oriented measurements to long-term periodic measurements. Groundwater quality observations have been made by the DWR, by participants in the 1969 Judgment on the Santa Ana River (Orange County Water District vs. City of Chino et al.), by dischargers under orders from the RWQCB, and by the County of San Bernardino. The DWR and the San Bernardino County Flood Control District were very active in collecting groundwater quality data in the Chino Basin prior to the adjudication of the Chino Basin. After the Judgment was entered in 1978, monitoring south of State Route 60 stopped almost completely with the exception of that conducted by the Cities of Chino, Chino Hills, and Norco; the Jurupa Community Services District (JCSD); and the Santa Ana River Water Company. Most of the pre-1978 measurements were digitized by the DWR. In 1986, the MWDSC conducted the first comprehensive survey of groundwater quality, covering all constituents regulated under Title 22.

Watermaster initiated a regular monitoring program for Chino Basin in 1989. Groundwater quality data has been obtained periodically since 1990.

4.2 Water Quality Monitoring Programs

Watermaster began conducting a more robust monitoring program as part of the initial OBMP implementation. Watermaster's program relies on municipal producers, government agencies, and private consultants to supply their groundwater quality data on a cooperative basis. Watermaster supplements these data with data obtained through its own sampling and analysis program of private wells in the area generally south of State Route 60. Water quality data are also obtained from special studies and monitoring programs that take place under the orders of the RWQCB, the California Department of Toxic Substances Control (DTSC), and others. Watermaster has combined previously digitized groundwater quality data from all known sources into a comprehensive database.

4.2.1 Water Quality Monitoring Programs for Wells Owned by Municipal Water Suppliers

Water quality samples are collected from Appropriative Pool wells and some overlying Non-Agricultural Pool wells as part of formalized monitoring programs. Constituents include (i) those regulated for drinking water purposes in the California Code of Regulations, Title 22; (ii) those regulated in the 1995 Water Quality Control Plan for the Santa Ana River Basin (Basin Plan); or (iii) those that are of special interest to the pumper.

4.2.2 Water Quality Monitoring Programs for Private Water Supply Wells

Historically, private wells were sampled less methodically and less frequently than wells owned by members of the Appropriative Pool. As a result, there is little historical (pre-1999) groundwater quality information for most of the 600 private wells in the southern part of the Chino Basin. As mentioned above, the MWDSC conducted an assessment of water quality and water levels in the private wells south of State Route 60 in 1986. This assessment was a component of the Chino Basin groundwater storage program Environmental Impact Report (MWDSC et al., 1988). Nevertheless, the historical quality of groundwater produced at the majority of the wells in the southern Chino Basin is unknown.

In 1999, the Comprehensive Monitoring Program initiated the systematic sampling of private wells south of State Route 60 in the Chino Basin. Over a three-year period, Watermaster sampled all available wells at least twice to develop a robust baseline data set. This program has since been reduced to approximately 110 private key wells, and about half of these wells are sampled every other year. Groundwater quality samples are analyzed for general minerals, physical properties, and for regional COPCs (e.g. perchlorate, and volatile organic chemicals [VOCs] in the vicinity of known VOC plumes). This key well monitoring program provides a good representation of the areal groundwater quality in this portion of the basin.

4.2.3 Water Quality Monitoring Programs Conducted Pursuant to Regulatory Orders

Groundwater monitoring is conducted by private and public entities as part of regulatory orders and voluntary cleanups. These programs consist of networks of monitoring wells designed specifically to delineate and characterize the extent of the responsible party's contamination. These monitoring programs may include monthly, quarterly, and/or annual sampling frequencies. The following is a summary of all the regulatory and voluntary contamination monitoring in Chino Basin:

- **Plume:** Alumax Aluminum Recycling Facility
  Constituent of Concern: TDS, sulfate, nitrate, chloride
  Order: RWQCB Cleanup and Abatement Order 99-38
- **Plume:** Chino Airport
  Constituent of Concern: VOCs
  Order: RWQCB Cleanup and Abatement Order 90-134

- **Plume:** California Institute for Men
  Constituent of Concern: VOCs
  Order: Voluntary Cleanup Monitoring
- **Plume:** Crown Coach International Facility
  Constituent of Concern: VOCs and Solvents
  Order: Voluntary Cleanup Monitoring
- **Plume:** General Electric Flatiron Facility
  Constituent of Concern: VOCs
  Order: Voluntary Cleanup Monitoring
- **Plume:** General Electric Test Cell Facility
  Constituent of Concern: VOCs
  Order: Voluntary Cleanup Monitoring
- **Plume:** Kaiser Steel Fontana Site
  Constituent of Concern: TDS/total organic carbon (TOC)
  Order: See discussion in Section 4.36.7.
- **Plume:** Milliken Sanitary Landfill
  Constituent of Concern: VOCs
  Order: RWQCB Order No. 81-003
- **Plume:** Upland Sanitary Landfill
  Constituent of Concern: VOCs
  Order RWQCB Order No 98-99-07
- **Plume:** Ontario International Airport (VOC Plume – South of Ontario Airport)
  Constituent of Concern: VOC
  Order: This plume is currently being voluntarily investigated by a group of potentially responsible parties.
- **Plume:** Stringfellow National Priorities List (NPL) Site
  Constituent of Concern: VOCs, perchlorate, N-nitrosodimethylamine (NDMA), heavy metals
  Order: The Stringfellow Site is the subject of US Environmental Protection Agency (EPA) Records of Decision (RODs): EPA/ROD/R09-84/007, EPA/ROD/R09-83/005, EPA/ROD/R09-87/016, and EPA/ROD/R09-90/048.

4.2.4 Other Water Quality Monitoring Programs

In a letter dated July 13, 2000, the RWQCB expressed their concern to the IEUA that the historical recharge of recycled water at IEUA Regional Plant No. 3 (RP3) may have caused groundwater contamination at down-gradient wells. Other sources of groundwater contamination in the area include the Kaiser Steel Mill, Alumax, other industries, and historical agricultural activities, including citrus groves and hog feed lots. Several municipal wells have been shut down in MZ3 due to perchlorate and nitrate in groundwater. MZ3 includes areas that underlie all or part of the Fontana Water Company, the Marygold Mutual Water Company, the CVWD, and the City of Ontario. MZ3 groundwater is tributary to wells owned by the JCSD.

To characterize groundwater levels and quality in MZ3, Watermaster and the IEUA

performed an investigation. The objectives of this investigation were to develop a groundwater sampling program, install two sentry wells at the distal end of the Kaiser plume, and perform further characterization of groundwater quality. Sampling was conducted at twenty-two selected key wells from late 2005 to 2007. Where possible, four quarterly samples and one annual sample were collected. In 2007, two triple-nested wells (MZ3-1 and MZ3-2) were installed down gradient of the Kaiser plume. These wells were sampled quarterly for one year. The sampling results provided data to further characterize the water quality patterns for contaminants of concern in the study area, including TDS, nitrate, sulfate, chloride, and perchlorate. And, the results from well MZ3-1/3 redefined the extent of the Kaiser plume.

4.2.5 Information Management

As with groundwater level and production data, Watermaster manages groundwater quality data in order to perform the requisite scientific and engineering analyses required to ensure that the goals of the OBMP are being met. Watermaster's relational database contains well location, construction, lithology, specific capacity, groundwater level, and water quality data. Historical water quality data for the period prior to the mid-1980s were obtained from the DWR and supplemented with data from producers in the Appropriative and Overlying Non-Agricultural Pools and others. For the period from the mid-1980s forward, Watermaster has QA/QC'd and uploaded water quality data from its own sampling programs, the State of California Department of Public Health (CDPH, formerly the Department of Health Services) database, and other cooperating parties to its relational database. Occasionally, problems have been found with CDPH data, usually occurring in the form of incorrect constituent identification. In 2003, Watermaster launched the Chino Basin Relational Database effort to collect water quality data directly from each member agency and thereby circumvent past data problems. Cooperating parties provide all data (including geologic, geophysical, water levels, water quality, production, and recharge) to Watermaster on a routine basis. These data are delivered in electronic format directly from the laboratory or from the cooperating party.

4.3 Groundwater Quality in Chino Basin

Figure 4-1 shows all wells with groundwater quality monitoring results for the 5-year period of July 2003 to June 2008.

Inorganic and organic constituents detected in groundwater samples from wells in the Chino Basin through June 2008 were analyzed synoptically. This analysis included all available data from production and monitoring wells. Hence, the data do not represent a programmatic investigation of potential sources nor do they represent a randomized study that was designed to ascertain the water quality status of the Chino Basin. These data do, however, represent the most comprehensive information available to date.

Monitoring wells targeted at potential sources tend to have greater concentrations than municipal or agricultural production wells. Wells with constituent concentrations greater than one-half of the MCL represent areas that warrant concern and inclusion in a long-term monitoring program. In addition, groundwater in the vicinity of wells with samples greater than the MCL may be impaired from a beneficial use standpoint.

Numerous water quality standards have been put in place by federal and state agencies. Primary MCLs are enforceable criteria that are set due to health effects. Secondary standards are related to the aesthetic qualities of the water, such as taste and odor. For some chemicals, there are "Notification Level" criteria that are set by the CDPH. When notification levels are exceeded, the CDPH recommends that the utility inform its customers and consumers about the presence of the contaminant and any health concerns associated with exposure. The level at which the CDPH recommends the drinking water system remove the affected drinking water source from service is the "Response Level." These levels range from 10 to 100 times the notification level, depending on the chemical. The following constituents exceeded at least one water quality criteria in more than 10 wells within the Chino Basin for the period of July 2003 through June 2008:

Analyte Group/Constituent		Wells with Exceedance
Inorganic Constituents		
	Total Dissolved Solids	221
	Nitrate-Nitrogen	395
	Aluminum	153
	Arsenic	24
	Chloride	25
	Chromium	30
	Iron	185
	Manganese	58
	Perchlorate	188
	Sulfate	41
	Vanadium	25
General Physical		
	Color	21
	Odor	28
	pH	14
	Specific Conductance	121
	Turbidity	78
Chlorinated VOCs		
	1,1-Dichloroethane	11
	1,1-Dichloroethene	31
	1,2,3-Trichloropropane	23
	1,2-Dichloroethane	17
	cis-1,2-Dichloroethene	10
	Tetrachloroethene (PCE)	37
	Trichloroethene (TCE)	115

For all figures (Section 4 and Appendix B) that depict water quality distributions in the Chino Basin, the following convention is typically followed in setting class intervals in the legend (where WQS is the applicable water quality standard [see table below]). Variations of this convention may be employed to highlight certain aspects of the data.

Symbol	Class Interval
○	Not Detected
●	<0.5x WQS, but detected
●	0.5x WQS to WQS
●	WQS to 2x WQS
●	2x WQS to 4x WQS
●	> 4x WQS

4.3.1 Total Dissolved Solids

In Title 22, TDS is regulated as a secondary contaminant. The California secondary drinking water MCL for TDS is 500 mg/L. Figure 4-2 shows the distribution of the maximum TDS concentrations in Chino Basin from July 2003 through June 2008. During this period, maximum TDS concentrations ranged from 48 mg/L to 4,790 mg/L with average and median concentrations of approximately 550 mg/L and 380 mg/L, respectively. The highest concentrations are located south of State Route 60 where the impacts from agriculture are greatest, which is consistent with the data reported in the 2006 State of the Basin Report.

The impacts of agriculture on TDS in groundwater are primarily caused by dairy waste disposal, consumptive use, and fertilizer use on crops. As irrigation efficiency increases, the impact of consumptive use on TDS in groundwater also increases. For example, if source water has a TDS concentration of 250 mg/L and the irrigation efficiency is about fifty percent (flood irrigation), the resulting TDS concentration in returns to groundwater would be 500 mg/L, which is exclusive of the mineral increments from fertilizer. If irrigation efficiency is increased to seventy-five percent, the resulting TDS concentration in the returns to groundwater would be 1,000 mg/L, which is also exclusive of the mineral increments from fertilizer. For modern irrigated agriculture, the TDS impacts of consumptive use are more significant than mineral increments from fertilizers.

Wells with low TDS concentrations in close proximity to wells with higher TDS concentrations suggests a vertical stratification of water quality. However, there is a paucity of information concerning well construction/perforation intervals; Thus, the vertical differences in water quality are currently unverifiable.

4.3.2 Nitrate-Nitrogen

In Title 22, the primary MCL for nitrate as nitrogen (NO3-N) in drinking water is 10 mg/L. By convention, all nitrate values are expressed in this report as NO3-N. Figure 4-3 displays the distribution of maximum NO3-N concentrations in the Chino Basin from July 2003 through June 2008.

Areas with significant irrigated land use or dairy waste disposal histories overlie groundwater with elevated nitrate concentrations. The primary areas of nitrate degradation were formerly or are currently overlain by:

- Citrus (the northern parts of the Chino-North MZ)
- Dairy and irrigated agriculture (the southern parts of the Chino-North MZ, the Chino-South MZ, the Chino-East MZ, and the Prado Basin MZ [PBMZ])

Nitrate concentrations in groundwater have increased slightly or remained relatively constant in the northern parts of the Chino-North MZ from 1960 to present. These areas were formerly occupied by citrus groves and vineyards. The nitrate concentrations underlying these areas rarely exceed 10 mg/L (as nitrogen). Over the same period, nitrate concentrations increased significantly in the southern parts of the Chino-North MZ, the Chino-South MZ, the Chino-East MZ, and the PBMZ. In these areas, land use was progressively converted from irrigated/non-irrigated agricultural land to dairies, and nitrate concentrations typically exceed the 10 mg/L MCL and frequently exceed 40 mg/L.

4.3.3 Other Constituents of Potential Concern

Section 4.3.3 discusses the constituents with water quality standards that were exceeded in ten or more wells in Chino Basin with the exception of nitrate and TDS. The details of these exceedances are displayed graphically in Figures 4-4 through 4-17, and in Appendix B.

A query was developed to analyze water quality data in the Chino Basin from July 2003 through June 2008 that is in exceedance of any water quality standard. The results of this query are provided in a summary table in Appendix C, including:

- Chemical Constituents (listed alphabetically)
- Reporting Units
- Water Quality Standards (detailed explanations are provided in the table's footnote):
  - EPA Primary MCL
  - EPA Secondary MCL
  - California Primary MCL
  - California Secondary MCL
  - California Notification Level
- Minimum – the minimum concentration of the given constituent for the given time period. Non-detect values were assigned a value of zero.
- Lower or First Quartile – the first value that divides the items of a frequency distribution or ordered data set into four classes with each containing one fourth of the total population.
- Median or Second Quartile – the second value that divides the items of a frequency distribution or ordered data set into four classes with each containing one fourth of the total population.
- Upper or Third Quartile – the third value that divides the items of a frequency distribution or ordered data set into four classes with each containing one fourth of the total population.

- Maximum – the maximum concentration of the given constituent for the given time period. Non-detect values were assigned a value of zero.
- Average – the average concentration of the given constituent for the given time period. Non-detect values were assigned a value of zero.
- Number of Samples – the total number of samples for the given constituent for the given time period.
- Number of Wells Sampled – the number of wells sampled in the given time period, not the number of samples collected.
- Number of Wells with Detects – the number of wells in the period wherein the constituent was detected at any concentration.
- Number of Wells with Exceedances – the number of wells in the given time period with any value that exceeded any of the five water quality standards.

4.3.3.1 VOCs

The following seven VOCs were detected at or above their MCL in more than 10 wells in the Chino Basin:

- 1,1-dichloroethane (1,1-DCA)
- 1,1-dichloroethene (1,1-DCE)
- 1,2,3-trichloropropane (1,2,3-TCP)
- 1,2-dichloroethane (1,2-DCA)
- *cis*-1,2-dichloroethene (cis-1,2-DCE)
- tetrachloroethene (PCE)
- trichloroethene (TCE)

4.3.3.1.1 Trichloroethene and Tetrachloroethene

Trichloroethene (TCE) and tetrachloroethene (PCE) were/are widely used industrial solvents. Both PCE and TCE are used as metal degreasers in the automotive and other metal working industries. PCE is commonly used in the dry-cleaning industry. TCE was commonly used as a food extractant. The areal distributions of TCE and PCE are shown in Figures 4-4 and 4-5, respectively. In general, PCE is below the detection limit for wells in the Chino Basin. Wells with detectable levels tend to occur in clusters, such as those around the Milliken Landfill, south and west of the Ontario Airport, and along the margins of the Chino Hills. The spatial distribution of TCE resembles that of PCE. TCE was not detectable in most of the wells in the basin, and similar clusters of wells occur around the Milliken Landfill, south and west of Ontario International Airport (OIA), south of Chino Airport, and in the Stringfellow plume.

Figure 4-19 shows the ratio of TCE, PCE, and their breakdown products in monitoring wells associated with the VOC plumes in the southern Chino Basin. The unique characteristics of these plumes can be seen by comparing TCE and PCE concentrations and dispersion. For example, the Milliken Landfill plume and the GE plumes near Ontario Airport have significant concentrations of both TCE and PCE while the Chino Airport and Stingfellow

plumes have significant concentrations of TCE and only minor detections of PCE, and the OIA plume is characterized solely by TCE. These unique characteristics allow for differentiation between the plumes and determining the intermingling of plumes.

4.3.3.1.2 1,1-Dichloroethene, 1,2-Dichloroethane, and cis-1,2-Dichloroethene

1,1-Dichloroethene (1,1-DCE), 1,2-Dichloroethane (1,2-DCA), and cis-1,2-Dichloroethene (cis-1,2-DCE) are degradation by-products of PCE and TCE (Dragun, 1988) that are formed by reductive dehalogenation. The areal distributions of 1,1-DCE, 1,2-DCA, and cis-1,2-DCE are shown in Figures 4-6 through 4-8, respectively. 1,1-DCE, 1,2-DCA, and cis-1,2-DCE have not been detected in the majority of wells in the Chino Basin. 1,1-DCE is found near the Milliken Landfill, south and west of OIA, at the former Crown Coach Facility, and at the head of the Stringfellow plume. 1,2-DCA and cis-1,2-DCE are found in the same general locations.

4.3.3.1.3 1,1-Dichloroethane

1,1,-Dichloroethane (1,1-DCA) is a colorless oily liquid that is used as a solvent for plastics, as a degreaser, as a halon in fire extinguishers, and in the cementing of rubber, and is a degradation by-product of 1,1,1-TCA. Figure 4-9 shows the areal distribution of 1,1-DCA in the Chino Basin. Eleven wells were in exceedance of the primary CA MCL of 5 μg/L for 1,1-DCA for the period of July 2003 through June 2008. The majority of these wells are monitoring wells at the former Crown Coach Facility.

4.3.3.1.4 1,2,3-Trichloropropane

1,2,3-TCP is a colorless liquid that is used primarily as a chemical intermediate in the production of polysulfone liquid polymers and dichloropropene, and in the synthesis of hexafluoropropylene and as a cross linking agent in the synthesis of polysulfides. It has been used as a solvent, an extractive agent, a paint and varnish remover, and a cleaning and degreasing agent, and it has been formulated with dichloropropene in the manufacturing of soil fumigants, such as D-D.

The current California State Notification Level for 1,2,3-TCP is 0.005 μg/L. The adoption of the Unregulated Chemicals Monitoring Requirements regulations occurred before a method capable of achieving the required detection limit for reporting (DLR) was available. According to the CDPH, some utilities moved ahead with monitoring, and samples were analyzed using higher DLRs. Unfortunately, findings of non-detect with a DLR higher than 0.005 μg/L do not provide the CDPH with the information needed for setting a standard. New methodologies with a DLR of 0.005 μg/L have since been developed, and the CDPH has requested that any utility with 1,2,3-TCP findings of non-detect with reporting levels of 0.01 μg/L or higher do follow-up sampling using a DLR of 0.005 μg/L. Because 1,2,3-TCP may be a basin-wide water quality issue, private and public wells are continuing to be retested at the lower detection limit (0.005 μg/L).

Figure 4-10 shows the distribution of 1,2,3-TCP in Chino Basin, based on the data limitations discussed above. High 1,2,3-TCP values are associated with the Chino Airport Plume. Of particular note, there is a cluster of wells with 1,2,3-TCP concentrations greater than the Notification Level in the Jurupa region and a scattering of wells that exceed the Notification

Level on the western margins of the basin. Watermaster will continue to monitor and investigate this constituent.

4.3.3.2 Iron, Arsenic, and Vanadium

Iron, arsenic, and vanadium concentrations depend on mineral solubility, ion exchange reactions, surface complexations, and soluble ligands. These speciation and mineralization reactions, in turn, depend on pH, oxidation-reduction potential, and temperature.

4.3.3.2.1 Iron

In general, iron is not detected across the Chino Basin, but there are some scattered detectable concentrations that are above regulatory limits (see Appendix B). Iron concentrations are elevated in the vicinity of the Stringfellow Plume. Outside of the Stringfellow Plume, there were 85 wells with iron concentrations that exceed the MCL. Nevertheless, these exceedances may be an artifact of sampling methodology; relatively high concentrations of iron and trace metals are often the result of the dissolution of aluminosilicate particulate matter and colloids, which is caused by the acid preservative in unfiltered samples.

4.3.3.2.2 Arsenic

The US EPA implemented a new primary MCL for arsenic in 2006, decreasing the MCL from 50 μg/L to 10 μg/L. In November 2008, the Primary CA MCL was also changed from 50 μg/L to 10 μg/L. Figure 4-11 shows the distribution of arsenic in the Chino Basin. Eleven wells in the basin had arsenic concentrations that exceeded the MCL. Of these wells, three are associated with the Stringfellow Plume, and three are associated with Chino Airport Plume. Higher concentrations of arsenic are found in the Chino/Chino Hills area in the lower aquifer at depths greater than about 350 ft-bgs.

4.3.3.2.3 Vanadium

In the Chino Basin, vanadium has been detected above regulatory limits in some scattered wells. In groundwater, vanadium can result from mining and industrial activities or be of natural occurrence. While elemental vanadium does not occur in nature, vanadium compounds are found in fossil fuels and exist in over 60 different mineral ores. The primary industrial use of vanadium is in the steel industry where it is used to strengthen steel. Figure 4-12 shows the areal distribution of vanadium in the Chino Basin. The majority of the 25 wells in exceedance of the California Notification Level (0.05 mg/L) are associated with the Stringfellow Plume. Other exceedances are found near the Milliken Landfill, in deep wells in the Chino/Chino Hills area, and in one well near the Jurupa Mountains.

4.3.3.3 Perchlorate

Perchlorate has recently been detected in several wells in the Chino Basin (Figure 4-13), in other basins in California, and in other states in the west. The most probable reason why perchlorate was not detected in groundwater until recently is that analytical methodologies that could attain a low enough detection limit did not previously exist. Prior to 1996, the

method detection limit for perchlorate was 400 μg/L. In March 1997, an ion chromatographic method was developed with a detection limit of 1 μg/L and a reporting limit of 4 μg/L.

As an environmental contaminant, perchlorate (ClO4-) originates from the solid salts of ammonium perchlorate (NH4ClO4), potassium perchlorate (KClO4), or sodium perchlorate (NaClO4). Perchlorate salts are quite soluble in water. The perchlorate anion (ClO4-) is exceedingly mobile in soil and groundwater environments. Because of its resistance to react with other available constituents, it can persist for many decades under typical groundwater and surface water conditions. Perchlorate is a kinetically stable ion, which means that reduction of the chlorine atom from a +7 oxidation state in perchlorate to a -1 oxidation state as a chloride ion requires activation energy or the presence of a catalyst to facilitate the reaction. Since perchlorate is chemically stable in the environment, natural chemical reduction is not expected to be significant.

Possible sources of perchlorate contamination are synthetic (ammonium perchlorate used in the manufacturing of solid propellant used for rockets, missiles, and fireworks) and natural (perchlorate derived from Chilean caliche that was used for fertilizer).

Fertilizers derived from Chilean caliche are currently used in small quantities on specialized crops, including tobacco, cotton, fruits, and vegetables (Renner, 1999). However, evidence suggests that usage may have been widespread for citrus crops in Southern California from the late 1800s through the 1930s.

The current CDPH Notification Level for perchlorate is 6 μg/L, which was established on March 11, 2004.

Perchlorate has been detected in 188 wells in the Chino Basin at levels greater than 6 μg/L. Perchlorate Notification Level exceedances occur in the following areas of the Chino Basin (Figure 4-13):

- Rialto-Colton Basin (There is a significant perchlorate plume in the Rialto-Colton Basin. The RWQCB is investigating the source of this plume, which appears to be near the Mid-Valley Sanitary Landfill. According to the RWQCB, several companies—including B.F. Goodrich, Kwikset Locks, American Promotional Events, and Denova Environmental—operated nearby and used or produced perchlorate. These companies were located on a 160-acre parcel at T1N R5W S21 SW1/4. Denova Environmental also operated on a 10-acre lot at T1N R5W S20 S1/2 (along the boundary between Sections 20 and 29). Perchlorate in the Fontana area of Chino Basin may be the result of (i) the Rialto-Colton perchlorate plume migrating across the Rialto-Colton fault, (ii) other point sources in Chino Basin, and/or (iii) the non-point application of Chilean nitrate fertilizer in citrus groves.)
- Downgradient of the Stringfellow Superfund Site (Concentrations have exceeded 600,000 μg/L at onsite observation wells. The plume has likely reached the Pedley Hills and may extend as far as Limonite Avenue.)
- City of Pomona well field (source[s] unknown)
- Wells in the City of Ontario water service area, south of OIA (source[s] unknown)
- Scattered wells in the Monte Vista water service area (source[s] unknown)

- Scattered wells in the City of Chino water service area (source[s] unknown)

A forensic isotope study was conducted to determine the source of perchlorate in Chino Basin groundwater. This forensic technique was developed using comprehensive stable isotope analyses (37Cl/35Cl and 18O/17O/16O) of perchlorate to determine the origin of the perchlorate (synthetic vs. naturally occurring). Stable isotope analyses of perchlorate from known man-made (e.g. samples derived from electrochemically synthesized ammonium- and potassium-perchlorate salts) and natural (e.g. samples from the nitrate salt deposits of the Atacama Desert in Chile) sources reveal systematic differences in isotopic characteristics that are related to the formation mechanisms (Bao & Gu, 2004; Böhlke et al., 2005; Sturchio et al., 2006). There is considerable anecdotal evidence that large quantities of Chilean nitrate fertilizer were imported into the Chino Basin in the early 1900s for the citrus industry, which covered the north, west and central portions of the basin.

The perchlorate isotope study consisted of 10 groundwater samples that were collected throughout the Chino Basin. The sampling points included private wells and municipal production wells. Samples were collected using a flow-through column with a highly perchlorate-selective anion-exchange resin. The exchange resin concentrates low levels of perchlorate in groundwater such that a sufficient amount can be acquired and for isotopic analysis. Results confirmed that most of the perchlorate in the west and central portions of the Chino Basin was derived from Chilean nitrate fertilizer. One sample collected south of the OIA is a potential mixture of natural and synthetic sources.

4.3.3.4 Total Chromium and Hexavalent Chromium

Figure 4-14 shows the areal distribution of total chromium in the Chino Basin. Thirty wells were found to be in exceedance of the CA MCL of 50 μg/L. The majority of these wells are associated with the Milliken Sanitary Landfill, the Stringfellow Plume, and the GE Test Cell Plume. The remaining wells include isolated wells near the Jurupa Mountains and in the southern Chino Basin and City of Pomona wells. Chromium in groundwater results from natural and anthropogenic sources.

Hexavalent chromium is currently regulated under the MCL for total chromium. In 1999, the CDPH identified that hexavalent chromium needed an individual MCL, and concerns over its carcinogenicity grew. Subsequently, the CDPH included it on the list of unregulated chemicals that require monitoring. California Health and Safety Codes (§116365.5 and §1163659a) compelled the adoption of a hexavalent chromium MCL by January 1, 2004, and required it to be close to the public health goals (PHG) established by the Cal/EPA Office of Environmental Health Hazard Assessment (OEHHA). At present, the PHG has not been established, and the CDPH cannot proceed with the MCL process. Figure 4-15 shows the areal distribution of hexavalent chromium in the Chino Basin. Only three wells in the Chino Basin were in exceedence of the CA MCL for total chromium. In the near future hexavalent chromium may become a more significant contaminant of concern in the Chino Basin when a lower MCL is determined by CDPH, and more wells are sampled for hexavalent chromium.

4.3.3.5 Chloride and Sulfate

Chloride and sulfate both exceeded secondary MCLs. As discussed previously, secondary MCLs apply to chemicals in drinking water that adversely affect its aesthetic qualities and are not based on the direct health effects associated with the chemical. Chloride and sulfate are major anions associated with TDS. All wells in the basin had detectable levels of sulfate (Figure 4-16), but most had concentrations that were less then 125 mg/L (one-half the water quality standard). A total of 41 wells had concentrations at or above the sulfate secondary MCL. In general, these wells are distributed in the southern portion of the basin, in the Stringfellow plume, and along the margins of the Chino Hills. All wells had detectable levels of chloride (Figure 4-17), but most had concentrations that were less 125 mg/L (one-half the MCL). The secondary MCL for chloride was exceeded in 25 wells; almost all of which are located in the southern portion of the basin.

4.3.3.6 Color, Odor, and Turbidity

In the last 5 years, color, odor, and turbidity have been detected above their secondary MCLs in more than 10 wells within the Chino Basin (see Appendix B). These parameters are monitored purely for aesthetic reasons and should not substantially impair water quality in the Chino Basin.

4.3.4 Point Sources of Concern

The water quality discussion above described water quality conditions across the entire basin. The discussion below describes the water quality plumes associated with known point source discharges to groundwater. Figure 4-18 shows the locations of various point sources and associated areas of water quality degradation. Figure 4-19 shows the VOC plumes and features pie charts that display the relative percent of TCE, PCE, and other VOCs detected at groundwater wells within plume impacted areas. The pie charts demonstrate the chemical differentiation between the VOC plumes in the southern portion of Chino Basin.

4.3.4.1 Alumax Aluminum Recycling Facility

Between 1957 and 1982, an 18-acre aluminum recovery facility was operated in the City of Fontana. The byproducts of aluminum recycling are aluminum oxide wastes and brine water. During this 25-year period, solid wastes were stockpiled onsite. Process water containing sodium and potassium chloride salts was discharged onsite and allowed to percolate into native soil and groundwater. Discharge ceased in 1982, and the solid wastes were removed in 1992. Onsite groundwater monitoring was initiated in 1993 by then owner Alumax, Inc. The site was subsequently capped to prevent the future mobilization of salts offsite. Alcoa Davenport Works (Alcoa) purchased Alumax in 1998.

Currently, there are two onsite monitoring wells: MW-1 is located in the northeast corner of the property, and MW-2 is located in the southwest corner. These wells have steel casings and have experienced chloride corrosion and extensive accumulation of iron hydroxide scale. Rehabilitation efforts in 2001 failed to adequately clear the well screens. Both wells subsequently experienced partial casing constrictions or screen collapses. In 2007, it was discovered that over ten feet of iron oxide scale and sediment had accumulated in the bottom

of MW-1. MW-2 was abandoned and replaced in 2008 as it could no longer be sampled.

Offsite monitoring began with the construction of four monitoring wells (AOS-1, AOS-2, AOS-3, and AOS-4) between 1999 and 2000. These wells are all located downgradient of the site and were constructed of PVC in an effort to avoid the scale and corrosion experienced at the onsite wells. In April 2008, the RWQCB stated that Alcoa would no longer be required to monitor offsite monitoring wells AOS-1, AOS-2, and AOS-3 unless elevated levels of salts were detected at upgradient well AOS-4 (RWQCB, 2008). Alcoa is currently evaluating the ownership transfer of wells AOS-1, AOS-2, and AOS-3 to Watermaster to allow for continued monitoring.

The plume emanating from the Alumax site is characterized by elevated concentrations of sulfate, nitrate, chloride, potassium, and sodium. Consequently, the TDS concentrations at the onsite wells are high, ranging from about 500 mg/L to over 2,000 mg/L. Offsite monitoring has yielded observed TDS concentrations that range from about 100 mg/L to 700 mg/L. Note that these TDS values are higher than those observed at up-gradient wells, which typically range from 200 to 300 mg/L.

4.3.4.2 Chino Airport

The Chino Airport is located approximately four miles east of the City of Chino and six miles south of the OIA and occupies about 895 acres. From the early 1940s until 1948, the airport was owned by the federal government and used for flight training and aircraft storage. The County of San Bernardino acquired the airport in 1948 and has operated and/or leased portions of the facility ever since. Since 1948, businesses and activities at the airport have included: the modification of military aircraft; crop-dusting; aircraft-engine repair; aircraft painting, stripping, and washing; dispensing of fire-retardant chemicals to fight forest fires; and general aircraft maintenance. The use of organic solvents for various manufacturing and industrial purposes has been widespread throughout the airport's history. From 1986 to 1988, a number of groundwater quality investigations were performed in the vicinity of the Chino Airport. Analytical results from groundwater sampling revealed the presence of VOCs above MCLs in six wells downgradient of the Chino Airport. The most common VOC detected above its MCL is TCE, as shown in Figure 4-19. TCE concentrations in the contaminated wells ranged from 6 to 75 µg/L.

In 1990, Cleanup and Abatement Order (CAO) No. 90-134 was issued to address groundwater contamination emanating from the Chino Airport. During 2003, five groundwater monitoring wells were installed onsite; and in 2005, an additional four groundwater monitoring wells were installed onsite for further characterization. During June and July of 2006, Watermaster conducted a focused sampling event of 25 wells within the vicinity of the Chino Airport plume. In 2007, the San Bernardino County Department of Airports began to focus their investigation on offsite characterization of the plume. In 2008, the RWQCB issued a CAO (No. R-8 2008-0064) to the San Bernardino County Department of Airports in order to define the lateral and vertical extent of the VOCs in groundwater and to prepare a remedial action plan. In late 2008, nine offsite monitoring wells were completed in three locations. Initial sampling of these wells was done in August 2009.

Figure 4-18 shows the approximate areal extent of TCE in groundwater at concentrations in

exceedance of the MCL in the vicinity of the Chino Airport as of 2008. The plume is elongate in shape, up to 3,600 feet wide, and extends approximately 12,100 feet from the airport's northern boundary in a south to southwestern direction. From July 2003 to June 2008, the maximum TCE concentration detected at an individual well within the Chino Airport plume was 910 µg/L.

4.3.4.3 California Institute for Men

The California Institution for Men (CIM) is a state correctional facility located in the City of Chino and has been in existence since 1939. The property occupies approximately 1,500 acres, and is bounded by Eucalyptus Avenue to the north, Euclid Avenue to the east, Kimball Avenue to the south, and Central Avenue to the west. Site use includes agricultural operations, inmate housing, and correctional facilities. The Heman G. Stark Youth Correctional Facility occupies the eastern portion of the property (Geomatrix Consultants, 2005).

In 1990, PCE was detected at a concentration of 26 µg/L at CIM drinking water supply Well 1. Analytical results have indicated that the most common VOCs detected in groundwater underlying CIM are PCE and TCE. The maximum PCE concentration in groundwater detected at an individual monitoring well (MW-7) was 1990 µg/L, and the maximum TCE concentration in groundwater detected at an individual monitoring well (MW-6) was 160 µg/L (Geomatrix Consultants, 2007). Other detected VOCs include 1,2-DCE, bromodichloromethane, 1,1,1-TCA, carbon tetrachloride, chloroform, and toluene.

In 1992, construction began on a groundwater monitoring network of approximately 40 wells. These wells were sampled intermittently through 2007. An Interim Remedial Measure (IRM) was implemented to resume production at Well 1, treat extracted water to reduce VOC concentrations, and use that water as part of the CIM potable water distribution system. Since the implementation of the IRM, the concentrations of PCE and TCE in groundwater have decreased considerably. Of the 39 wells sampled in 2007, 6 wells in the shallow aquifer had PCE concentrations in exceedance of the MCL, and TCE was detected at one shallow monitoring well (Geomatrix Consultants, 2007). CIM submitted a Request for No Further Action (NFA) for groundwater PCE remediation to the RWQCB.

Figure 4-18 shows the approximate areal extent of VOCs in groundwater at concentrations exceeding their MCLs as of 2008. The plume is up to 2,900 feet wide and extends about 5,800 feet from north to south. As Figure 4-19 illustrates, the CIM plume is primarily characterized by PCE. From July 2003 to June 2008, the maximum PCE and TCE concentrations in groundwater detected at an individual well within the CIM plume were 57 µg/L and 26 µg/L, respectively.

4.3.4.4 Crown Coach

The former Crown Coach site, located at 13799 Monte Vista Ave in the City of Chino, was used by the General Electric Corporation (GE) for the manufacturing and maintenance of semi-tractors and buses from the early 1970s onward. In 1987, it was discovered that twelve underground storage tanks were leaking lube oils, diesel, antifreeze, waste oil, and waste

solvents. All 12 tanks were removed by 1988, and the release of spent solvents in the underlying soil and groundwater was reported (Rosengarten Smith & Associates, 1992). Since 1988, sampling at 22 monitoring wells has determined the concentration and areal extent of the VOC plume. Contaminated soil and groundwater are contained onsite. The most common VOCs detected are TCE, PCE, and 1,1-DCE, as shown in Figure 4-19.

Concurrent with groundwater monitoring, a series of remediation activities have occurred on the property. Starting in June 1990, extracted groundwater was discharged to an onsite sewer connection, operating under an industrial wastewater discharge permit. A soil-vapor extraction system was brought onsite in 1992 to address vadose zone contamination. Starting in 2005, a Dual Phase Extraction Treatment System (DPETS) was used to remediate groundwater and soil. In May 2008, Duke Reality began redevelopment activities on the property. During construction, DPETS operations ceased, and Edible Oil Solution (EOS) was injected into ten monitoring and extraction wells as a remediation replacement.

Figure 4-18 shows the approximate areal extent of VOCs in groundwater at concentrations exceeding their MCLs near the Crown Coach Facility as of 2008. The plume is approximately 500 feet in length and 250 feet wide. The last monitoring event in 2008 indicated that the lateral boundaries of the plume are decreasing, and PCE, TCE, and 1,1 DCE were not detected in deep aquifer wells (Rosengarten Smith & Associates, 2008). From July 2003 to June 2008, the maximum PCE and TCE concentrations detected at an individual well within the Crown Coach VOC plume were 182 μg/L and 125 μg/L, respectively.

In June 2009, GE submitted a report to the Regional Board evaluating the effectiveness of the EOS injections and the need for additional remedial measures. In this report GE concluded that the hydrogeologic conditions beneath the site are sufficient to protect the beneficial uses of groundwater in the regional aquifer and that no further monitoring and remediation activity is warranted at this site. A response from the Regional Board on this report is pending.

4.3.4.5 General Electric Flatiron Facility

The General Electric Flatiron Facility (Flatiron Facility) occupied the site at 234 East Main Street, Ontario, California from the early 1900s to 1982. Its operations primarily consisted of manufacturing clothes irons. Currently, the site is occupied by an industrial park. The RWQCB issued an investigative order to GE in 1987 after an inactive well in the City of Ontario was found to contain TCE and chromium above drinking water standards. Analytical results from groundwater sampling have indicated that VOCs and total chromium are the major groundwater contaminants. The most common VOC detected at levels significantly above its MCL is TCE, as shown in Figure 4-19. TCE has reached a measured maximum concentration of 5,620 μg/L. Other VOCs—including PCE, toluene, and total xylenes—are periodically detected but commonly below their MCLs (Geomatrix Consultants, 1997).

The facility's eighteen monitoring wells are part of a quarterly monitoring program that began in 1991. Remediation activities began in 1995 with RWQCB Waster Discharge Requirement Order No. 95-62 for the pump and treat of groundwater at two extraction wells, EW-01 and EW-02. The operation of the extraction wells and remediation system is also referred to as the Final Remediation Measures (FRM). Groundwater from EW-01 is treated for VOCs, and groundwater from EW-02 is treated for VOCs and chromium. The two sources of treated

water join, are pipelined to the West Cucamonga Channel and ultimately to the Ely Basins, where it percolates into the Chino Basin Aquifer. In late 2009 or early 2010, an injection well and pipeline will be completed, and treated groundwater will be injected into the Chino Basin. In addition to the remediation measures discussed above, a Soil Vapor Extraction (SVE) system has been in operation since 2003 to remove VOCs from impacted soil.

Figure 4-18 shows the approximate areal extent of TCE in groundwater at concentrations exceeding the MCL as of 2008. The plume is up to 3,400 feet wide and extends about 9,000 feet south-southwest (hydraulically downgradient) from the southern border of the site. From July 2003 to June 2008, the maximum TCE concentration detected at an individual well within the Flatiron Facility plume was 5,620 μg/L, and the maximum total chromium concentration detected at an individual well was 485 μg/L.

4.3.4.6 General Electric Test Cell Facility

The GE Engine Maintenance Center Test Cell Facility (Test Cell Facility) is located at 1923 East Avion, Ontario, California. From 1956 to present, primary operations at the Test Cell Facility have included the testing and maintenance of commercial and military aircraft engines. Historically, hazardous waste was disposed of in dry wells. In 1987, results of a preliminary investigation indicated the presence of VOCs in soils near the dry wells. In 1991, a soil and groundwater investigation and subsequent quarterly groundwater quality monitoring showed the presence of VOCs in the soil and groundwater beneath the Test Cell Facility and that the VOCs had migrated offsite (Dames & Moore, 1996). Subsequent investigations indicated that the most common and abundant VOC detected in groundwater beneath the site was TCE. The historical maximum TCE concentration measured at an onsite monitoring well (directly beneath the Test Cell Facility) was 1,240 μg/L. The historical maximum TCE concentration measured at an offsite monitoring well (downgradient) was 190 μg/L (BDM International, 1997). Other detected VOCs include PCE, cis-1,2-DCE, 1,2-dicholoropropane, 1,1-DCE, 1,1-DCA, and chloroform, among others.

A Consent Order between General Electric and CDPH was signed September 28, 1988 for groundwater and soil remediation (Docket No. 88/89-009CO). The groundwater investigation and cleanup is under the oversight of the RWQCB. Vapor extraction treatment system operations began in 1996 (Docket No. HAS 97/98-014). Quarterly monitoring and operations status reports have been submitted to the DTSC and the RWQCB since remediation commenced. Recently a study was conducted to evaluate the effectiveness of the soil remediation program. The results of this study were submitted to the DTSC in October 2008 (Geosyntec Consultants, 2008). In some regions of the facility, shallow soils have reached acceptable closure levels; however, remediation activities will continue until sufficient data can be evaluated.

Figure 4-18 shows the approximate areal extent of VOCs in groundwater at concentrations exceeding federal MCLs as of 2008. The plume is elongate in shape, up to 2,400 feet wide, and extends approximately 10,300 feet from the Test Cell Facility in a southwesterly direction. As Figure 4-19 illustrates, the GE Test Cell Facility plume is characterized primarily by TCE, PCE, cis-1,2-DCE, and 1,1-DCE. From July 2003 to June 2008, the maximum TCE and PCE concentrations in groundwater detected at an individual well within the Test Cell Facility

plume were 900 µg/L and 16 µg/L, respectively.

4.3.4.7 Kaiser Steel Fontana Steel Site

Between 1943 and 1983, the Kaiser Steel Corporation (Kaiser) operated an integrated steel manufacturing facility in Fontana. During the first 30 years of operations (1945-1974), a portion of the Kaiser brine wastewater was discharged to surface impoundments and allowed to percolate into the soil. In the early 1970s, the surface impoundments were lined to eliminate percolation to groundwater (Wildermuth, 1991). In July of 1983, Kaiser initiated a groundwater investigation that revealed the presence of a plume of degraded groundwater beneath the facility. In August 1987, the RWQCB issued CAO Number 87-121, requiring additional groundwater investigations and remediation activities. The results of those investigations showed that the major constituents of release to groundwater were inorganic dissolved solids and low molecular weight organic compounds. The wells sampled during the groundwater investigations had TDS concentrations ranging from 500 to 1,200 mg/L and TOC concentrations ranging from 1 to 70 mg/L. By November 1991, the plume had migrated almost entirely off the Kaiser site.

In 1993, Kaiser and the RWQCB entered into a settlement agreement; Kaiser was required to mitigate any adverse impacts caused by its plume at existing and otherwise useable municipal wells. Pursuant to the settlement, the RWQCB rescinded its earlier order 91-40, and Kaiser was granted capacity in the Chino II Desalter to intercept and remediate the Kaiser plume within the Chino Basin. In an effort to further characterize the plume, during 2005, a network of 22 public and private supply wells were selected for quarterly groundwater sampling for one year and annual sampling thereafter. In addition, two triple nested monitoring wells, MZ3-1 and MZ3-2, were installed between the distal edge of the plume and municipal supply wells in 2007. Well MZ3-1/3 was found to have elevated concentrations of TDS, sulfate, and TOC. Based on this finding, the Kaiser plume was extended to include this well.

Figure 4-18 shows the approximate areal extent of the TDS/TOC groundwater plume as of 2008. Based on a limited number of wells, including Kaiser monitoring wells MP-2 and KOSF, City of Ontario Wells 27 and 30, and monitoring wells MZ3-1 and MZ3-2, the plume is up to 7,000 feet wide and extends about 18,500 feet from the northeast to the southwest.

4.3.4.8 Milliken Sanitary Landfill

The Milliken Sanitary Landfill (MSL) is an inactive Class III Municipal Solid Waste Management Unit, located near the intersections of Milliken Avenue and Mission Boulevard in the City of Ontario. This facility is owned by the County of San Bernardino and managed by the County's Waste System Division. The facility operated from 1958 to 1999. Groundwater monitoring at the MSL began in 1987 with five monitoring wells as part of a Solid Waste Assessment Test (SWAT) investigation (IT, 1989). The results of this investigation indicated that the MSL had released organic and inorganic compounds to underlying groundwater. Based on this finding, the MSL conducted an Evaluation Monitoring Program (EMP) investigation. At the completion of the EMP, a total of 29 monitoring wells were drilled to evaluate the nature and extent of the groundwater impacts identified in the vicinity of the MSL (GeoLogic Associates, 1998). Analytical results have indicated that VOCs

are the major constituents of release. The most commonly detected VOCs are TCE, PCE, and dichlorodifluoromethane. Other VOCs that have been detected above MCLs include vinyl chloride, benzene, 1,1-dichloroethane, and 1,2-dichloropropane. Historically, the maximum total VOC concentration in an individual monitoring well was 159.6 µg/L (GeoLogic Associates, 1998).

Figure 4-18 shows the approximate areal extent of VOCs in groundwater at concentrations exceeding MCLs as of 2008. The plume is up to 1,800 feet wide and extends about 2,100 feet south of the MSL's southern border. As Figure 4-19 illustrates, the MSL plume is characterized by a mixture of PCE, TCE, and their degradation products. From July 2003 to June 2008, the maximum TCE and PCE concentrations detected at an individual well within the MSL plume were 12 µg/L and 8.4 µg/L, respectively.

4.3.4.9 Municipal Wastewater Disposal Ponds

Historically, treated municipal wastewater was disposed of in ponds located near the current IEUA Regional Plant 1 (RP1), located in south Ontario, and the former Regional Plant 3 (RP3) disposal ponds, located in south Fontana. The ponds located just east of RP1, commonly referred to as the Cucamonga ponds, were used to dispose of untreated effluent collected by the Cucamonga County Water District (now the CVWD) and the IEUA. The RP3 disposal ponds are located on the southwest corner of Beech and Jurupa Avenues in the City of Fontana. The discharge of treated wastewater to the Cucamonga ponds and the RP3 ponds ceased between the early 1970s and the mid-1980s. The contaminant plumes emanating from these ponds have never been characterized.

4.3.4.10 Upland Sanitary Landfill

The Upland Sanitary Landfill (USL) is located on the site of a former gravel quarry at the southeastern corner of 15th Street and Campus Avenue in the City of Upland. The facility operated from 1950 to 1979 as an unlined Class II and Class III municipal solid waste disposal site. In 1982, the entire USL disposal site was covered with a 10-inch thick, low permeability layer of sandy silt (GeoLogic Associates, 1997). Groundwater monitoring began at the USL in 1988, and there are now three onsite monitoring wells: an upgradient well, a cross-gradient well, and a downgradient well (City of Upland, 1998). Monitoring results indicate that the USL has released organic and inorganic compounds to underlying groundwater (GeoLogic Associates, 1997). Groundwater samples from the downgradient monitoring well consistently contain higher concentrations of organic and inorganic compounds than samples from the upgradient and cross-gradient wells. Historical groundwater samples have indicated that VOCs are the major constituents of release, and all three monitoring wells have shown detectable levels of VOCs. The most common VOCs detected above MCLs are dichlorodifluoromethane, PCE, TCE, and vinyl chloride. Other VOCs that have been periodically detected above MCLs include methylene chloride, cis-1,2-DCE, 1,1-DCA, and benzene. For the 1990 to 1995 period, the average total VOC concentration at the downgradient monitoring well was 125 µg/L (GeoLogic Associates, 1997). And, for the July 2003 to June 2008 period, the maximum TCE and PCE concentrations detected at USL monitoring wells were 0.6 µg/L and 3.5 µg/L, respectively.

Figure 4-18 shows the approximate areal extent of VOCs at concentrations exceeding MCLs as of 2008. Please note that this plume is only defined by three onsite monitoring wells. The extent of the plume may be greater than currently depicted in Figure 4-18.

4.3.4.11 VOC Plume – South of the OIA

A VOC plume, containing TCE, exists south of the OIA. This plume extends approximately from State Route 60 on the north and Haven Avenue on the east to Cloverdale Road on the south and South Grove Avenue on the west. It is up to 11,300 feet wide and 20,500 feet long. By the late 1980s, the RWQCB determined TCE was present in numerous private wells in the area south of the OIA, and identified past activities at the airport as a likely source of TCE (RWQCB, 2005b). By 2005, TCE in exceedance of the CA MCL (5µg/L) was detected in 92 of the 167 private wells in the area. In July 2005, Draft CAOs were issued by the RWQCB to six parties identified as former TCE dischargers on the OIA property: Aerojet, the Boeing Company (Boeing), the Department of Defense, the Lockheed Martin Corporation (Lockheed), and the Northrop Grumman Corporation (Northrop). On a voluntary basis, Lockheed, GE, Boeing, and Aerojet are funding current investigative work on the extent and source of the TCE plume. Three triple nested monitoring wells were constructed in 2008 between the OIA and the VOC plume. A fourth well will be completed in 2009.

Final CAOs will likely be issued in the future. Watermaster has been working closely with the RWQCB and the identified parties, providing any available information to assist in the investigation. Remediation of the plume will likely be achieved using the CDA's Chino Basin Desalter I facilities . Watermaster is currently seeking a settlement with the companies to recover treatment costs associated with the VOC plume.

Figure 4-18 shows the approximate areal extent of the plume as of 2008. As Figure 4-19 illustrates, the OIA plume is characterized solely by TCE. During the July 2003 to June 2008 period, the maximum TCE concentration detected at an individual well within this plume was 38 µg/L.

4.3.4.12 Stringfellow NPL Site

One facility in the Chino Basin, the Stringfellow site, is on the current NPL of Superfund Sites. This site is located in Pyrite Canyon north of Highway 60 near the community of Glen Avon in Riverside County (see Figure 4-18). From 1956 until 1972, this 17-acre site was operated as a hazardous waste disposal facility. More than 34-million gallons of industrial waste—primarily from metal finishing, electroplating, and pesticide production—were deposited at the site (US EPA, 2001). A groundwater plume of site-related contaminants exists underneath portions of the Glen Avon area. Groundwater at the site contains various VOCs, perchlorate, NDMA, and trace metals, such as cadmium, nickel, chromium, and manganese. In the original disposal area, soil is contaminated with pesticides, polychlorinated biphenyls (PCBs), sulfates, perchlorate, and trace metals. The original disposal area is covered by a clay cap, fenced, and guarded by security services.

Contamination at the Stringfellow site has been addressed by cleanup remedies described in four EPA RODs. Since 1986, cleanup actions have focused on controlling the source of contamination, installing an onsite pretreatment plant, the cleanup of the lower part of Pyrite Canyon, and the cleanup of the community groundwater area below Highway 60. In 1996, the DTSC assumed responsibility for the maintenance of the Stringfellow Superfund Site through a Cooperative Agreement with the USEPA. In December 2007, the DTSC submitted the Draft Final Supplemental Feasibility Study (SFS), which identified and evaluated the final remedial alternatives for cleanup. The 2007 Draft SFS is a revised version of an earlier 2000 draft; reconsideration was required after perchlorate and other new contaminates were discovered in 2001. Once finalized, the SFS will be used by the US EPA to select a final remedial strategy and prepare a draft ROD. The draft ROD is anticipated in December 2009.

Figure 4-18 shows the approximate areal extent of the Stringfellow VOC plume as of 2008. The VOC plume is elongate in shape, up to 1,500 feet wide, and extends approximately 14,500 feet from the original disposal area in a southwesterly direction. The most common VOC detected at levels above the MCL is TCE. There are approximately 70 extraction wells throughout the length of the plume, which have been effective in stopping plume migration and removing TCE contamination. South of Highway 60, there are only a few isolated areas where TCE exceeds 5 µg/L (DTSC, 2008). During the 2003 to 2008 period, the maximum TCE concentration detected in the Stringfellow plume was 170 µg/L.

High levels of perchlorate associated with the Stringfellow site were detected in community groundwater south of Highway 60 in 2001. Residents connected to the JCSD water service were provided bottled water, and the DTSC contracted to install water mains and hook ups at each residence. Concurrent with the SFS, the DTSC is conducting a Remedial Investigation and Feasibility Study of remedial alternatives for perchlorate in the downgradient community area. As with TCE, the operation of the groundwater treatment system has resulted in a reduction of perchlorate. Since the discovery in 2001, perchlorate concentrations have been reduced by 30% to 50% throughout the monitored area (DTSC, 2008). Figure 4-18 shows the approximate areal extent of perchlorate concentrations exceeding the Notification Level (6 µg/L) as of 2008. The perchlorate plume is elongated in shape, up to 2,000 feet wide, and extends approximately 25,000 feet to the southwest from the original disposal area. During the 2003 to 2008 period, the maximum perchlorate concentration detected in the Stringfellow plume was 870 µg/L.

4.3.5 Water Quality by Management Zone

Figure 4-20 shows the locations of wells with groundwater quality time histories discussed herein and the five Chino Basin management zone boundaries. Wells were selected based on length of record, completeness of record, quality of data, and geographical distribution. Wells are identified by their local name (usually owner abbreviation and well number) or their X Reference ID (X Ref ID) if privately owned. The HCMP wells were selected because they are sampled at multiple depths and have a consistent water quality record for the past four years. Figures 4-21 through 4-28 are TDS and NO3-N time histories for the wells shown in Figure 4-20 from 1970 to 2008. These time histories illustrate water quality variation and trends within each management zone and the current state of water quality compared to

historical trends.

4.3.5.1 Management Zone 1

MZ1 is an elongate region in the westernmost part of the Chino Basin. Figures 4-21 and 4-22 show TDS and NO3-N time histories for three wells representative of the northern portion of MZ1 (City of Upland well 8 [Upland 08], Monte Vista Water District well 5 [MVWD 05], and City of Upland well 20 [Upland 20]), two wells representative of the central region (City of Chino 5 [Chino 05] and City of Pomona well 23 [Pomona 23]), and two wells representative of the southern portion (Chino Institution for Men well 13 [CIM 13] and HCMP 3). In the northern portion of MZ1, NO3-N and TDS values have remained steady or decreased slightly over the time period depicted. Upland 08 exhibits NO3-N concentrations above the MCL (10 mg/L); however, slightly towards the west, near the Upland, Montclair, and College Heights Recharge Basins, NO3-N values drop below the MCL, as demonstrated by MVWD 05. TDS levels also decrease near the recharge basins. In the central region of MZ1, TDS and NO3-N concentrations have increased slightly over the last 30 years, but they are still below the MCLs. In the southern portion, NO3-N and TDS concentrations have increased significantly since 1990 and are above the MCLs, which is the trend seen in the majority of wells south of Highway 60. Quarterly sampling at HCMP 3 shows that TDS and NO3-N concentrations have remained stable over the past four years. HCMP 3 also shows the variation of water quality from the shallow to deeper aquifers. Overall, NO3-N and TDS concentrations in MZ1 escalate from north to south but have not increased over the last five years.

4.3.5.2 Management Zone 2

MZ2 is an elongate region in the center part of the Chino Basin. Figures 4-23 and 4-24 show TDS and NO3-N time histories for two wells representative of the northern portion of MZ2 (CVWD Well 5 [CVWD 05] and City of Ontario well 24 [ONT 24]), one well representative of the central region (City of Ontario well 17 [ONT 17]), and three wells representative of the southern portion (X Ref 29, HCMP 1, and X Ref 5333). Similar to MZ1, NO3-N and TDS values increase from north to south. Over the time period depicted, NO3-N and TDS concentrations have remained stable in the northern portion of MZ2, increased slightly in the central region, and increased considerably in the southern portion. At X Ref 5333 and HCMP 1, in the southern portion of MZ2, TDS concentrations are currently greater than twice the MCL (500 mg/L), and NO3-N concentrations are twice the MCL (10mg/L) or greater. In addition, HCMP 1 exemplifies the variation of high TDS and NO3-N levels in the shallow aquifer and low levels in the deeper aquifer. Overall, NO3-N and TDS concentrations have not increased over the last five years with the exception well X Ref 5333.

4.3.5.3 Management Zone 3

MZ3 is an elongate region that borders the majority of the Chino Basin's eastern boundary. Figures 4-25 and 4-26 show TDS and NO3-N time histories for one well representative of the northern portion (City of Fontana 37A [F37A]), one well representative of the central region (City of Ontario well 31 [ONT 31]), and two wells representative of the southern portion (Jurupa Community Service District well 16 [JCSD 16], and X Ref 5736). Similar to MZ1 and

MZ2, NO3-N and TDS values increase from north to south. In the northern and central areas of MZ3, TDS values have slightly increased since 1980 but still remain below the MCL (500 mg/L). Over the time period depicted, NO3-N concentrations increase in all regions of MZ3. Well F37A, in the northern region, exhibits NO3-N concentrations slightly above the MCL (10 mg/L). In the southern portion of MZ3, current TDS and NO3-N concentrations are near double the MCLs. At JCSD 16, NO3-N and TDS concentrations have increased significantly since 1990. In general, NO3-N and TDS concentrations have not increased over the last five years.

4.3.5.4 Management Zone 4

MZ4 – also known as Chino-East – is a wedge shaped region, bounded by the Jurupa Hills to the northeast, the Pedley Hills to the southeast, Management Zone 5 to the south, and Management Zone 3 to the west. Figures 4-27 and 4-28 show TDS and NO3-N time-histories for one well representative of the western region (HCMP-9), one well representative of the northern region (Jurupa Community Service District Well 24 [JCSD 24]), and one well representative of the eastern region (CDPH Stringfellow monitoring well [CTP-TW1]). In the western portion of MZ4, at HCMP-9, TDS and NO3-N concentrations are above the MCLs in the shallow aquifer but quite low in the deeper aquifer. The TDS and NO3 concentrations at JCSD 24 are slightly lower than those in the western portion, but they are slightly below or equal to the MCLs. In the eastern portion, at CTP-TW1, TDS and NO3-N concentrations are significantly above the MCLs. High TDS and NO3-N concentrations in the eastern portion of MZ4 are predominantly associated with the Stringfellow plume. Pre-1990 water quality data was not available for wells in this region. Since 1990, MZ4 TDS and NO3-N levels have remained relatively stable and decreased slightly over the last few years.

4.3.5.5 Management Zone 5

MZ5 – also known as Chino-South – is a small region towards the southeastern boundary of the Chino Basin. It is bordered by MZ4 to the north and MZ3 to the east. Figures 4-27 and 4-28 show TDS and NO3-N time histories for three wells representative of the northern portion of MZ5 (San Ana River Water Company Well 1A [SARWC 01A], JCSD 01, and HCMP-8). None of the wells in the southern region of MZ5 have sampling records that are complete enough to be considered representative. At JCSD 01 and SARWC 01A, TDS concentrations have historically been above the MCL (500 mg/L) and began to notably increase in 1990. Starting in 1995, NO3-N concentrations at JCSD 01 and SARWC 01A began to increase slightly above the MCL. Water quality sampling at these two wells ceased around 2005; however, HCMP-8 shows that TDS and NO3-N concentrations have decreased significantly since then.

4.3.6 Current State of Groundwater Quality in Chino Basin

The groundwater quality in Chino Basin is generally very good with better groundwater quality found in the north where recharge occurs. In the southern portion of the basin, TDS and NO3-N concentrations increase. Between July 2003 and June 2008, 32 percent of the wells sampled south of Highway 60 had TDS concentrations below the secondary MCL, an

improvement from the 20 percent reported in the 2006 State of the Basin Report (period of July 2001 through June 2006). In some places, wells with low TDS concentrations are proximate to wells with higher TDS concentrations, suggesting a vertical stratification of water quality. Between July 2003 and June 2008, about 69 percent of the wells sampled south of Highway 60 had NO3-N concentrations greater than the MCL, an improvement from the 80 percent reported in the 2006 State of the Basin Report (period of July 2001 through June 2006). However, please note that these statistical improvements may be an artifact of sampling occurrence and frequency.

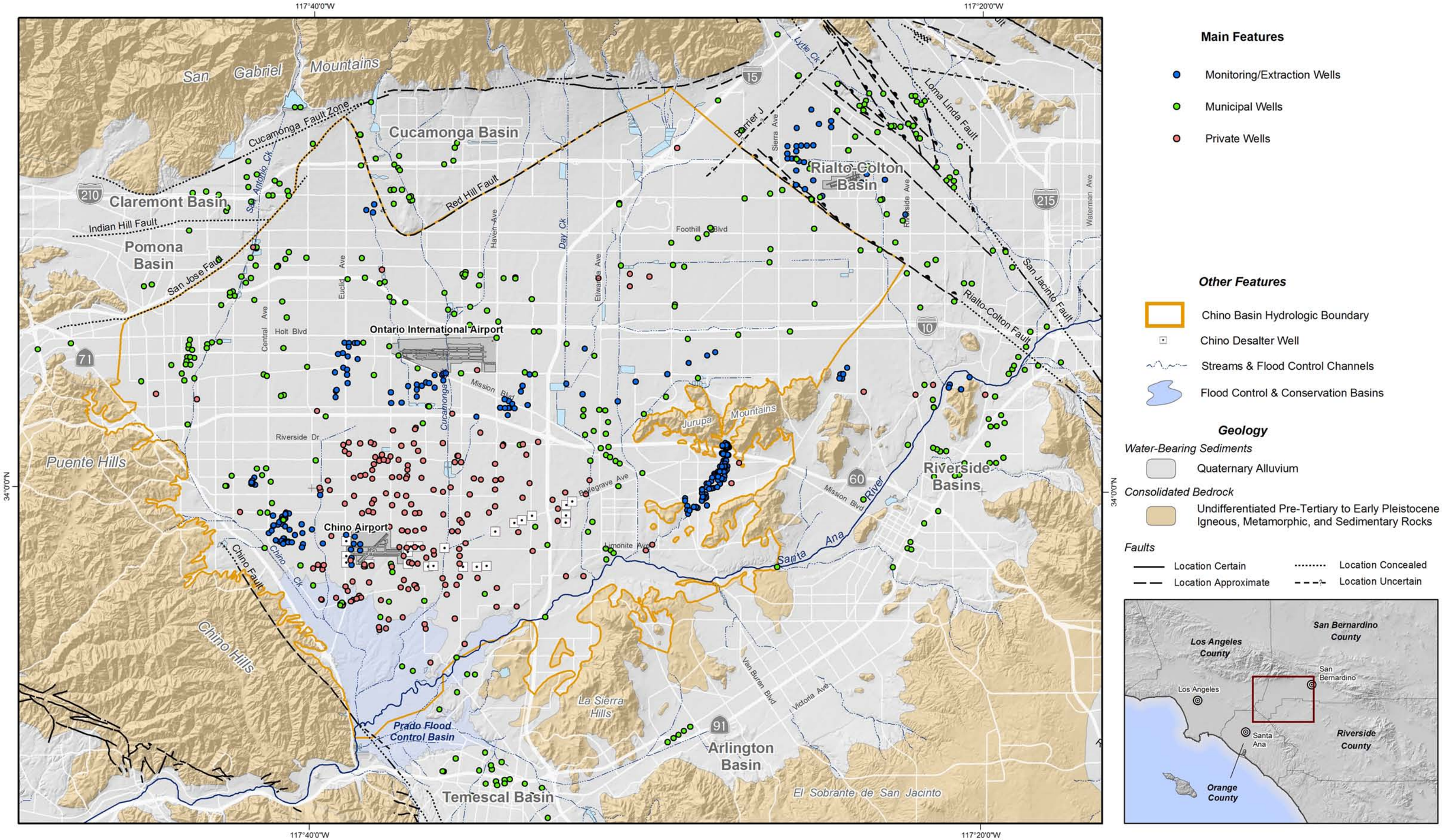
Other constituents that impact groundwater quality from a regulatory or Basin Plan standpoint include certain VOCs, arsenic, and perchlorate. As discussed in Section 4.3.4, there are a number of point source releases of VOCs in the Chino Basin that are in various stages of investigation or cleanup. There are also known point source releases of perchlorate (MVSL area, Stringfellow, etc.), and non-point source related perchlorate contamination appears to have resulted from natural and anthropogenic sources. Arsenic at levels above the WQS appears to be limited to the deeper aquifer zone near the City of Chino Hills. Hexavalent chromium, while not currently a groundwater quality issue in the Chino Basin, may become so, depending on the promulgation of future standards.

4.4 Conclusions and Recommendations

The Initial State of the Basin, and the 2004 and 2006 State of the Basin Reports discussed the need for future, long-term monitoring. Due to commercial and residential development in the Chino Basin area; many of the private agricultural wells that have been used for monitoring activities are destroyed as land is developed.

In response to the loss of historically utilized wells, Watermaster developed a water quality key well program. This program designates a series of wells across a wide areal distribution for long-term monitoring activities. To establish the well network, a grid was overlain the basin, and, where possible, at least one well was chosen per grid cell. Wells that are part of the water level monitoring program and/or on property that is not likely to be developed were preferentially chosen. Details of the Key Well Groundwater Quality Monitoring Program are available in the 2008 Chino Basin Maximum Benefit Annual Report and in Section 4.2.2 of this report. Key well sampling began in fall 2005 and runs in two-year cycles. Sampling results are added to the Watermaster database.

Point sources of concern are critical to the overall quality of Chino Basin groundwater. To ensure that Chino Basin groundwater remains a sustainable resource, it is of the utmost importance that Watermaster closely monitor point sources and emerging contaminates. It is recommended that Watermaster continue to work closely with the RWQCB and potentially responsible parties within the Chino Basin. This will allow for up-to-date understanding of groundwater quality, investigations, remediation activities, and potential mutually beneficial remedial options through Chino Basin desalting facilities.



Main Features

- Monitoring/Extraction Wells
- Municipal Wells
- Private Wells

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

Produced by:

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Author: VME
Date: 20090422
File: Figure_4-1mxd

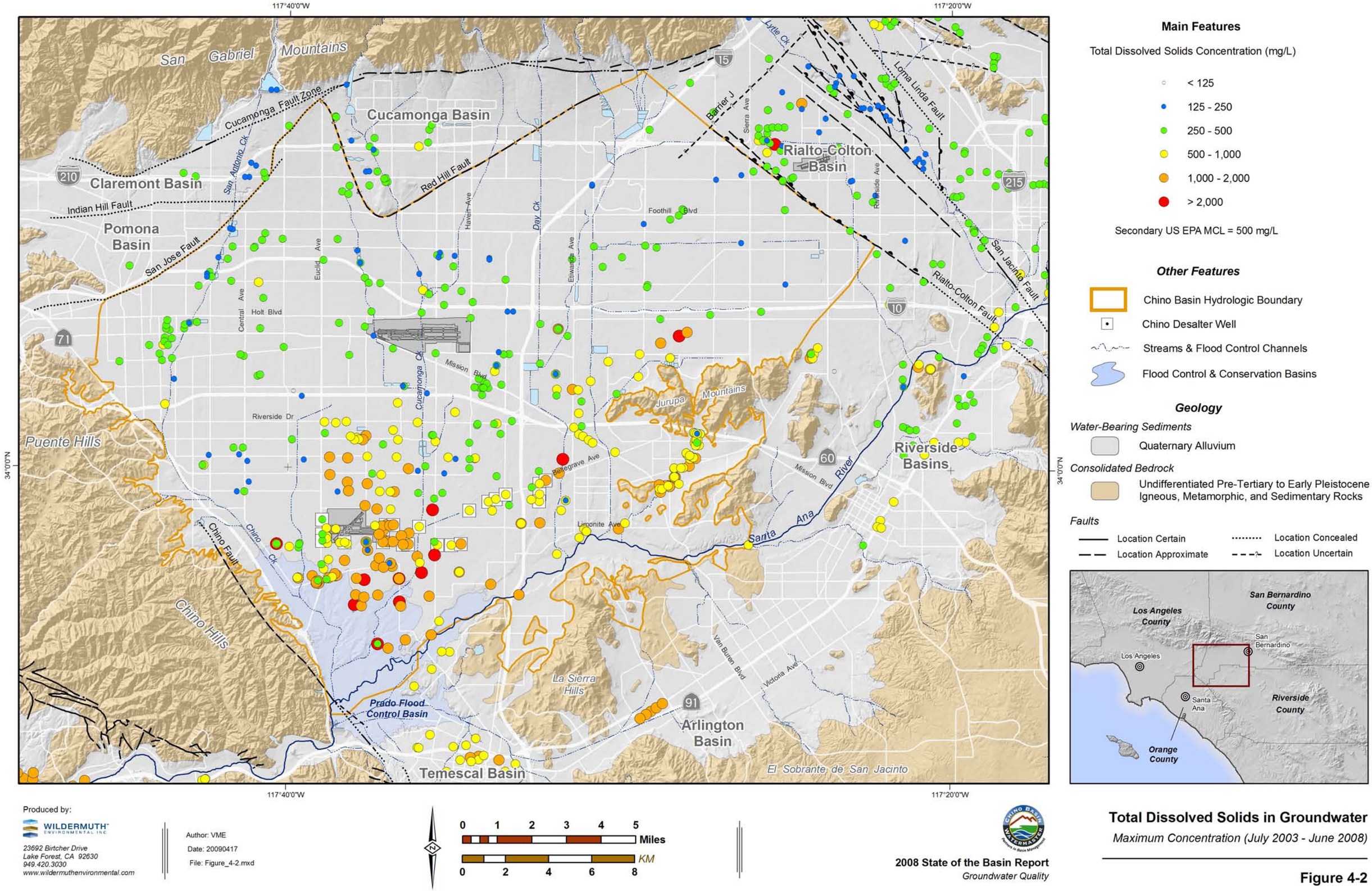
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Groundwater Wells with Water Quality Data

July 2003 - June 2008

Figure 4-1



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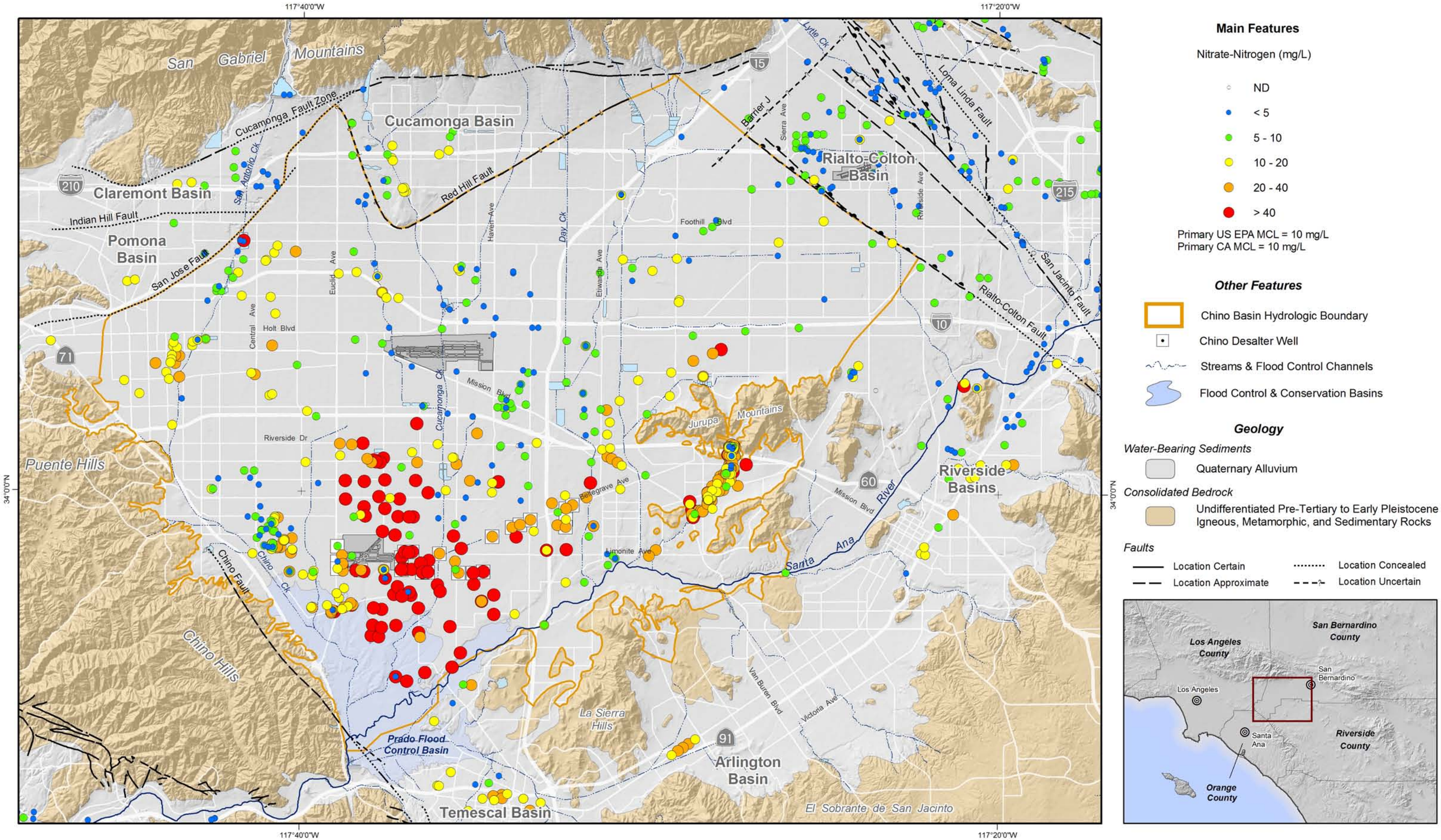
Author: VME
Date: 20090417
File: Figure_4-2.mxd

2008 State of the Basin Report
Groundwater Quality

Total Dissolved Solids in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-2



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Author: VME
Date: 20090417
File: Figure_4-3.mxd

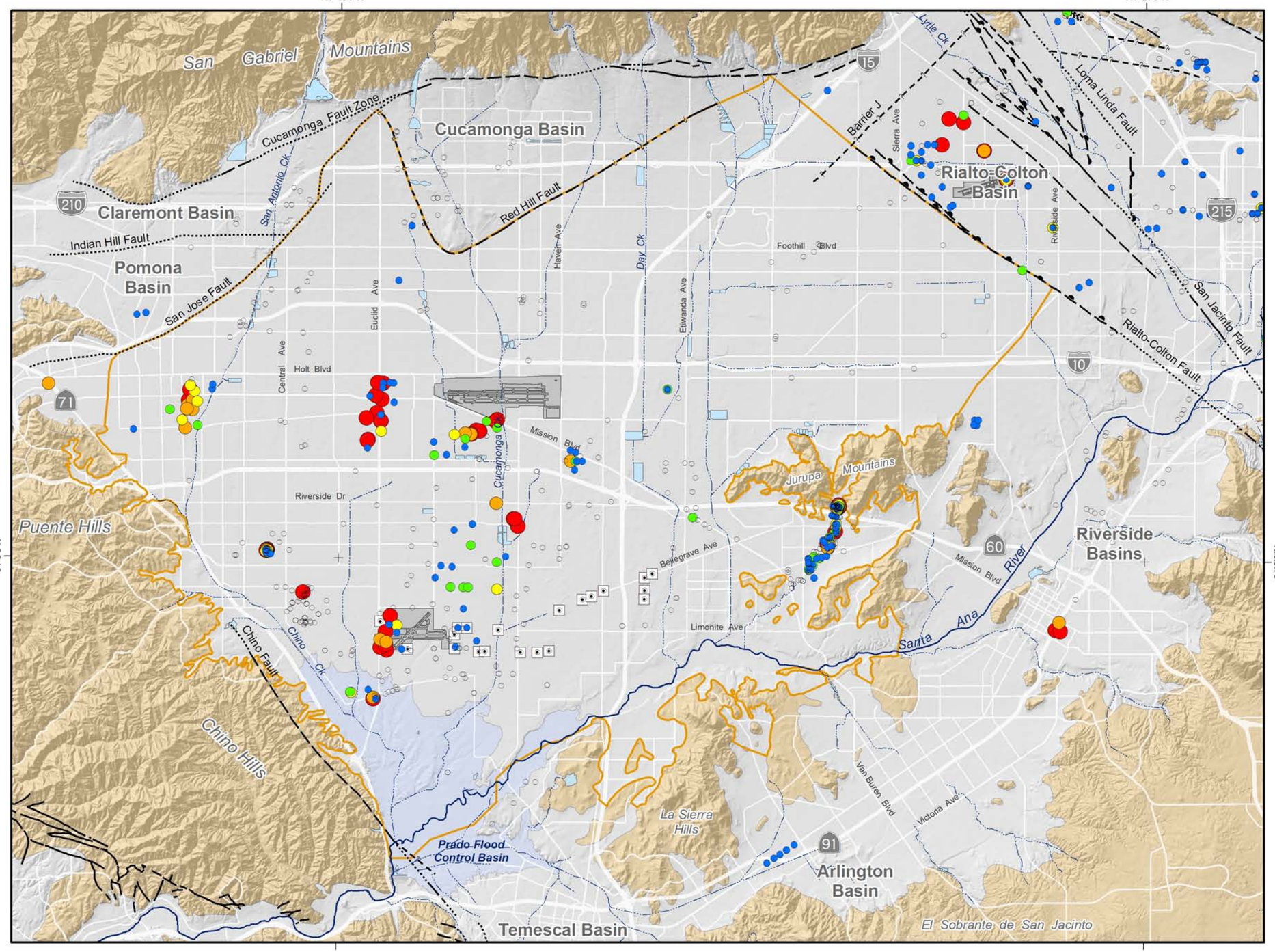
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Nitrate as Nitrogen in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-3



Main Features

Trichloroethene (ug/L)

- ND
- < 2.5
- 2.5 - 5
- 5 - 10
- 10 - 20
- > 20

Primary US EPA MCL = 5 ug/L
Primary CA MCL = 5 ug/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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Date: 20090420
File: Figure_4-4.mxd

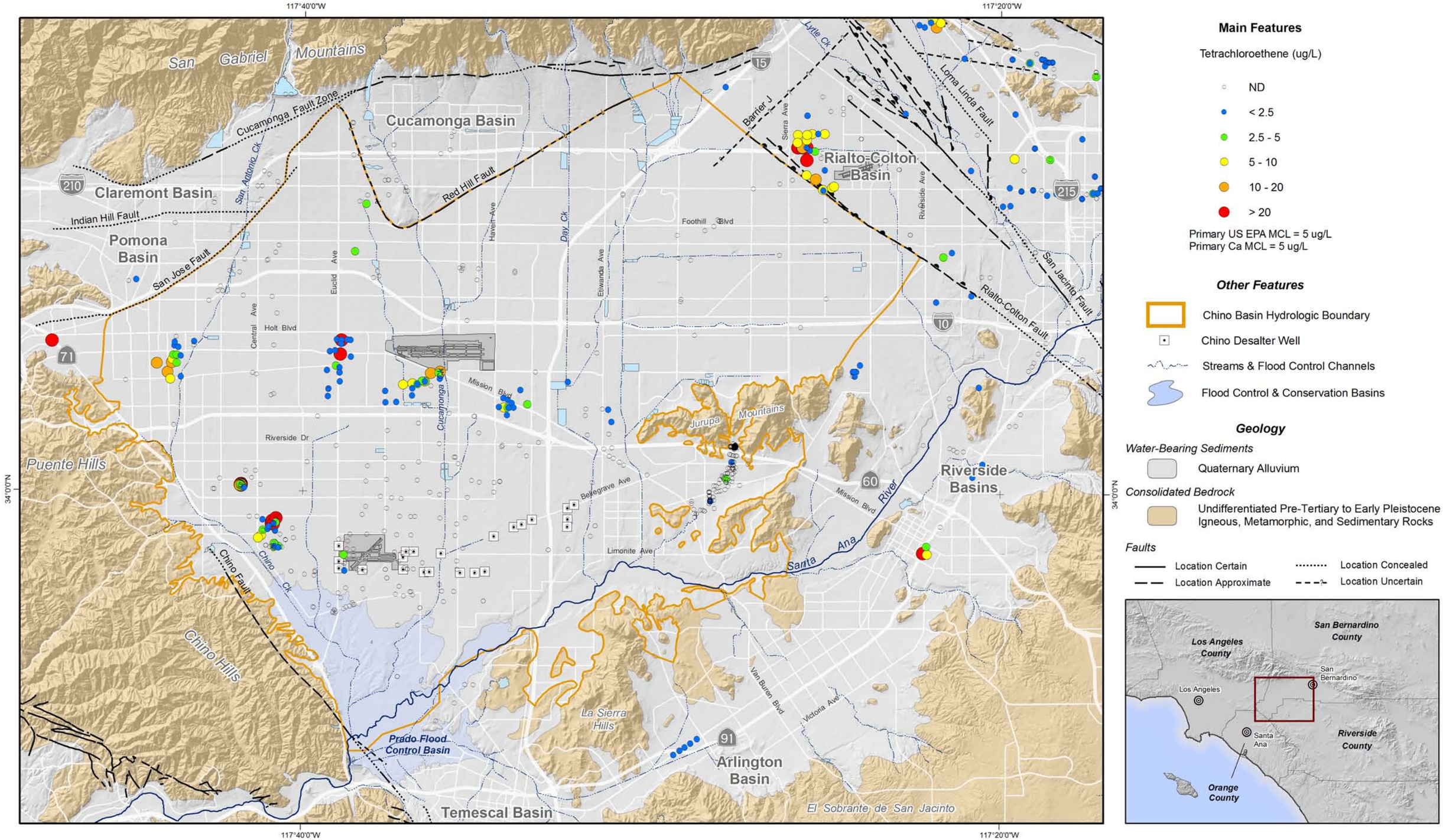
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Trichloroethene in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-4



Main Features

Tetrachloroethene (ug/L)

- ND
- < 2.5
- 2.5 - 5
- 5 - 10
- 10 - 20
- > 20

Primary US EPA MCL = 5 ug/L
Primary Ca MCL = 5 ug/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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Faults

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

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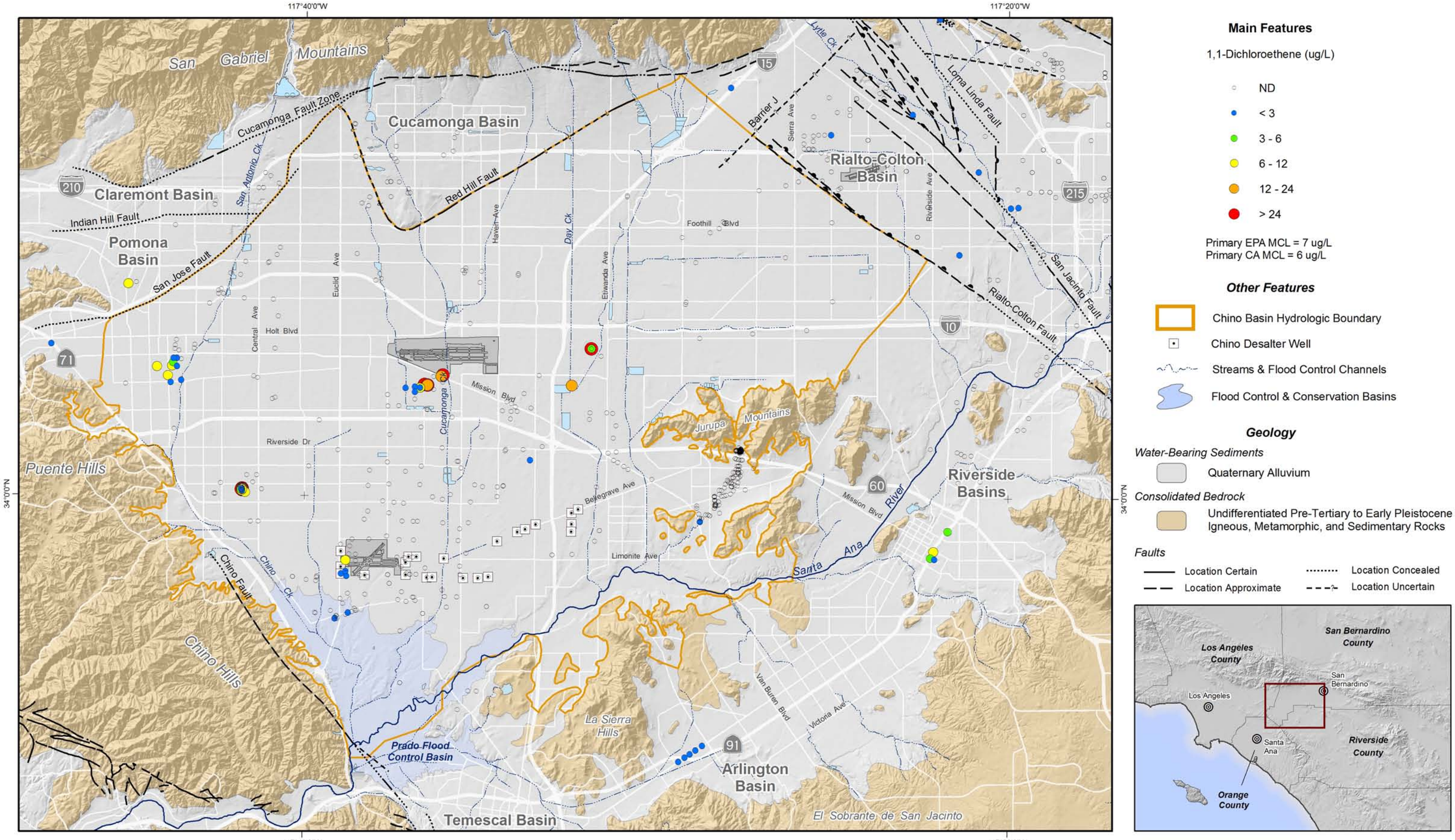
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Tetrachloroethene in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-5



Main Features

1,1-Dichloroethene (ug/L)

- ND
- < 3
- 3 - 6
- 6 - 12
- 12 - 24
- > 24

Primary EPA MCL = 7 ug/L
Primary CA MCL = 6 ug/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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Faults

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

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Date: 20090420
File: Figure_4-6.mxd

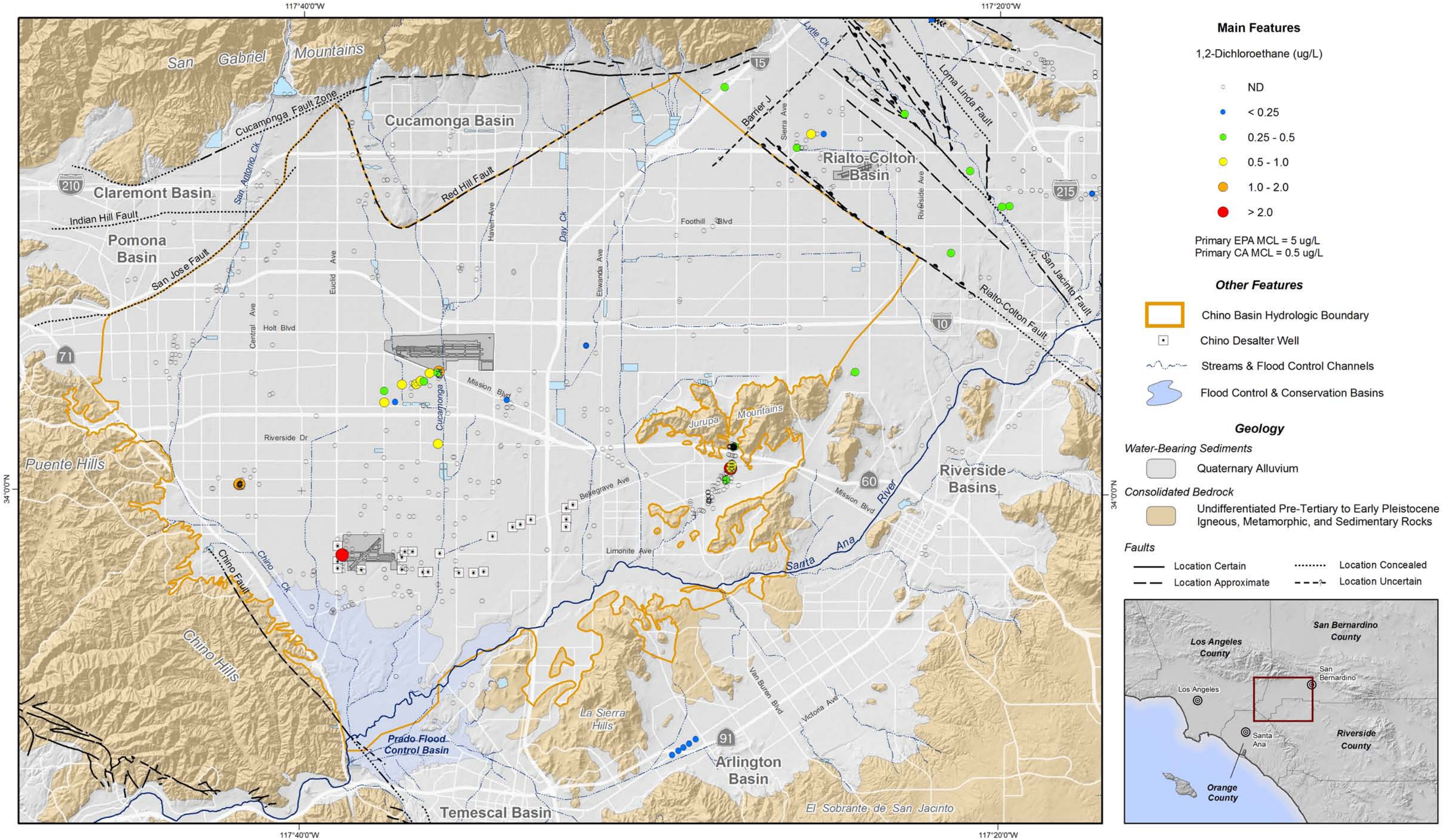
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

1,1-Dichloroethene in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-6



Main Features

1,2-Dichloroethane (ug/L)

- ND
- < 0.25
- 0.25 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0

Primary EPA MCL = 5 ug/L
Primary CA MCL = 0.5 ug/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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Faults

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

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File: Figure_4-7.mxd

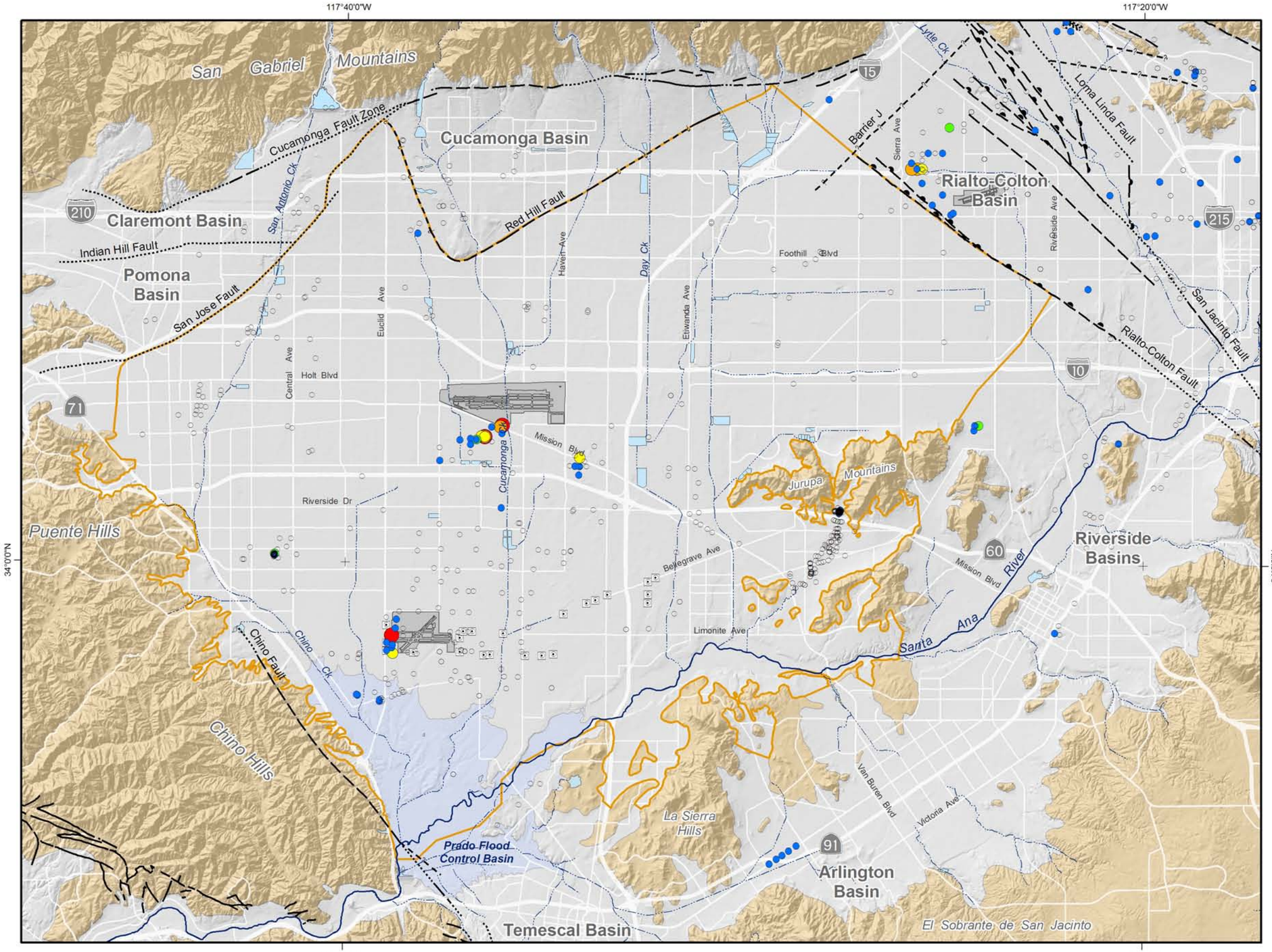
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

1,2-Dichloroethane in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-7



Main Features

cis-1,2-Dichloroethene (ug/L)

- ND
- < 3
- 3 - 6
- 6 - 12
- 12 - 24
- > 24

Primary EPA MCL = 7 ug/L
Primary CA MCL = 6 ug/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

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Consolidated Bedrock

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Faults

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

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Date: 20090420
File: Figure_4-8.mxd

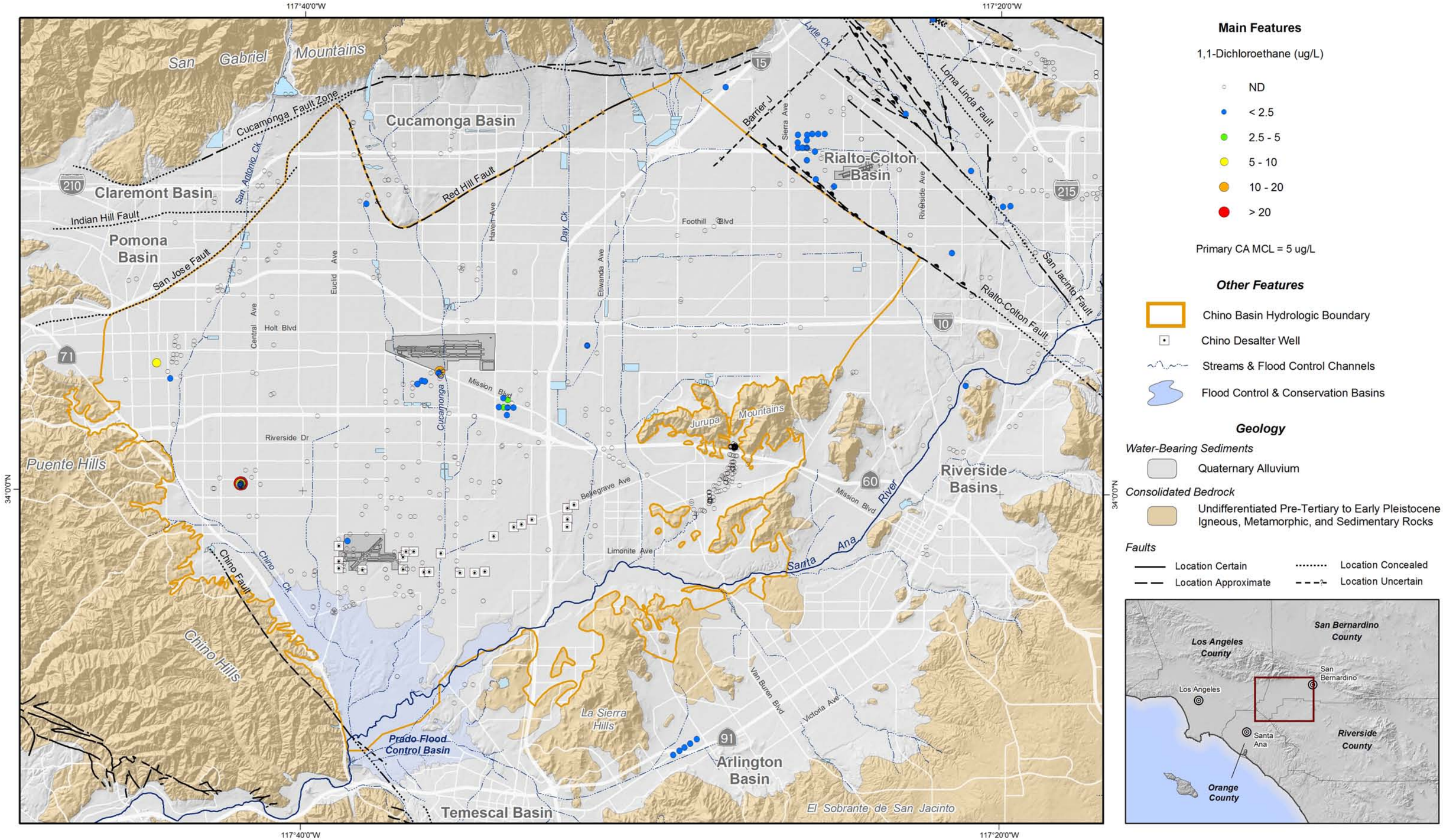
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

cis-1,2-Dichloroethene in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-8



Main Features

1,1-Dichloroethane (ug/L)

- ND
- < 2.5
- 2.5 - 5
- 5 - 10
- 10 - 20
- > 20

Primary CA MCL = 5 ug/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

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Faults

- Location Certain
- Location Approximate
- Location Concealed
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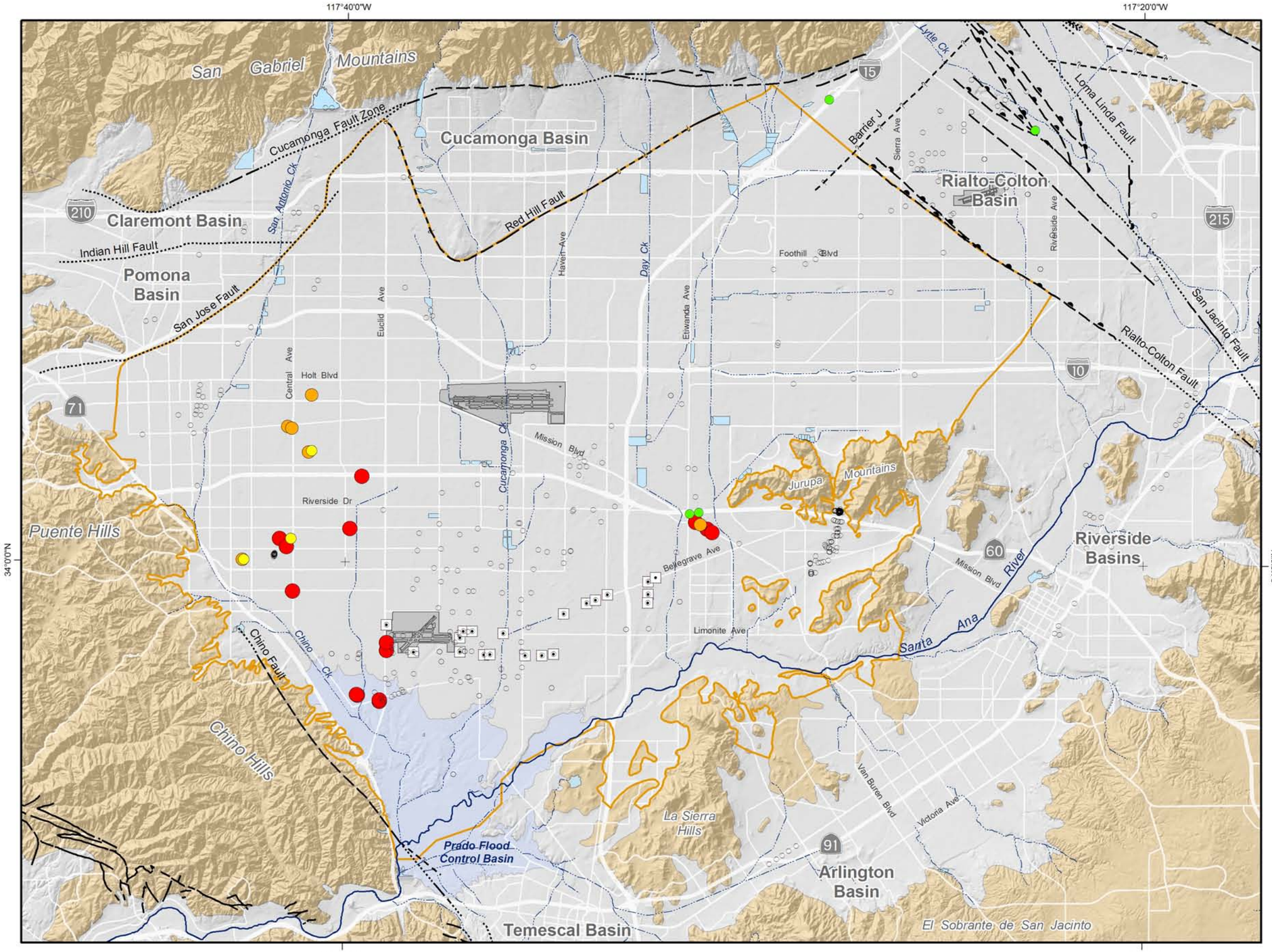
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

1,1-Dichloroethane in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-9



Main Features

1,2,3-Trichloropropane (ug/L)

- ND
- < 0.0025
- 0.0025 - 0.005
- 0.005 - 0.01
- 0.01 - 0.02
- > 0.02

CA Notification Level = 0.005 ug/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

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Faults

- Location Certain
- Location Approximate
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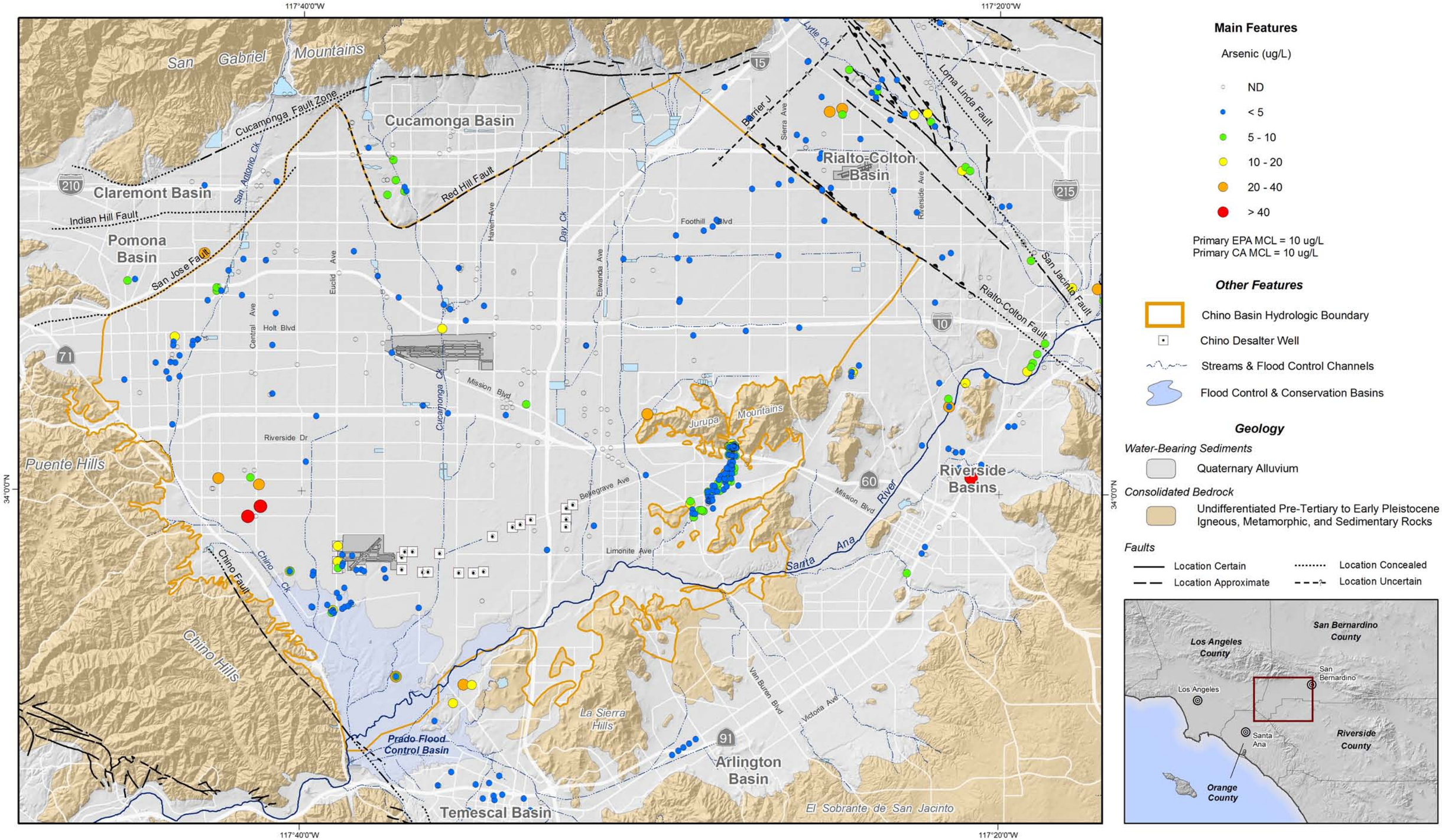
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

1,2,3-Trichloropropane in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-10



Main Features

Arsenic (ug/L)

- ND
- < 5
- 5 - 10
- 10 - 20
- 20 - 40
- > 40

Primary EPA MCL = 10 ug/L
Primary CA MCL = 10 ug/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

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Faults

- Location Certain
- Location Approximate
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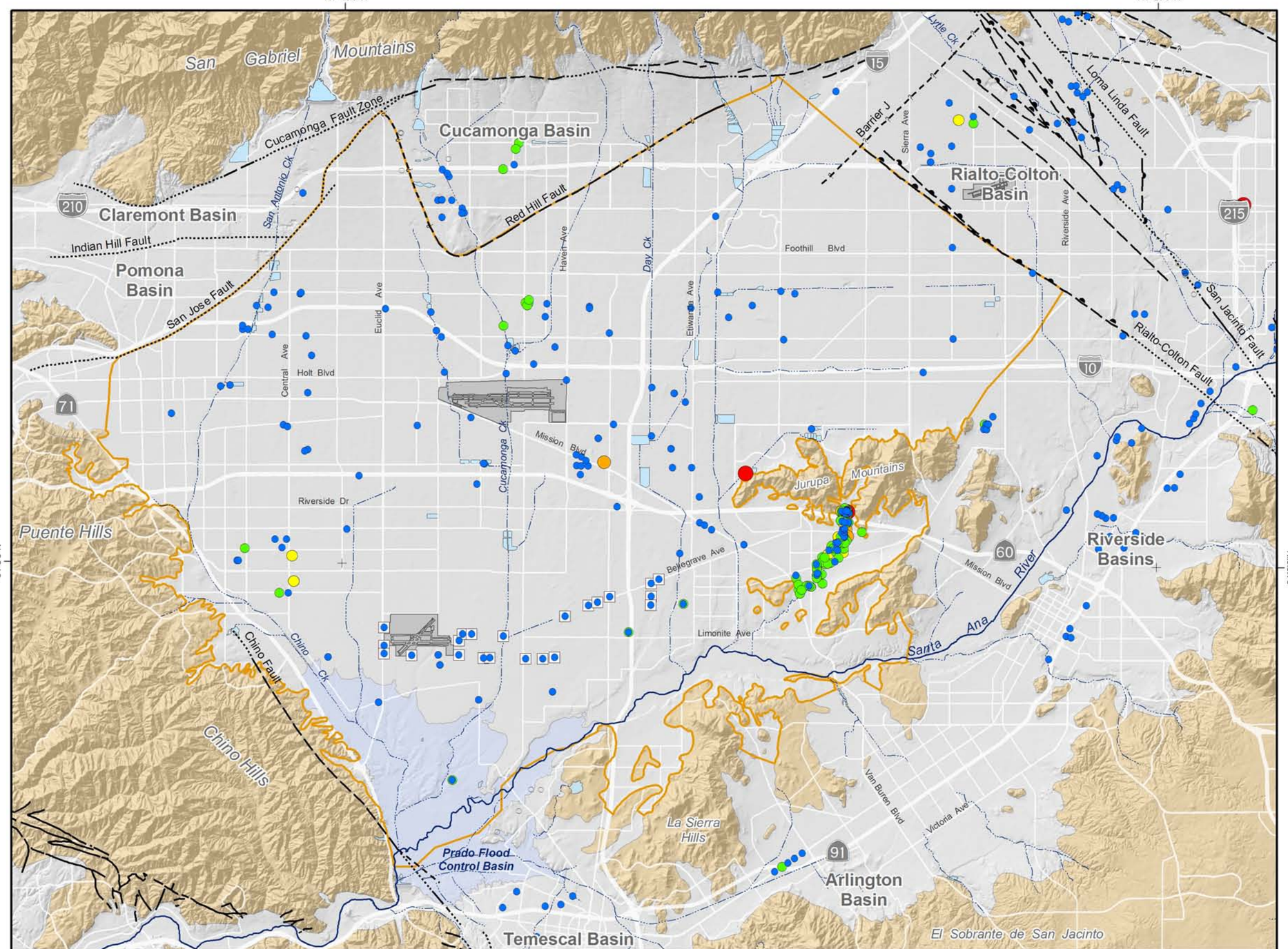
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Arsenic in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-11



Main Features

Vandium (mg/L)

- ND
- < 0.025
- 0.025 - 0.050
- 0.05 - 0.1
- 0.1 - 0.2
- > 0.2

CA Notification Level = 0.05 mg/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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Faults

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

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0 1 2 3 4 5 Miles

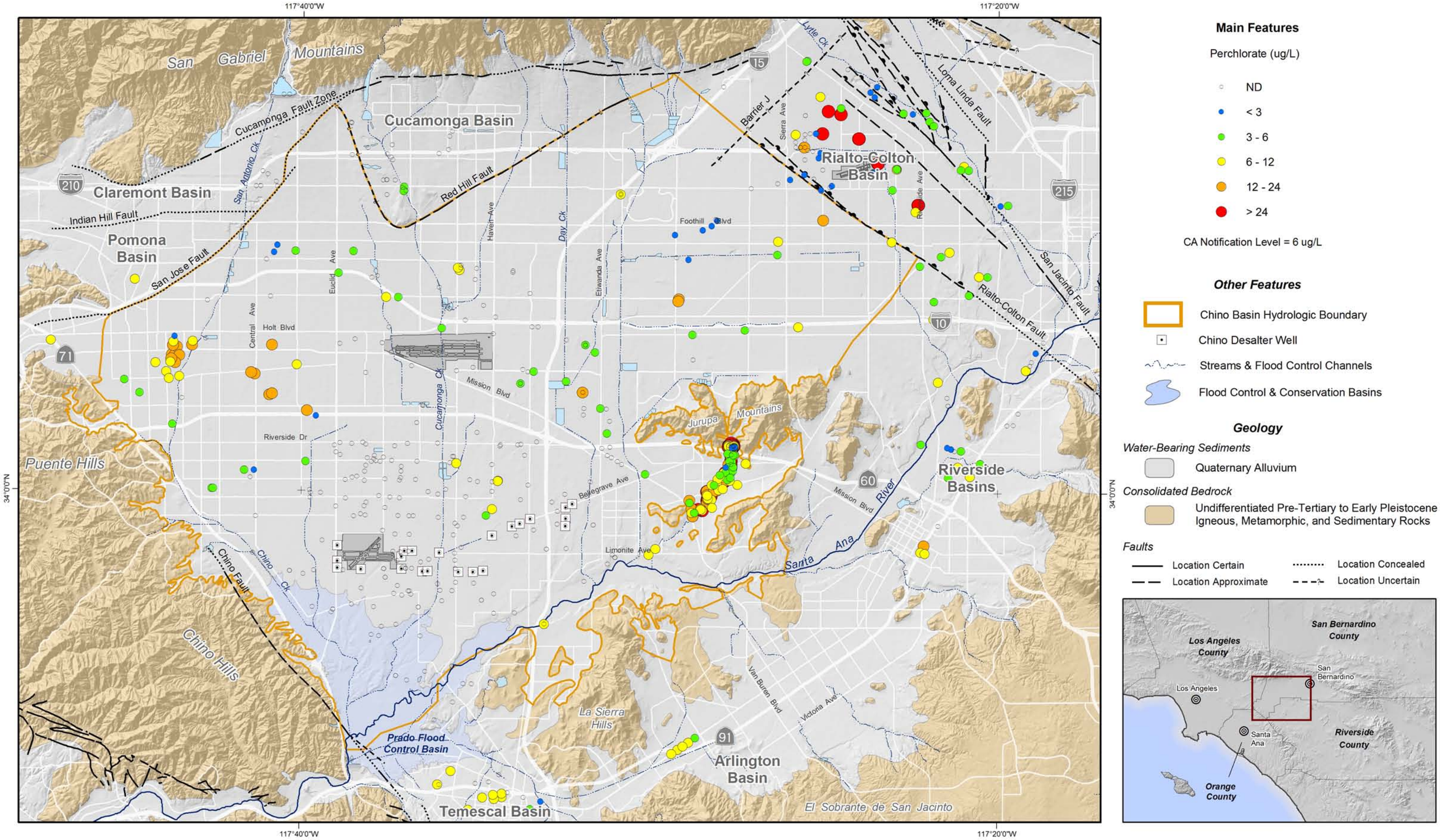
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Vanadium in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-12



Main Features

Perchlorate (ug/L)

- ND
- < 3
- 3 - 6
- 6 - 12
- 12 - 24
- > 24

CA Notification Level = 6 ug/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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Faults

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

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File: Figure_4-13.mxd

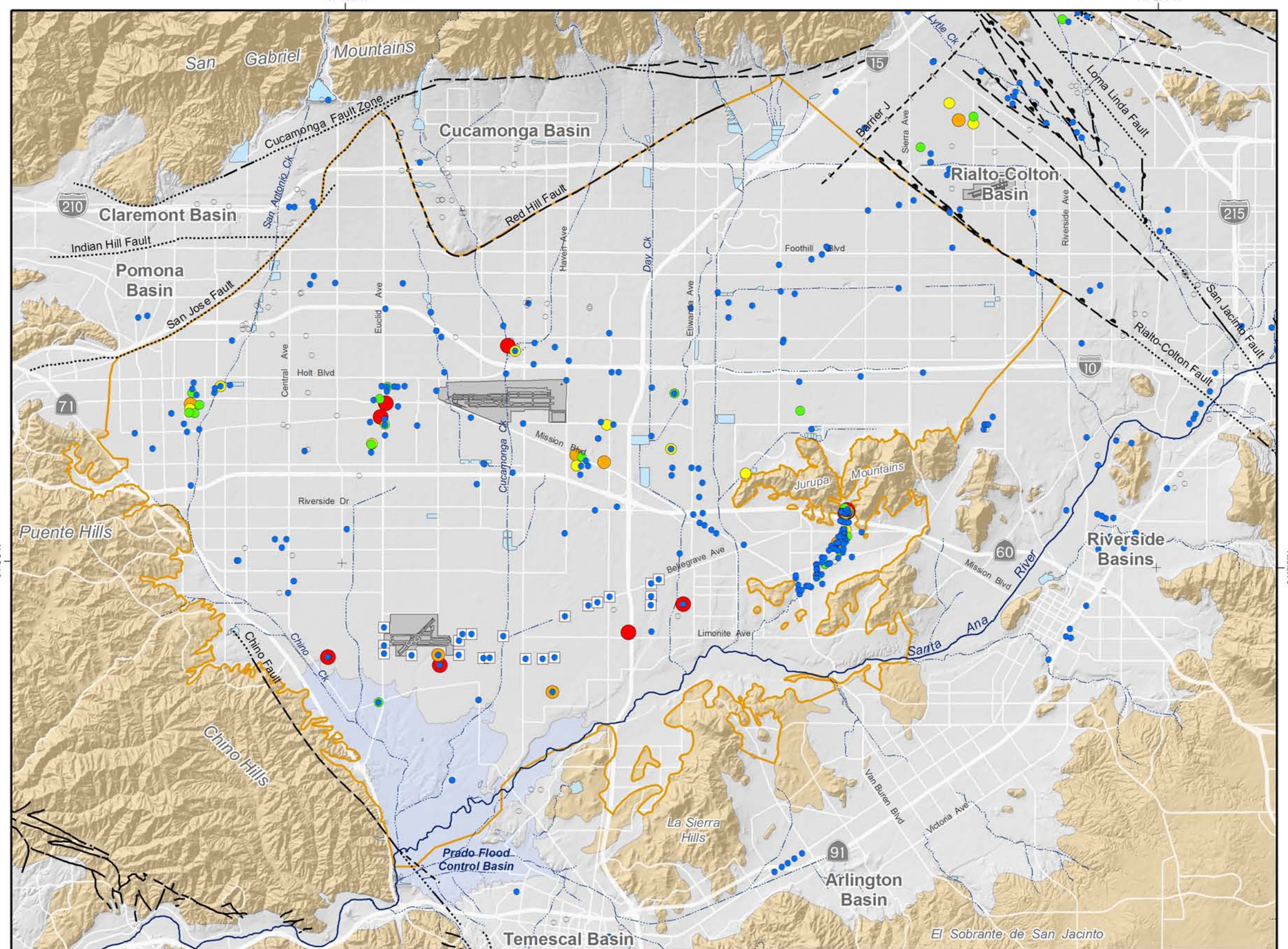
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Perchlorate in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-13



Main Features

Total Chromium (ug/L)

- ND
- < 25
- 25 - 50
- 50 - 100
- 100 - 200
- > 200

Primary EPA MCL = 100 ug/L
Primary CA MCL = 50 ug/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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Faults

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

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Date: 20090420
File: Figure_4-14.mxd

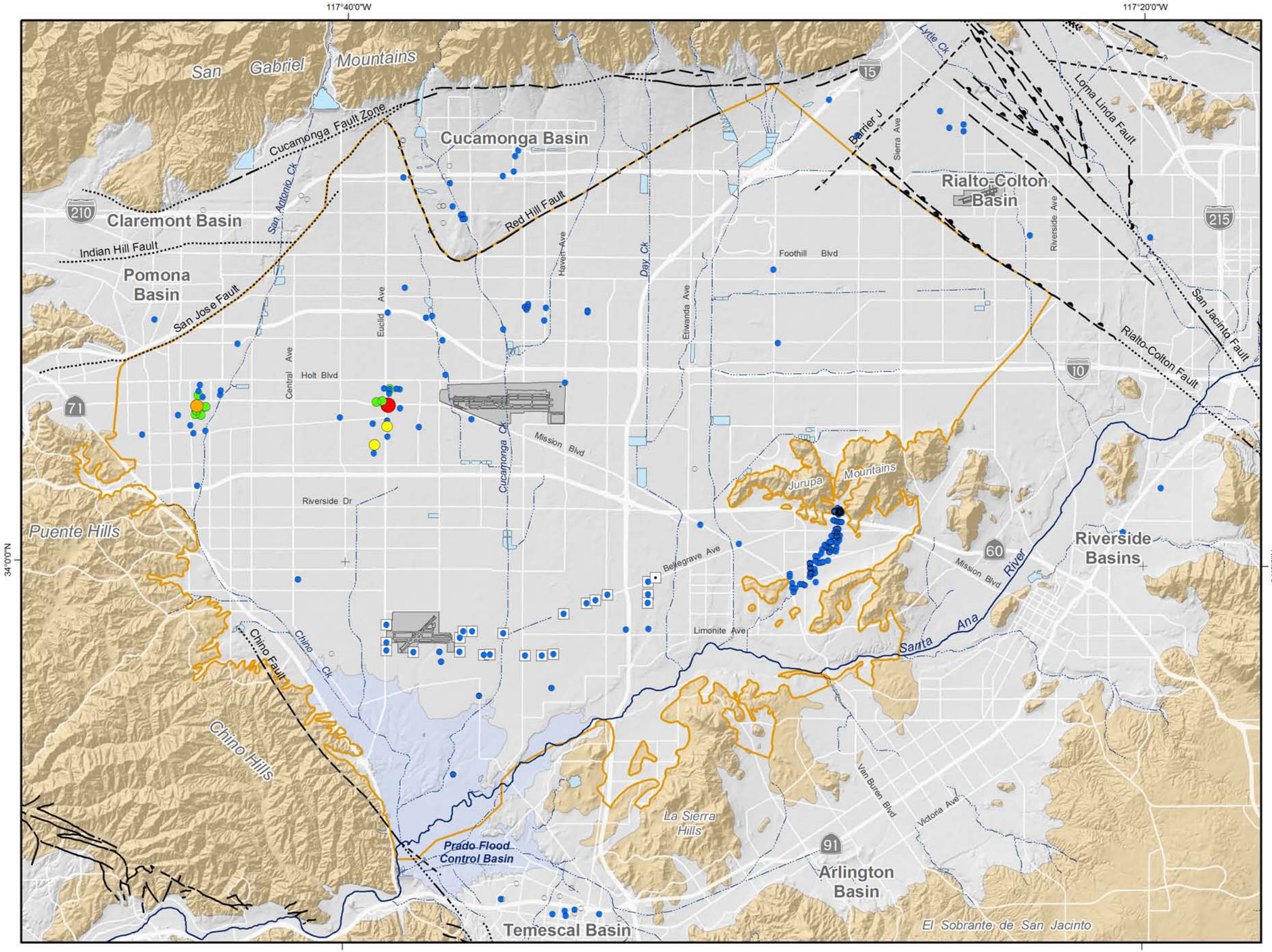
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Total Chromium in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-14



Main Features

Hexavalent Chromium (ug/L)

- ND
- < 25
- 25 - 50
- 50 - 100
- 100 - 200
- > 200

Currently no US EPA or CA EPA MCL

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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Faults

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

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Date: 20090420
File: Figure_4-15.mxd

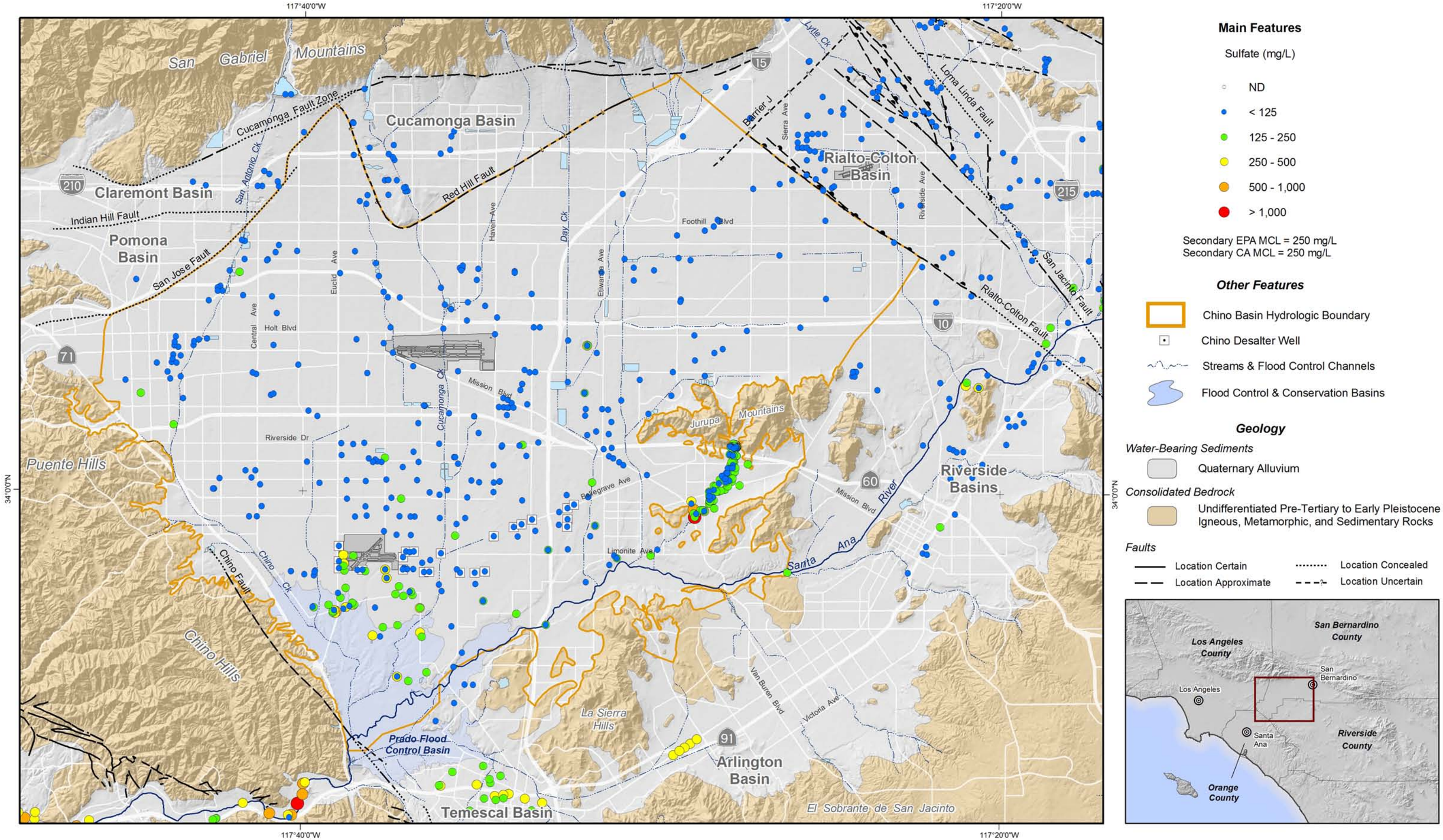
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Hexavalent Chromium in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-15



Main Features

Sulfate (mg/L)

- ND
- < 125
- 125 - 250
- 250 - 500
- 500 - 1,000
- > 1,000

Secondary EPA MCL = 250 mg/L
Secondary CA MCL = 250 mg/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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Faults

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

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Date: 20090420
File: Figure_4-16.mxd

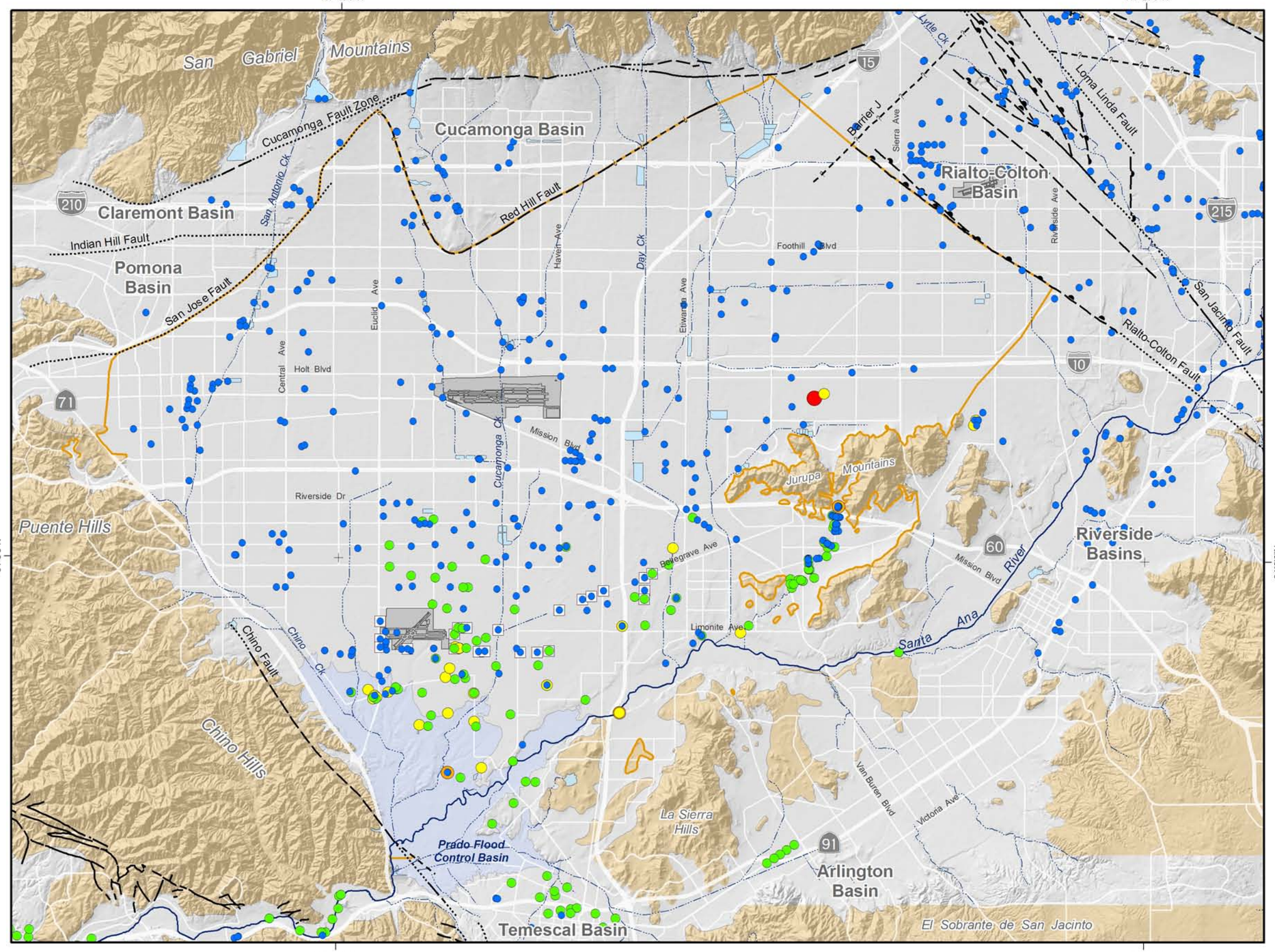
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Sulfate in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-16



Main Features

Chloride (mg/L)

- < ND
- < 125
- 125 - 250
- 250 - 500
- 500 - 1,000
- > 1,000

Secondary EPA MCL = 250 mg/L
Secondary CA MCL = 250 mg/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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Faults

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

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File: Figure_4-17.mxd

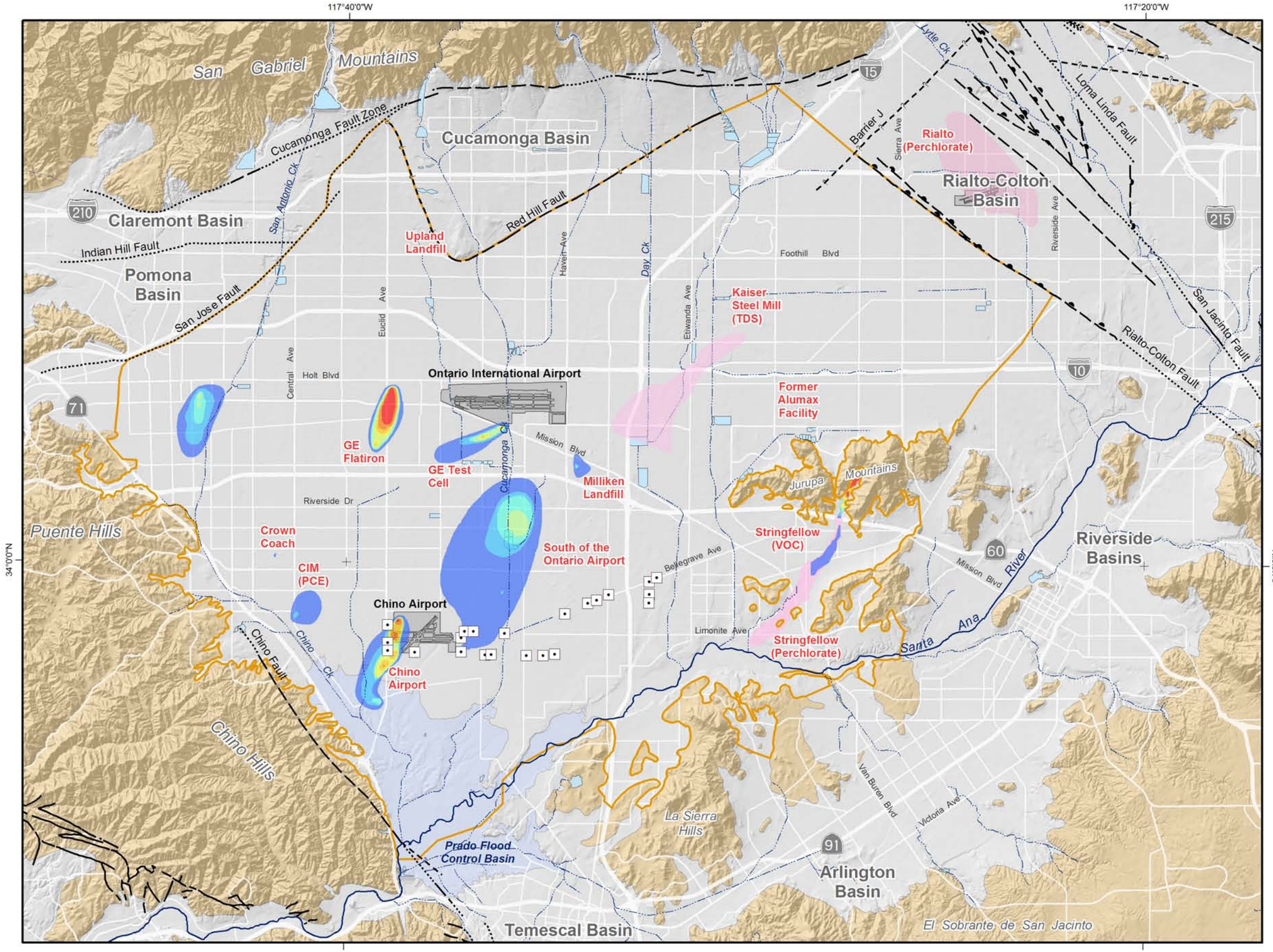
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Chloride in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-17



Plumes

VOC Concentration (ug/L)

- > 0 and ≤ 5
- > 5 and ≤ 10
- > 10 and ≤ 20
- > 20 and ≤ 50
- > 50 and ≤ 100
- > 100 and ≤ 200
- > 200 and ≤ 500
- > 500

VOC concentrations represent the maximum for the period 2003-2007. All VOC plumes are shown as TCE concentration except for CIM which is shown as PCE concentration. The Upland and Crown Coach plumes are of limited geographical extent and are barely visible at the scale of this map, although their general locations are labelled. Not shown on this map are perchlorate detections at wells widely distributed across the basin.

Other Plumes

Location of plumes (labelled by name and dominant contaminant)

Other Features

Chino Basin Hydrologic Boundary

Chino Desalter Well

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

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

Faults

Location Certain — Location Concealed

Location Approximate — Location Uncertain

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Date: 20090420
File: Figure_4-18.mxd

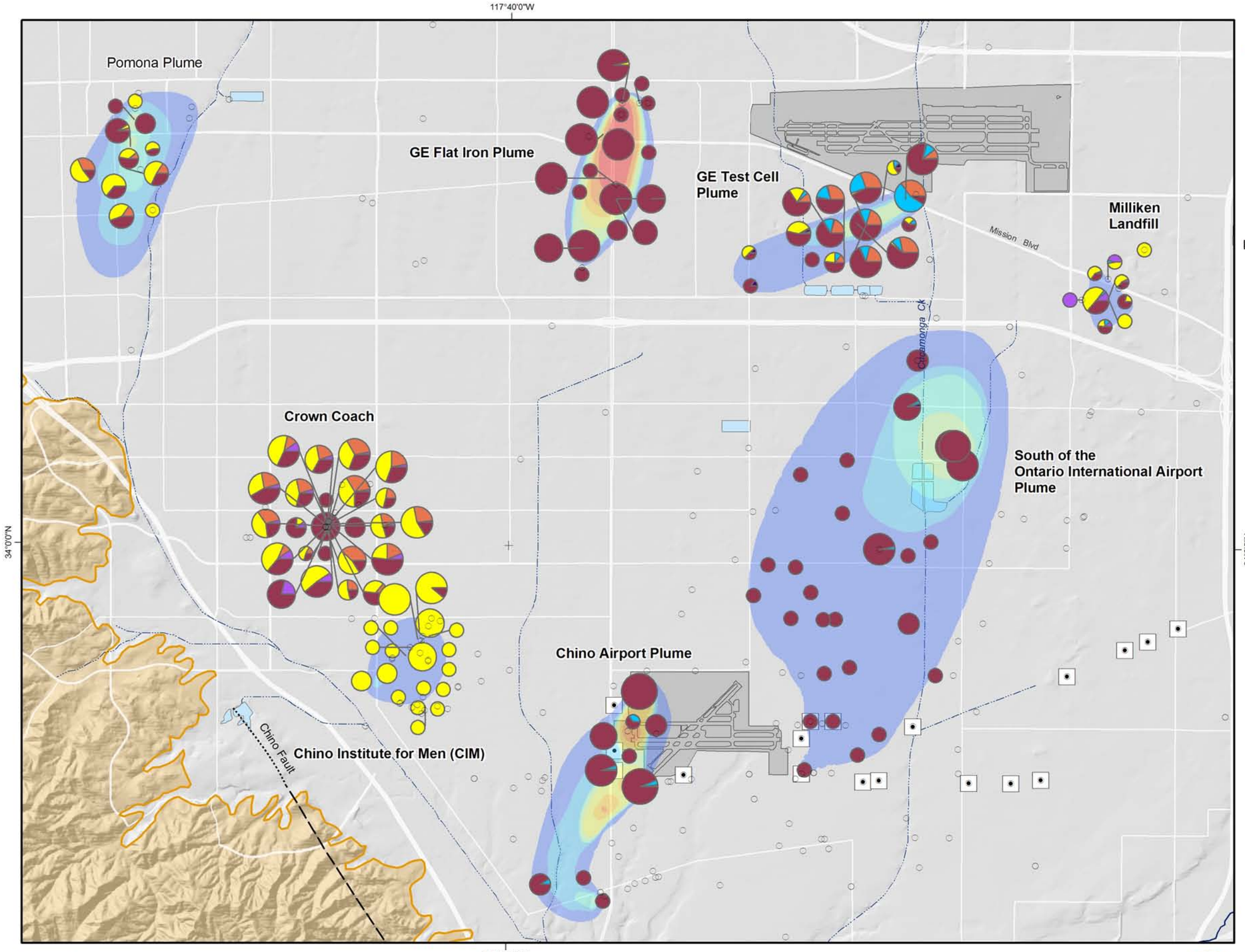
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Groundwater Contamination Plumes

Chino Basin Area (Updated June 2008)

Figure 4-18



Main Features

Pie Chart Symbols Display the Percent of Detectable TCE, PCE,and their Degradation Products (Percentage Based on Most Recent Sample Collected from 2007-2008)

- 1,1,1-Trichloroethane
- 1,1-Dichloroethane
- 1,1-Dichloroethene
- 1,2-Dichloroethane
- cis-1,2-Dichloroethene
- Tetrachloroethene (PCE)
- trans-1,2-Dichloroethene
- Trichloroethene (TCE)
- Vinyl Chloride

Symbol Size

Based on the Sum of TCE, PCE, and their Degradation By-Products Concentrations in Micrograms Per Liter (ug/L)

- 0.01 - 5
- 5 - 10
- 10 - 20
- 20 - 50
- > 50

Other Features

- Wells with Non-Detect Results for VOCs During Last Sample Event (2003 - 2008).
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

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File: Figure_4-19.mxd

117°40'0"W

0 0.9 1.8 2.7 Miles

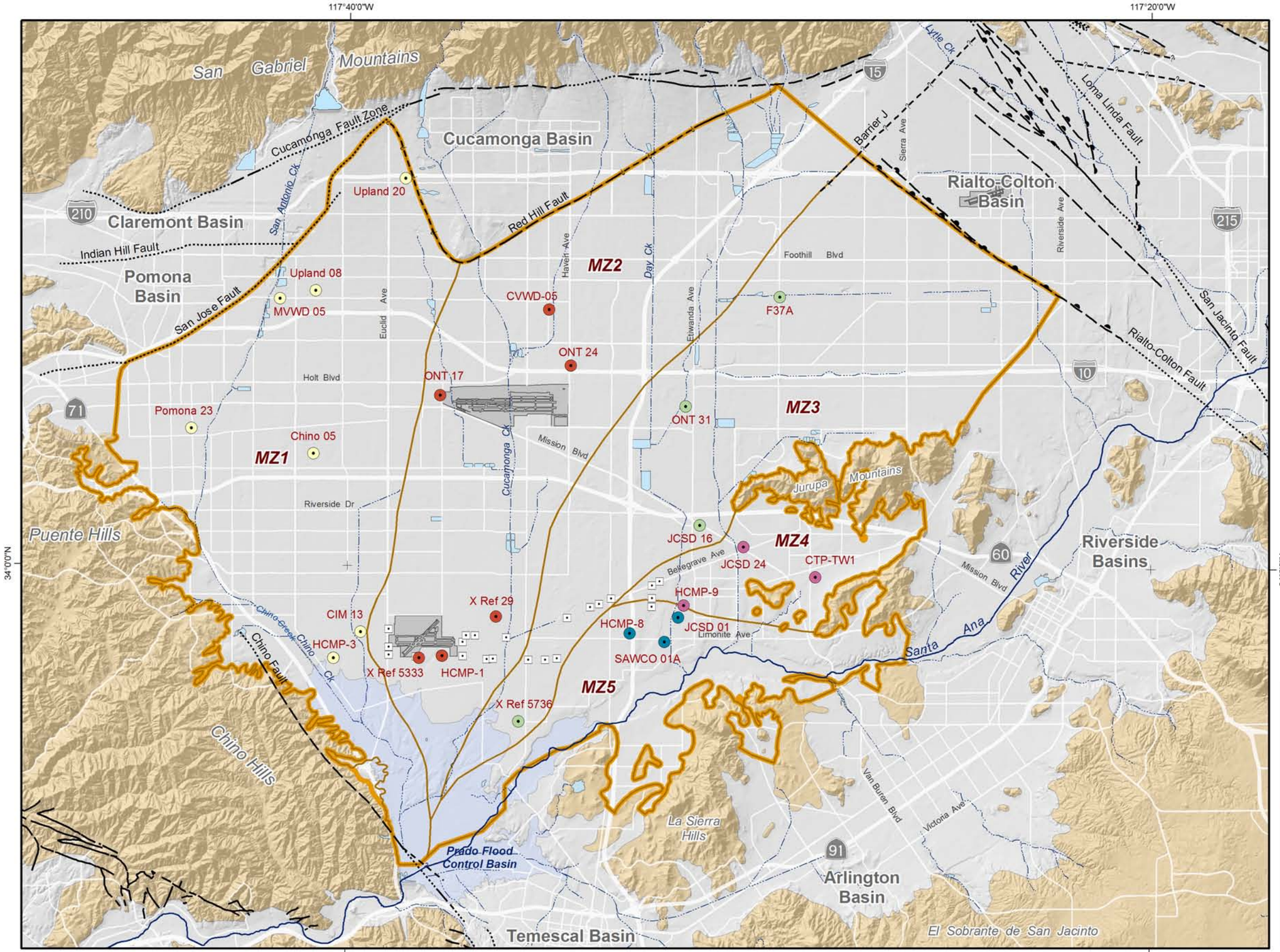
0 0.9 1.8 2.7 3.6 Kilometers

2008 State of the Basin Report
Groundwater Quality

VOC Pie Chart Comparisons

Wells Within and Adjacent to Groundwater Contamination Plumes

Figure 4-19



Main Features

- Chino Basin Hydrologic Boundary
- Chino Basin Management Zone Boundaries
- MZ1 Wells
- MZ2 Wells
- MZ3 Wells
- MZ4 Wells
- MZ5 Wells

Other Features

- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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Date: 20090515
File: Figure4-20.mxd

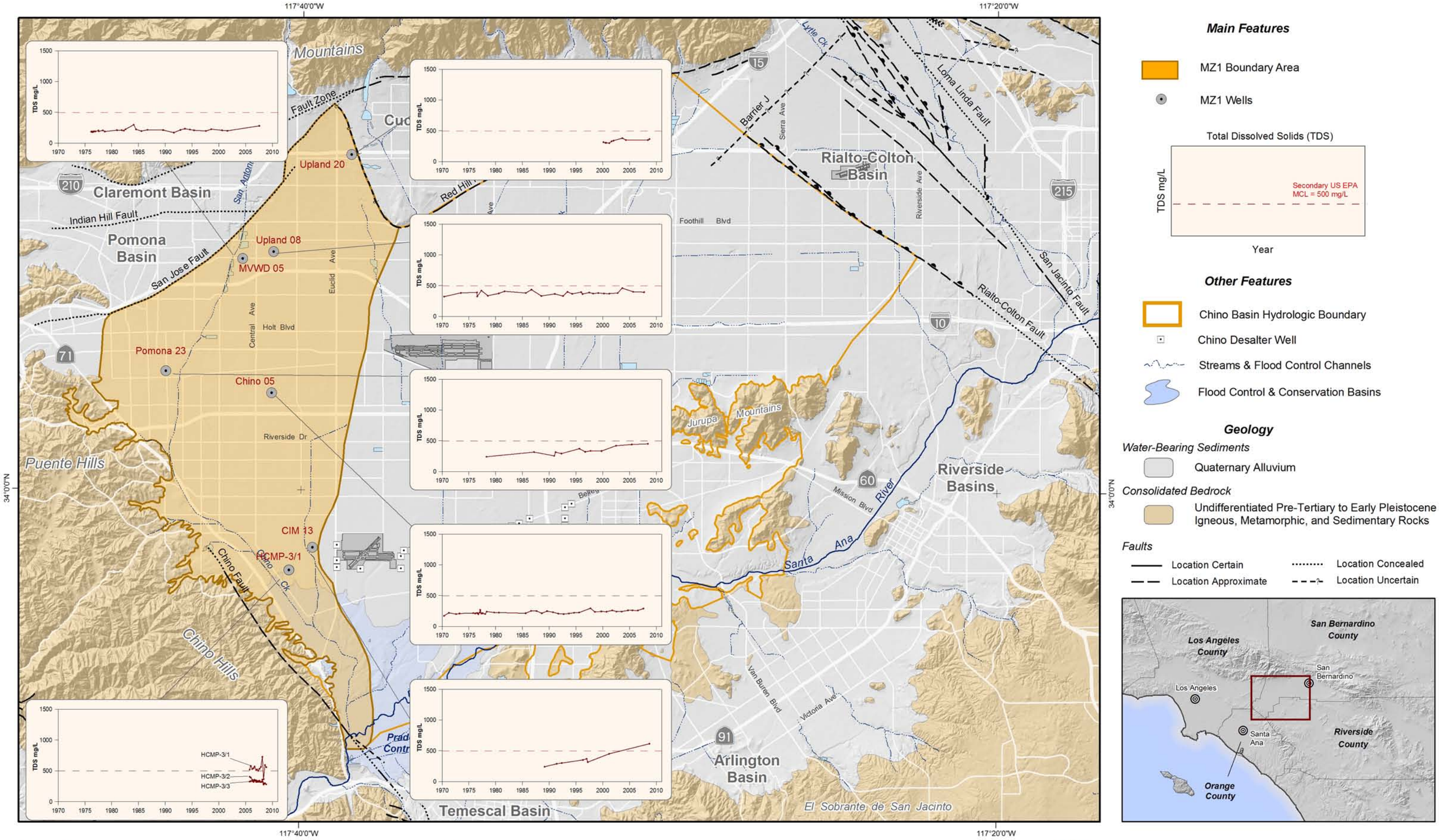
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Well Locations

Wells Used in Management Zone Water Quality Analyses

Figure 4-20



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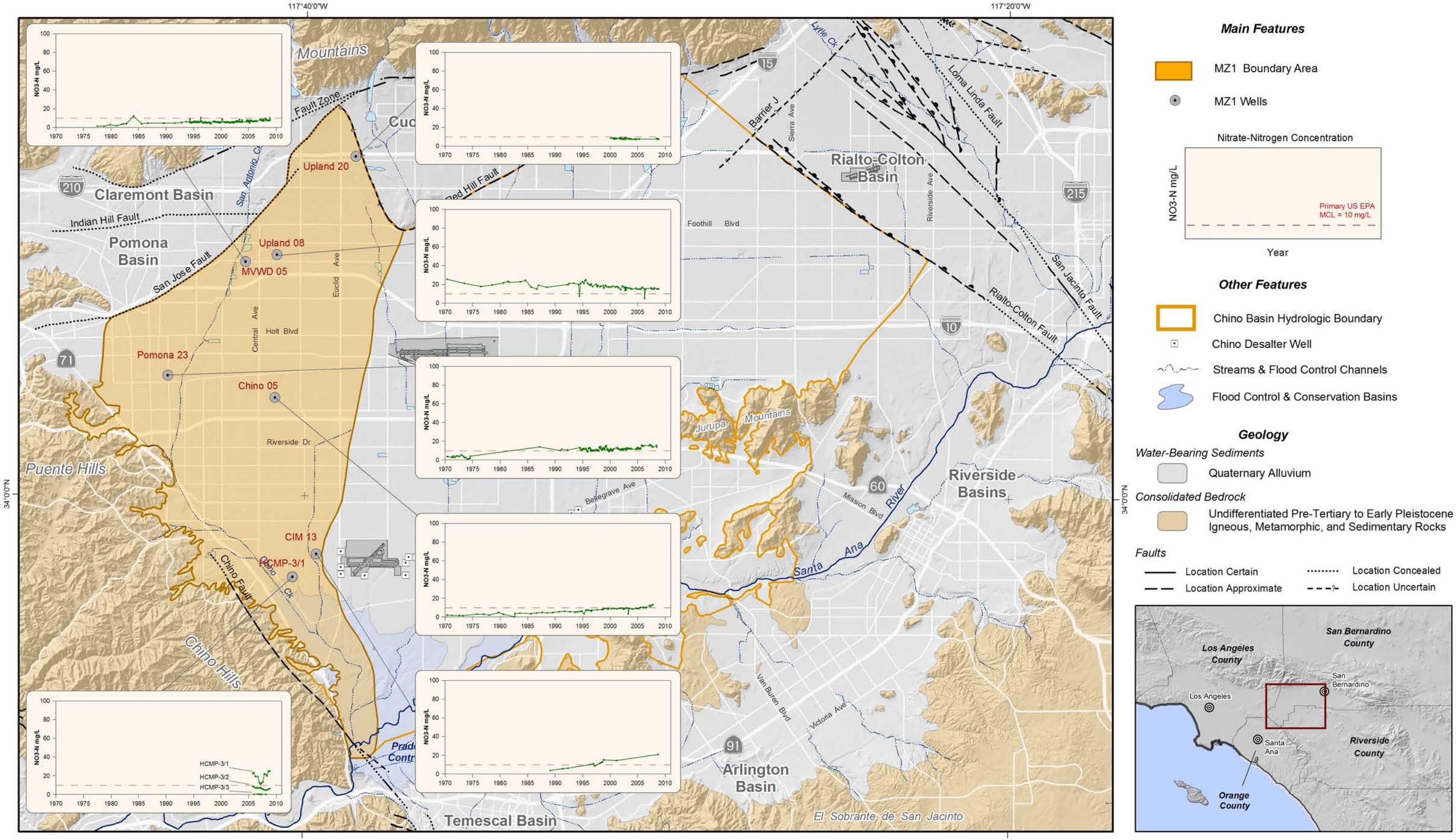
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Chino Basin Management Zone 1

Historical and Current Total Dissolved Solids Concentration

Figure 4-21



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File: Figure_4-22.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 KM

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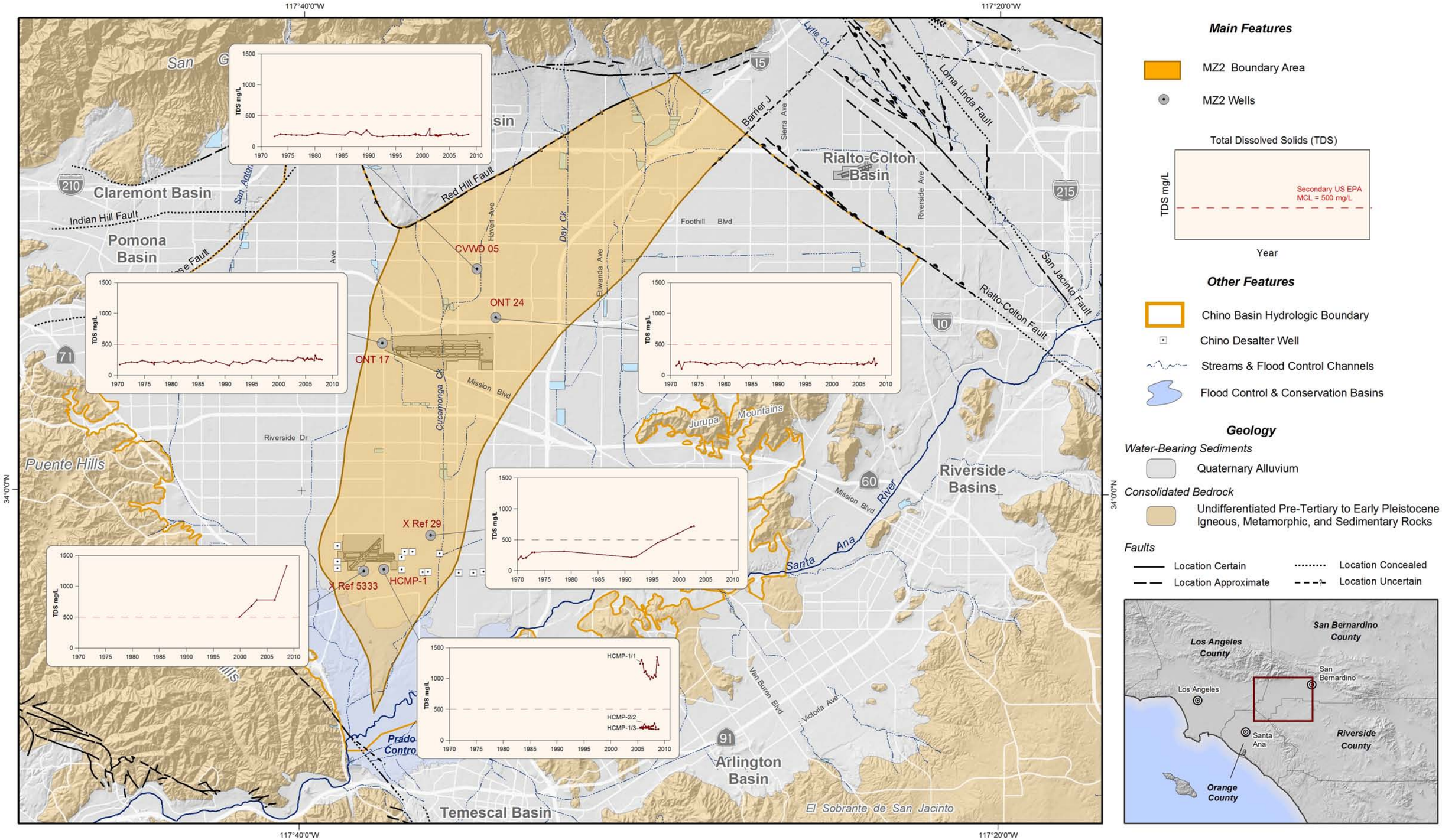
Groundwater Quality

Chino Basin Management Zone 1

Historical and Current Nitrate-Nitrogen Concentrations

Figure 4-22



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0 1 2 3 4 5 Miles
0 2 4 6 8 KM

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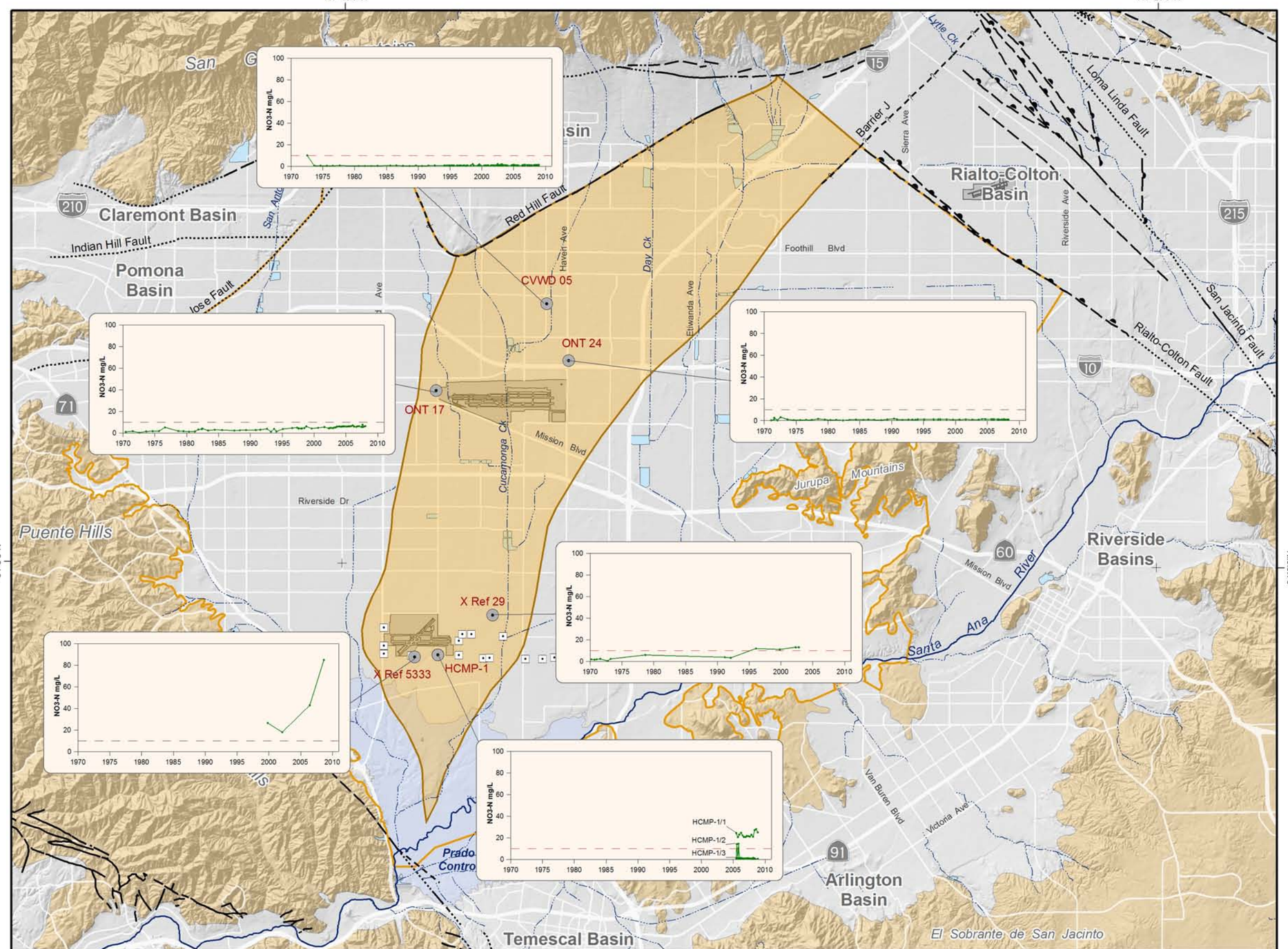
Chino Basin Management Zone 2

Historical and Current Total Dissolved Solids Concentration

Figure 4-23



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File: Figure_4-24.mxd

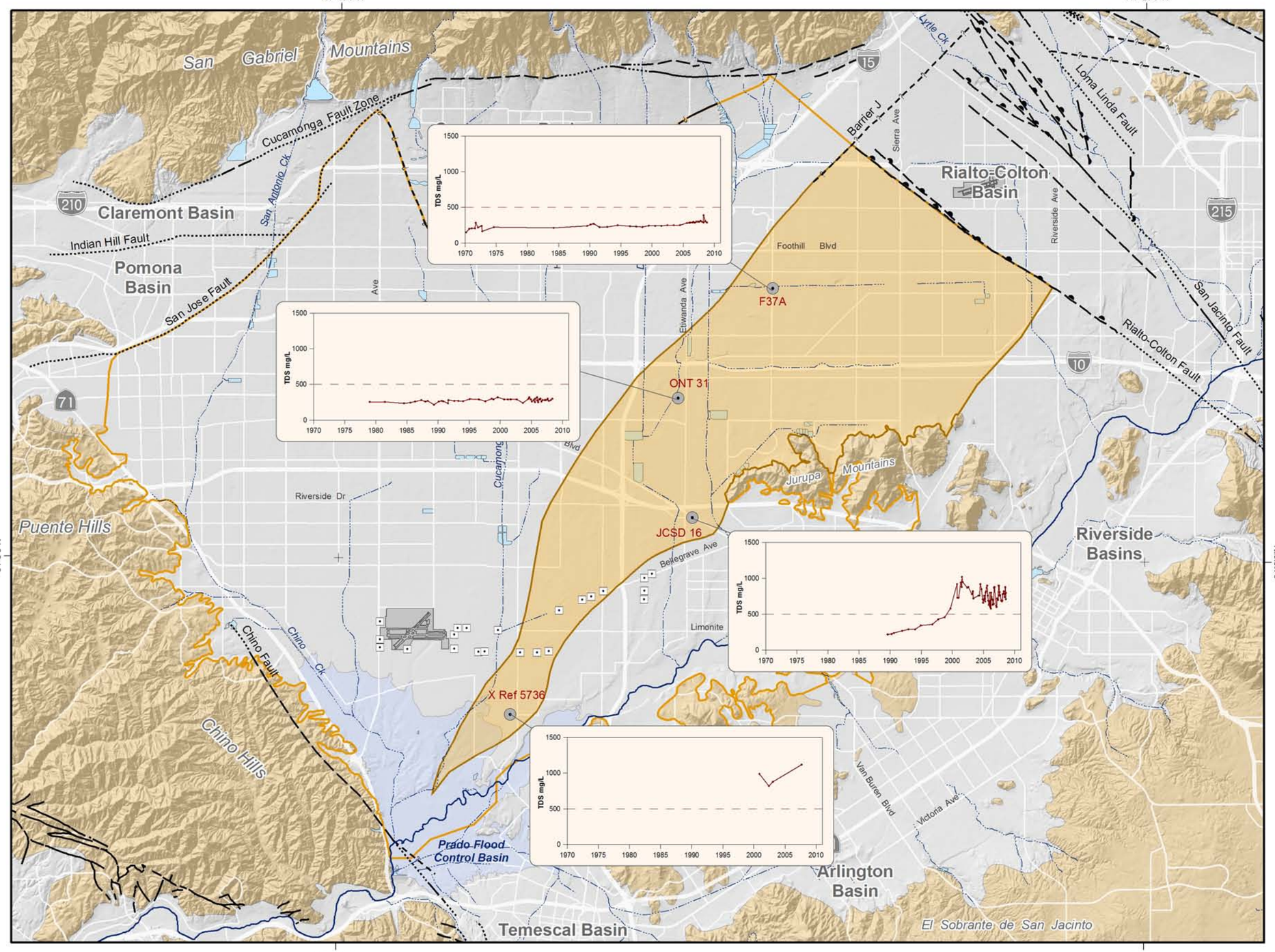
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Chino Basin Management Zone 2

Historical and Current Nitrate-Nitrogen Concentration

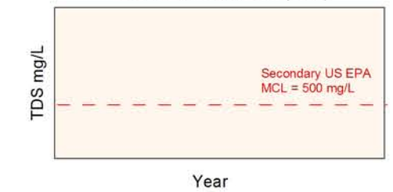
Figure 4-24



Main Features

- MZ3 Boundary Area
- MZ3 Wells

Total Dissolved Solids (TDS)



Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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File: Figure_4-25.mxd

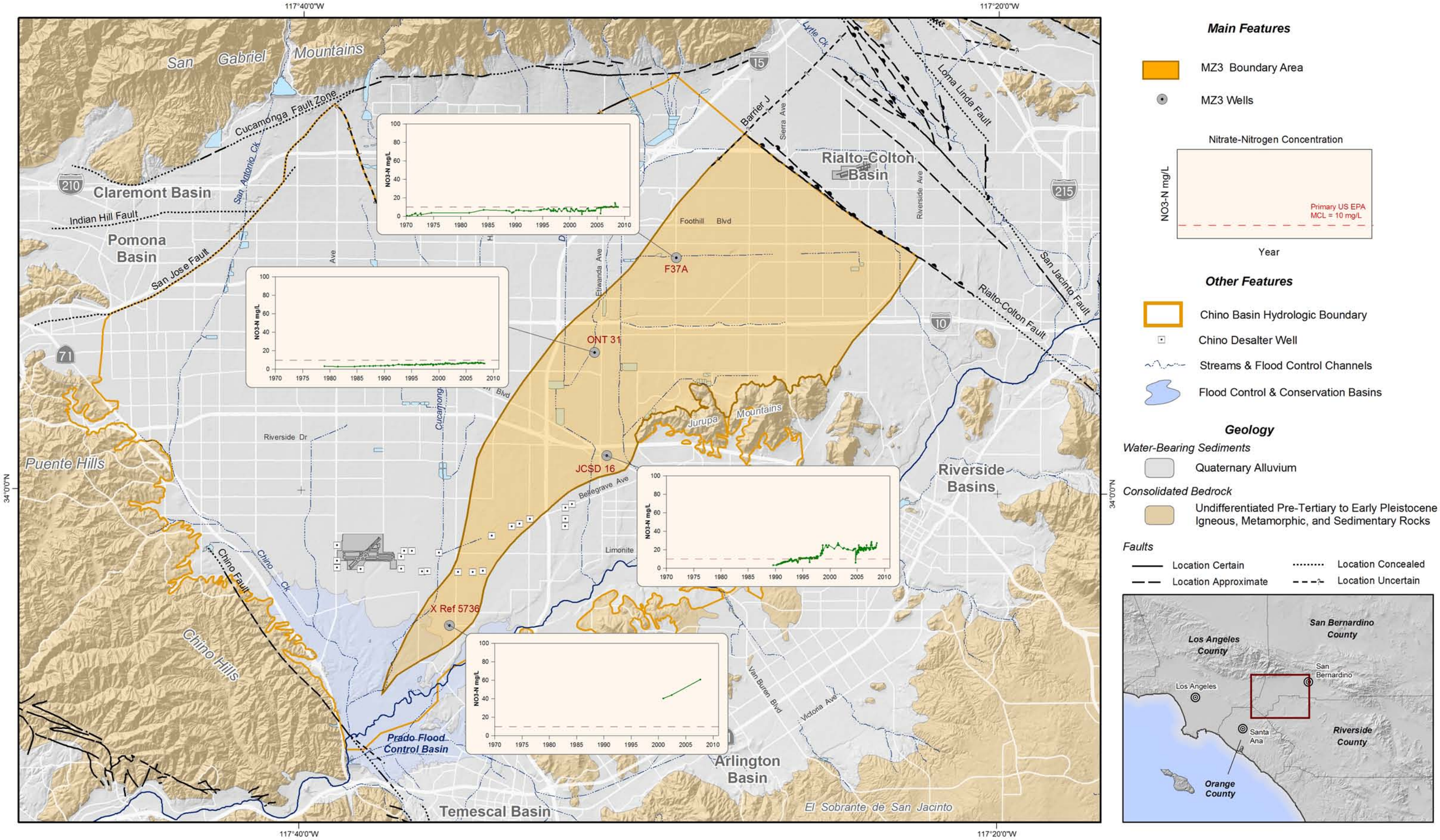
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Chino Basin Management Zone 3

Historical and Current Total Dissolved Solids Concentration

Figure 4-25



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File: Figure_4-26.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 KM

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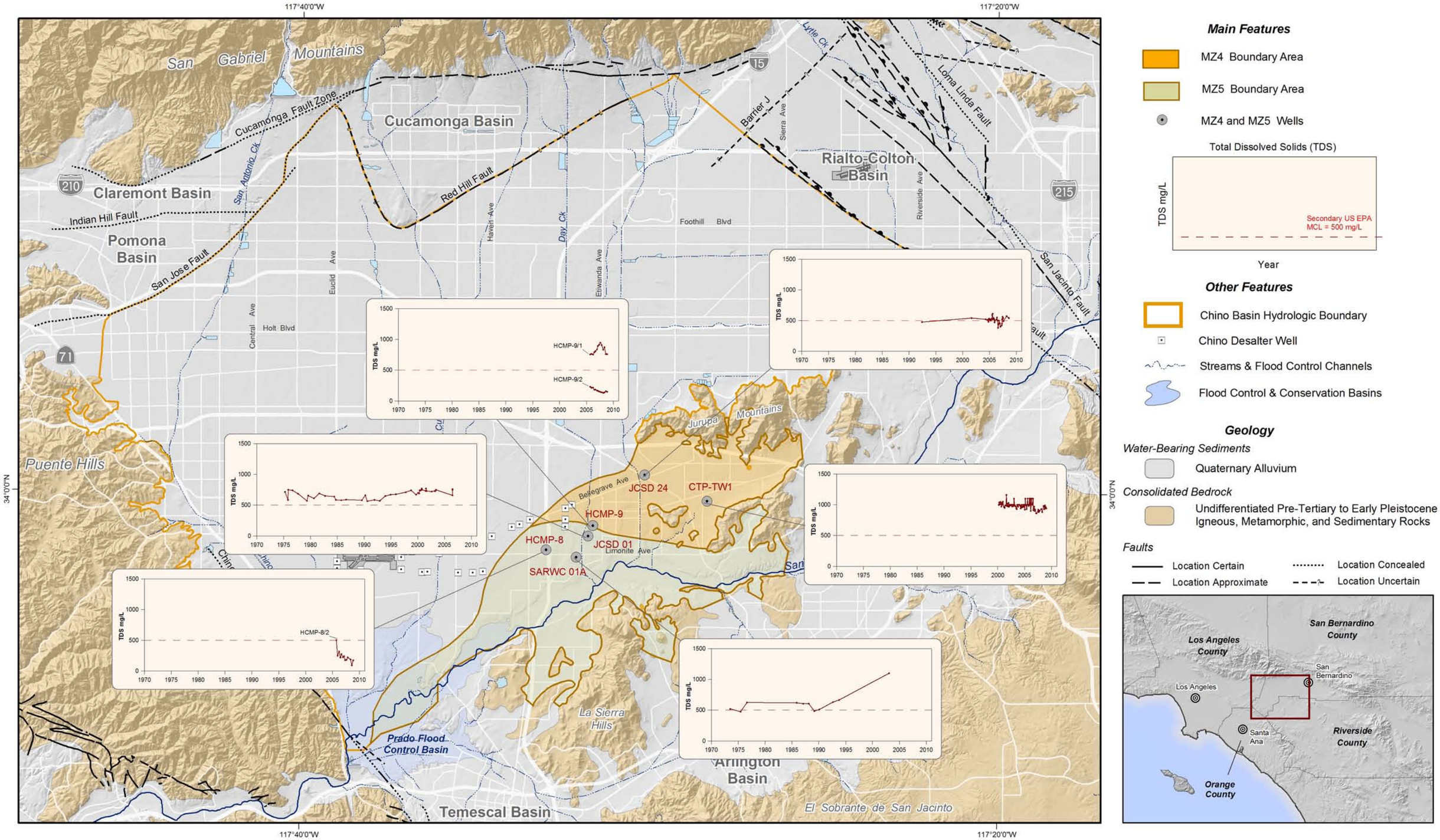
Groundwater Quality

Chino Basin Management Zone 3

Historical and Current Nitrate-Nitrogen Concentration

Figure 4-26



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File: Figure_4-27.mxd

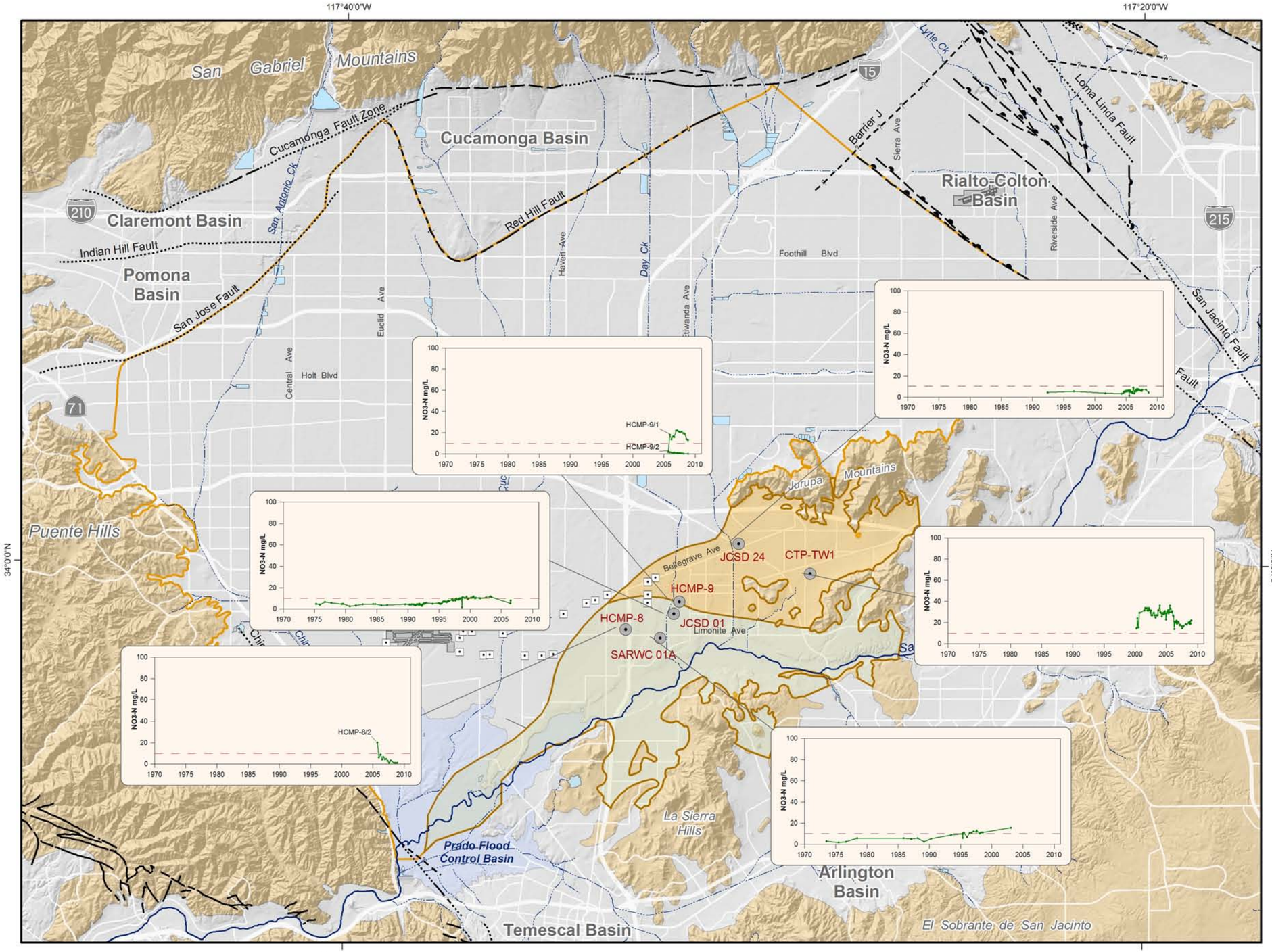
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Chino Basin Management Zone 4 and Zone 5

Historical and Current Total Dissolved Solids Concentration

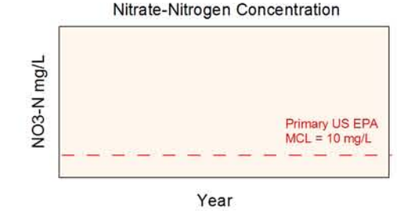
Figure 4-27



Main Features

- MZ4 Boundary Area
- MZ5 Boundary Area
- MZ4 and MZ5 Wells

Nitrate-Nitrogen Concentration



Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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File: Figure_4-28.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Chino Basin Management Zone 4 and Zone 5

Historical and Current Nitrate-Nitrogen Concentration

Figure 4-28

5.1 Background

One of the earliest indications of land subsidence in Chino Basin was the appearance of ground fissures in the City of Chino. These fissures appeared as early as 1973, but an accelerated occurrence of ground fissuring ensued after 1991 and resulted in damage to existing infrastructure (see Figure 5-1). The scientific studies that followed attributed the fissuring phenomenon to differential land subsidence caused by pumping of the underlying aquifer system and the consequent drainage and compaction of aquitard sediments.

5.1.1 OBMP Program Element 4

In 1999, the OBMP Phase I Report (WEI, 1999) identified pumping-induced drawdown and subsequent aquifer-system compaction as the most likely cause of land subsidence and ground fissuring observed in MZ1. Program Element 4 of the OBMP, *Develop and Implement a Comprehensive Groundwater Management Plan for Management Zone 1*, called for the development and implementation of an interim management plan for MZ1 that would:

- Minimize subsidence and fissuring in the short-term.
- Collect the information necessary to understand the extent, rate, and mechanisms of subsidence and fissuring.
- Formulate a management plan to abate future subsidence and fissuring or reduce it to tolerable levels.

In 2000, the Implementation Plan in the Peace Agreement called for an aquifer-system and land subsidence investigation in the southwestern region of MZ1 to support the development of a management plan for MZ1 (second and third bullets above). This investigation was titled the MZ1 Interim Monitoring Program (IMP). From 2001-2005, Watermaster developed, coordinated, and conducted the IMP under the guidance of the MZ1 Technical Committee, which is composed of representatives from all major MZ1 producers and their technical consultants. Specifically, the producers represented on the MZ1 Technical Committee include: the Agricultural Pool, the Cities of Chino, Chino Hills, Ontario, Pomona, and Upland; the Monte Vista Water District; the Southern California Water Company; and the State of California (CIM).

The main conclusions derived from the IMP were:

1. Groundwater production from the deep confined aquifer system in this area causes the greatest stress to the aquifer system. In other words, pumping of the deep aquifer system causes water level drawdowns that are much greater in magnitude and lateral extent than drawdowns caused by pumping of the shallow aquifer system.
2. Water level drawdowns due to pumping of the deep aquifer system can cause inelastic (permanent) compaction of the aquifer-system sediments, which results in permanent land subsidence. The initiation of inelastic compaction within the aquifer system was identified during this investigation when water levels fell below

a depth of about 250 feet in the PA-7 piezometer at Ayala Park.

3. The current state of aquifer-system deformation in south MZ1 (in the vicinity of Ayala Park) is essentially elastic. Very little inelastic (permanent) compaction is now occurring in this area, which is in contrast to the recent past when about 2.2 feet of land subsidence, accompanied by ground fissuring, occurred from about 1987 to 1995.
4. During this study, a previously undetected barrier to groundwater flow was identified. This barrier is located within the deep aquifer system and is aligned with the historical zone of ground fissuring. Pumping from the deep aquifer system is limited to the area west of the barrier, and the resulting drawdowns do not propagate eastward across the barrier. Thus, compaction occurs within the deep system on the west side of the barrier but not on the east side, which causes concentrated differential subsidence across the barrier and creates the potential for ground fissuring.
5. InSAR and ground level survey data indicate that permanent subsidence in the central region of MZ1 (north of Ayala Park) has occurred in the past and continues to occur today. The InSAR data also suggest that the groundwater barrier extends northward into central MZ1. These observations suggest that the conditions that very likely caused ground fissuring near Ayala Park in the 1990s are also present in central MZ1 and should be studied in more detail.

The investigation methods, results, and conclusions (listed above) are described in detail in the MZ1 Summary Report (WEI, 2006b). The investigation provided enough information for Watermaster to develop Guidance Criteria for the MZ1 producers in the investigation area that, if followed, would minimize the potential for subsidence and fissuring during the completion of the MZ1 Subsidence Management Plan (MZ1 Plan). The Guidance Criteria formed the basis for the MZ1 Plan, which was developed by the MZ1 Technical Committee and approved by Watermaster in October 2007. In November 2007, the California Superior Court, which retains continuing jurisdiction over the Chino Basin Adjudication, approved the MZ1 Plan and ordered its implementation.

The MZ1 Plan includes a listing of Managed Wells subject to the plan, a map of the so-called Managed Area in southern MZ1, an initial threshold water level (Guidance Level) at an index well in the Managed Area (245 feet below the top of the PA-7 well casing at Ayala Park in Chino [ft-brp]), and a plan for ongoing monitoring and annual reporting.

5.1.2 OBMP Program Element 1

The OBMP Phase I Report also noted that land subsidence was occurring in other parts of the basin besides Chino. Program Element 1 (PE1) of the OBMP and the Implementation Plan, *Develop and Implement a Comprehensive Monitoring Program*, called for basin-wide analysis of land subsidence via ground-level surveys and InSAR and ongoing monitoring based on the analysis of the subsidence data. Through 2008, basin-wide monitoring has been based on the ground-level survey data and InSAR data collected as part of the IMP and the MZ1 Plan implementation.

5.2 Ground-Level Monitoring Program

Implementation of the MZ1 Plan began in 2008. The MZ1 Plan calls for (1) the continued scope and frequency of monitoring implemented during the IMP within the MZ1 Managed Area and (2) expanded monitoring of the aquifer system and land subsidence in other areas of the Chino Basin where the IMP indicated concern for future subsidence and ground fissuring. The expanded monitoring efforts outside of the MZ1 Managed Area are consistent with the requirements PE1.

Watermaster's current ground-level monitoring program includes:

- *Piezometric Levels*. Piezometric levels are an important part of the ground-level monitoring program because piezometric changes are the mechanism for aquifer-system deformation and land subsidence. Watermaster monitors piezometric levels at about 33 wells in MZ1. Currently, a pressure-transducer/data-logger is installed at each of these wells and records one water level reading every 15 minutes. And, Watermaster records depth-specific water levels at the piezometers located at the Ayala Park Extensometer facility every 15 minutes.
- *Aquifer-System Deformation*. Watermaster records aquifer-system deformation at the Ayala Park Extensometer facility (see Figure 5-1). At this facility, two extensometers, completed at 550 ft-bgs and 1,400 ft-bgs, record the vertical component of aquifer-system compression and/or expansion once every 15 minutes (synchronized with the piezometric measurements).
- *Vertical Ground-Surface Deformation*. Watermaster monitors vertical ground-surface deformation via the ground-level surveying and remote sensing (InSAR) techniques established during the IMP. Currently, ground-level surveys are being conducted in the MZ1 Managed Area once per year. InSAR is the only monitoring technique being employed outside the MZ1 Managed Area, and InSAR data is analyzed once per year.
- *Horizontal Ground-Surface Deformation*. Watermaster monitors horizontal ground-surface displacement across the eastern side of the subsidence trough and the adjacent area east of the barrier/fissure zone. These data, obtained by electronic distance measurements (EDMs), are used to characterize the horizontal component of land surface displacement caused by groundwater production on either side of the fissure zone. Currently, Watermaster is collecting EDMs at a semiannual frequency (Spring/Fall) between east/west aligned benchmarks on Eucalyptus, Edison, Schaefer, and Philadelphia Avenues.

5.3 Results of Ground-Level Monitoring Program

At the conclusion of each fiscal year, the MZ1 Plan requires that Watermaster produce an MZ1 Annual Report that includes the results of the past year's monitoring. The 2008 MZ1 Annual Report (currently in preparation) will be the first such report published by Watermaster and will focus primarily on the intensive monitoring being conducted in the MZ1 Managed Area.

The ground-level monitoring results described below will focus primarily on the ground-level

survey and InSAR monitoring being conducted across the entire Chino Basin (PE1).

5.3.1 InSAR

Figure 5-2 is a map of the Chino Basin that shows InSAR results for 2005-2008. The InSAR data are generally coherent and useful in the northern urbanized areas of the basin but are generally incoherent and not as useful in the southern agricultural areas (light brown areas in Figure 5-2). This pattern of "coherence" relative to land use is typical of InSAR data.

Figure 5-2 shows that ground motion during 2005-2008 was relatively minor (less than about -0.02 ft of subsidence) in the northeastern parts of the basin, such as Fontana and Rancho Cucamonga. However, in northwestern parts of the basin, land subsidence of over -0.14 ft and -0.12 ft have been measured by InSAR in Pomona and Ontario, respectively.

Figure 5-2 also shows that ground motion is influenced by geologic faults that cut through the aquifer system and act as barriers to groundwater flow. For instance, the land surface elevation has increased (uplift) in the southern portion of the Cucamonga Basin—just north of the Red Hill Fault. The San Jose Fault is clearly influencing the pattern of ground motion in the Claremont, Pomona, and Chino Basins. Of most concern, with respect to the potential for ground fissuring, is the differential ground motion across the San Jose Fault between the Pomona and Chino Basins.

Historically, the City of Chino has experienced the most land subsidence (e.g. over -2.0 ft of subsidence within the MZ1 Managed Area during 1987-1999), but for 2005-2008, the InSAR data indicate that land subsidence was relatively minor in this area (less than about -0.04 ft).

5.3.2 Ground-Level Surveys

Figure 5-3 is a map of the western half of Chino Basin that shows both the InSAR and ground-level survey results for 2005-2008. The ground-level survey data generally corroborate the patterns and magnitude of ground motion shown in the InSAR data with a few exceptions:

- The ground-level survey data indicate a greater magnitude of land subsidence in the MZ1 Managed Area (maximum subsidence = -0.10 ft) than the InSAR data (maximum subsidence = -0.05 ft).
- In some areas, the ground-level survey data indicate minor subsidence while the InSAR data indicate minor uplift. In these instances, the difference between the ground-level survey and InSAR data is generally less than about 0.05 ft.

One advantage of the ground-level survey data is that it can provide information on ground motion in areas where InSAR data is absent. See, for example, the area shown on Figure 5-3 near at the intersection of Euclid Avenue and Kimball Avenue where the Chino I Desalter wells pump groundwater from the deep aquifer system. The survey data indicated maximum land subsidence of -0.24 ft in this area during 2005-2008.

5.4 Analysis of Ground Surface Displacement

Historical ground motion data (shown in Figure 5-1) and recent ground motion data (shown in Figures 5-2 and 5-3) indicate that land subsidence concerns in the Chino Basin are confined to certain portions of MZ1 and MZ2. These "areas of subsidence concern" are delineated and labeled in Figures 5-2 and 5-3. Besides the MZ1 Managed Area, Watermaster has designated four additional areas of subsidence concern: the Central MZ1 Area, the Pomona Area, the Ontario Area, and the Southeast Area.

The recent land subsidence that has been occurring in each of these areas is mainly controlled by recent and/or historical changes in groundwater levels, which, in turn, are mainly controlled by pumping and recharge.

Below, the relationships between groundwater pumping, aquifer recharge, groundwater levels, and ground motion, which help to reveal cause and effect; the current state of ground motion; and the nature of current land subsidence (i.e. elastic and/or inelastic, differential, etc.), are discussed by area of concern.

5.4.1 MZ1 Managed Area

Within the MZ1 Managed Area, pumping of the deep confined aquifer system causes water level drawdowns that are much greater in magnitude and lateral extent than drawdowns caused by pumping of the shallow aquifer system. Artificial recharge in the northern portions of MZ1 appears to have no immediate impact on groundwater levels in the deep aquifer system in the MZ1 Managed Area. These conclusions were established during the IMP (WEI, 2006b) and are shown graphically in Figure 5-4.

Figures 5-4 and 5-5 also show vertical ground motion at the Deep Extensometer at Ayala Park and at a benchmark monument (137/53) at the corner of Schaefer Avenue and Central Avenue. About -2.5 ft of subsidence occurred in portions of the MZ1 Managed Area from 1987-2000, but very little inelastic subsidence has occurred since 2000, and no additional ground fissuring has been observed.

Another conclusion of the IMP was that groundwater-level drawdowns due to pumping of the deep aquifer system can cause inelastic (permanent) compaction of the aquifer-system sediments, which results in permanent land subsidence. The initiation of inelastic compaction within the aquifer system was identified during the IMP when water levels fell below a depth of about 250 feet in the PA-7 piezometer at Ayala Park. From 2005 to 2008, water levels at PA-7 did not decline below 250 ft-brp , and very little, if any, inelastic compaction was recorded in the MZ1 Managed Area. Data from the MZ1 Managed Area are further analyzed in the 2008 MZ1 Annual Report (in preparation).

The IMP also identified a previously undetected barrier to groundwater flow on the east side of the MZ1 Managed Area. This barrier is located within the deep aquifer system and is aligned with the historical zone of ground fissuring (see Figure 5-3). Pumping from the deep aquifer system has been limited to the area west of the barrier, and the resulting drawdowns have not propagated eastward across the barrier. Thus, historical compaction occurred within the deep system on the west side of the barrier but not on the east side. Concentrated

differential subsidence across the barrier is the most likely cause of the ground fissuring observed in the early 1990s. The rate of land subsidence decreased to almost zero in the MZ1 Managed Area in the mid-1990s, and no additional ground fissuring has been observed.

5.4.2 Central MZ1 Area

The Central MZ1 Area is located directly north of the MZ1 Managed Area (see Figure 5-3). Figures 5-6 and 5-7 display time histories of groundwater pumping, aquifer recharge, groundwater levels, and ground motion in the Central MZ1 Area.

The ground motion time histories for Central MZ1 is similar to that of the MZ1 Managed Area—as much as -2.2 ft of inelastic subsidence occurred at the corner of Philadelphia and Monte Vista Avenue from 1987-2000, but very little inelastic subsidence has occurred since 2000. This similarity suggests a relationship to the causes of land subsidence in the MZ1 Managed Area; however, there is very little historical groundwater level data in this area to confirm this relationship.

Most of the wells with historical groundwater level records are in the northern part of Central MZ1 (see Figure 5-3) where historical subsidence was not as pronounced. From about 1935 to 1978, groundwater levels in these wells declined by about 150 ft. Groundwater levels increase by about 50 ft during the 1980s and remained relatively stable until 2005. Since 2005, groundwater levels have increased by about 25 ft, which is likely due to decreased pumping and increased recharge in MZ1.

5.4.3 Pomona Area

The Pomona Area is located directly north of the Central MZ1 Area (see Figure 5-3). Figures 5-8 and 5-9 display time histories of groundwater pumping, aquifer recharge, groundwater levels, and ground motion in the Pomona Area.

The ground motion time histories of the Pomona Area is based solely on InSAR data from 1992 to 1995, 1995 to 2000, and 2005 to 2008. These data indicate that land subsidence has occurred continuously in this area, generally at a rate of about 0.07 ft/yr. The rate of subsidence appears to be decreasing gradually with time.

From about 1935 to 1978, groundwater levels in the Pomona Area declined by about 175 ft or more. Groundwater levels increased by about 50 to 100 ft during the 1980s. From about 1990 to 2004, groundwater levels declined again by about 25 to 50 ft. And from 2004 to 2008, groundwater levels increased by about 25 to 50 ft. The groundwater level changes from 1990 to 2008 appear to be closely related to pumping and recharge in MZ1.

The observed, continuous land subsidence cannot be explained entirely by the corresponding changes in groundwater levels during this time (1992-2008). A plausible explanation for the subsidence is that thick, slowly-draining aquitards are compacting in response to the historical drawdowns that occurred from 1935 to 1978 (see Figure 5-9).

Lastly, the InSAR data in Figure 5-3 shows a steep gradient of subsidence across the San Jose Fault, indicating the potential for the accumulation of horizontal strain in the shallow

sediments and the possibility of ground fissuring. Ground fissuring is the main subsidence-related threat to infrastructure.

5.4.4 Ontario Area

The Ontario Area is located east of the Central MZ1 and the Pomona Areas (see Figure 5-3). Figures 5-10 and 5-11 display time histories of groundwater pumping, aquifer recharge, groundwater levels, and ground motion in the Ontario Area.

The ground motion time histories of the Ontario Area is based solely on InSAR data from 1992 to 1995, 1995 to 2000, and 2005 to 2008. These data indicate that land subsidence has occurred continuously in this area, generally at a rate of about 0.06 ft/yr. The rate of subsidence appears to be decreasing gradually with time.

From about 1935 to 1978, groundwater levels in the Ontario Area declined by about 125 ft. Groundwater levels increased by about 10 to 20 ft during the early 1980s and have remained relatively stable since then.

The observed continuous land subsidence from 1992 to 2008 is not explained by the relatively stable groundwater levels. A plausible explanation for the subsidence is that thick, slowly-draining aquitards are compacting in response to the historical drawdowns that occurred from 1935 to 1978 (see Figure 5-11).

5.4.5 Southeast Area

The Southeast Area is located east of the MZ1 Managed Area (see Figure 5-3). Figures 5-12 and 5-13 display time histories of groundwater pumping, aquifer recharge, groundwater levels, and ground motion in the Southeast Area.

The ground motion time histories of the Southeast Area is based solely on ground-level surveys performed from 1987to 2008. These data indicate that land subsidence has occurred continuously and slowly in this area, generally at a rate of about 0.02 ft/yr. However, the data also indicate that from 2005 to 2008 about -0.24 ft of subsidence occurred near the western portion of the Chino I Desalter well field where these wells are pumping from and causing drawdown within the deep confined aquifer system.

There is very little historical groundwater level data for this area prior to about 1990. The data since 1990 indicate relatively stable groundwater levels.

The observed slow but continuous land subsidence from 1987 to 2008 is not explained by the relatively stable groundwater levels. A plausible explanation for the subsidence is that thick, slowly-draining aquitards are compacting in response to the historical drawdowns that likely occurred prior to 1990.

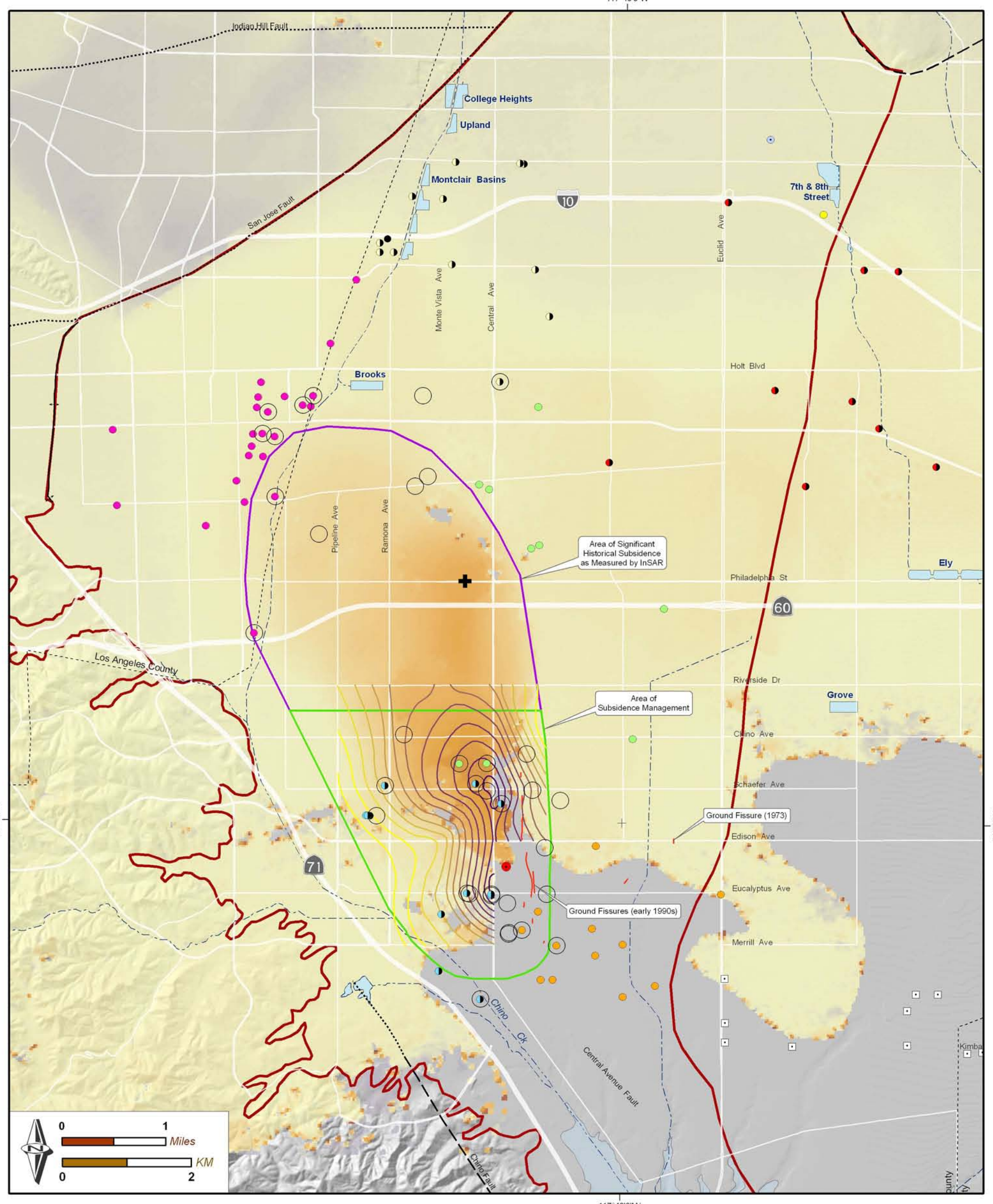
Lastly, the first ground fissures ever documented in the Chino Basin occurred in the Southeast Area in the early 1970s, but ground fissuring has not been observed in the Southeast Area since then.

5.5 Conclusions and Recommendations

The conclusions and recommendations for Watermaster's basin-wide ground-level monitoring program are provided below.

- Land subsidence does not appear to be a concern in the eastern and northernmost portions of Chino Basin. In these areas, the underlying aquifer system is composed primarily of coarse-grained sediments that are not prone to compaction.
- Land subsidence and the potential for ground fissuring are major concerns in the western and southern portions of the Chino Basin. In these areas, the underlying aquifer system consists of interbedded, fine-grained sediment layers (aquitards) that can drain and compact when groundwater levels decline in the adjacent coarse-grained aquifers. Ground fissuring has occurred in the past where land subsidence was differential (i.e. steep gradient of subsidence). Ground fissuring is the main subsidence-related threat to infrastructure.
- Land subsidence has been persistent across most of the western and southern portions of the Chino Basin since, at least, 1987 when land subsidence monitoring began. In many of these areas, land subsidence continues even during periods of groundwater level recovery, indicating that thick, slowly-draining aquitards are compacting in response to the large historical drawdowns of 1935 to 1978.
- Pumping-induced drawdown has caused accelerated occurrences of land subsidence in the recent past, including subsidence in the City of Chino during the early 1990s and, currently, in the vicinity of the Chino I Desalter well field. Watermaster should anticipate similar occurrences of land subsidence in areas (1) that are prone to subsidence and (2) where drawdown will occur in the future.
- Watermaster will continue its basin-wide ground-level monitoring program, using InSAR and ground-level surveys. Watermaster will consider expanding the ground-level surveys to cover the area of the proposed Chino Creek Desalter Well Field. This is an area that is prone to subsidence, where drawdown may occur near where ground fissuring has occurred in the past, and where InSAR data is not currently available. Watermaster will also consider expanding the ground-level surveys to cover the Pomona and Ontario Areas. In general, InSAR data coverage is continuous and of high quality throughout both areas, so ground-level surveys would primarily provide supporting and confirmation data for the InSAR and would occur at a frequency of once every three to five years.
- Watermaster will consider installing low-cost piezometer/extensometer facilities at appropriate locations in all Areas of Subsidence Concern. This type of facility has been successfully constructed and tested at Ayala Park in Chino. Such facilities record the requisite data (1) to monitor land subsidence and groundwater levels at high resolution and accuracy, (2) to provide the information necessary to characterize the elastic and/or inelastic nature of any land subsidence occurring in an area, (3) to provide the information necessary to develop criteria to manage subsidence, and (4) to provide the information necessary to characterize aquifer and aquitard properties that could be used in a predictive computer-simulation model of subsidence.

- Watermaster will consider building and calibrating predictive computer-simulation models of subsidence across all Areas of Subsidence Concern in the Chino Basin. These models would provide information on the rates and ultimate magnitude of land subsidence that could be associated with various basin management planning scenarios (i.e. pumping and recharge patterns). This information would be valuable to affected Watermaster parties.
- Because ground fissuring caused by differential land subsidence is the main threat to infrastructure, Watermaster will periodically inspect for signs of ground fissuring in areas that are experiencing differential land subsidence. In addition, Watermaster will consider monitoring the horizontal strain across these zones of potential ground fissuring in an effort to better understand and manage ground fissuring.



Subsidence Features

0.0

Contours of Relative Change in Land Surface Altitude as Measured by Leveling Surveys 1987 - 1999 (feet)

-2.2

+ 1.0

0.0

- 1.0

Relative Change in Land Surface Altitude as Measured by InSAR Oct 1993 - Dec 1995 (feet)

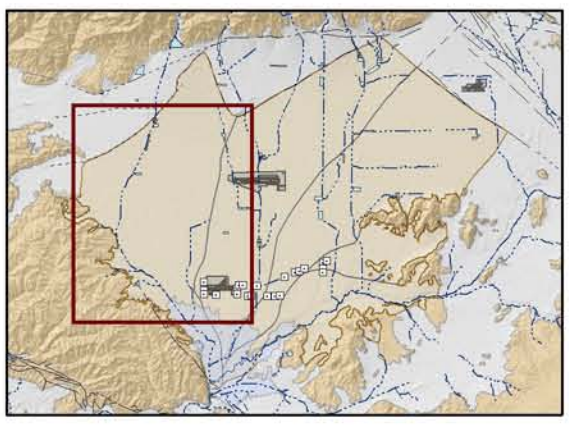
No InSAR Data

Active Production Wells in MZ-1 by Owner

- Ontario
- Pomona
- SAWC
- Upland
- SCWC
- CIM
- Chino Hills
- Chino
- MVWD

Other Features

- Well Used in MZ-1 Monitoring Program
- Ayala Park Extensometer Facility
- Proposed Central MZ-1 Piezometer
- Chino Basin Desalter Well (Existing)
- Management Zone 1 Boundary



Historical Land Surface Deformation in Management Zone 1

Leveling Surveys (1987-99) and InSAR (1993-95)

Figure 5-1

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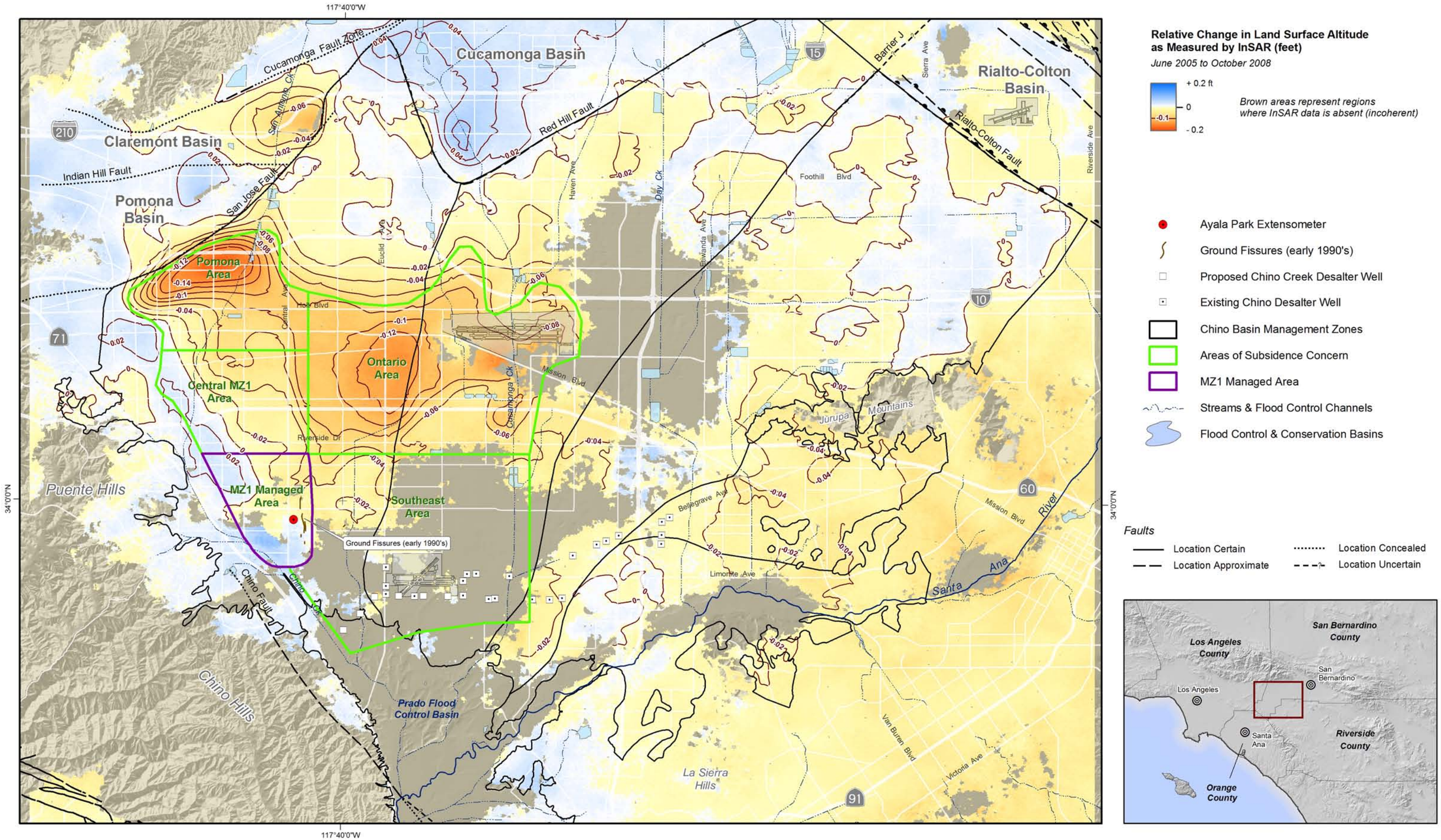
File: Figure_5-1.mxd



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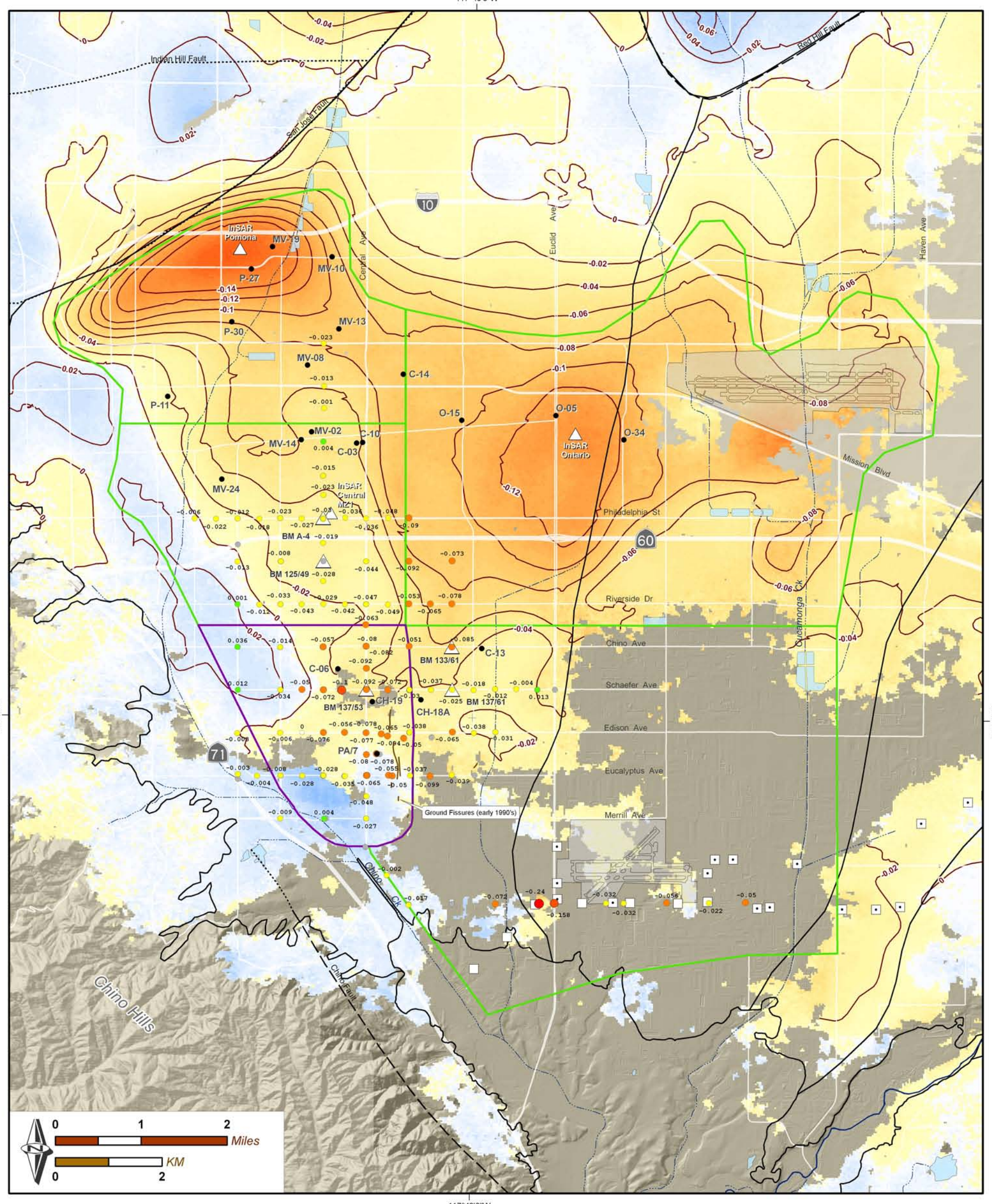
0 1 2 3 4 5 Miles
0 1 2 3 4 5 6 7 KM

2008 State of the Basin Report
Ground-Level Monitoring

Vertical Ground Motion (2005-2008)
as Measured by InSAR in the Chino Basin Area

Figure 5-2



Insufficient Data
> 0.20
0.10 - 0.20
0.05 - 0.10
0.01 - 0.05
0.00
-0.01 - -0.05
-0.05 - -0.10
-0.10 - -0.20
< -0.20

Relative Change in Land Surface Altitude as Measured by Leveling Surveys Oct 2005 - Oct 2008 *(feet)*

+ 0.2 ft
0
-0.1
- 0.2

Relative Change in Land Surface Altitude as Measured by InSAR June 2005 - Oct 2008 *(feet)*

Brown areas represent regions where InSAR data is absent (incoherent)

Water Level Wells (in Figures 5-4 to 5-13)

Chino Basin Desalter Well (Existing)

Proposed Chino Creek Desalter Well

Survey and InSAR Measurement Points (in Figures 5-4 to 5-13)

Chino Basin Management Zones

Subsidence Areas of Interest

MZ1 Managed Area

Vertical Ground Motion (2005-2008)

Leveling Surveys and InSAR in Western Chino Basin

Figure 5-3

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Date: 20090617
File: Figure_5-3.mxd

Figure 5-4
Groundwater Levels versus Ground Levels in the MZ1 Managed Area - 1993 to 2009

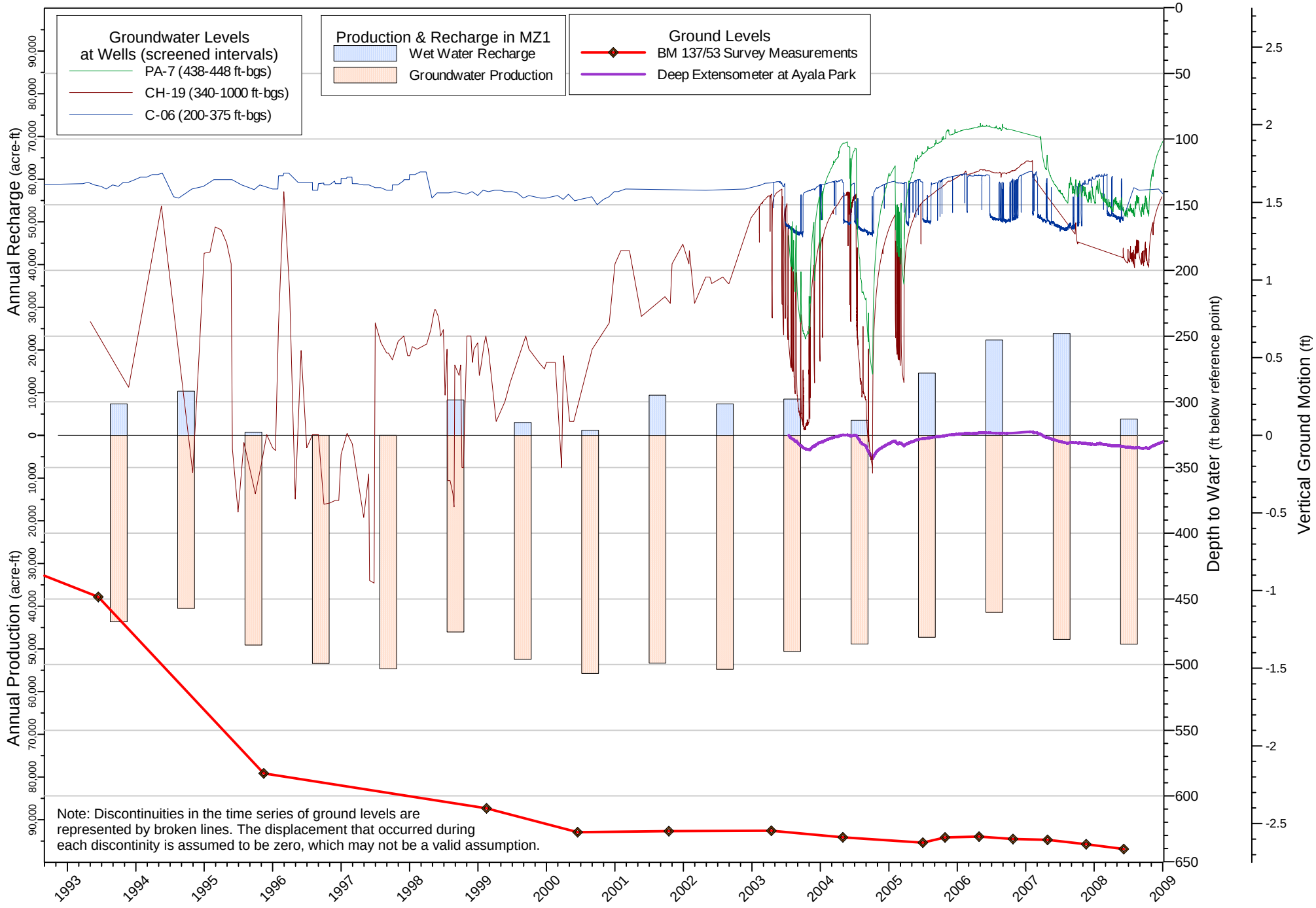


Figure 5-5
Groundwater Levels versus Ground Levels in the MZ1 Managed Area - 1935 to 2009

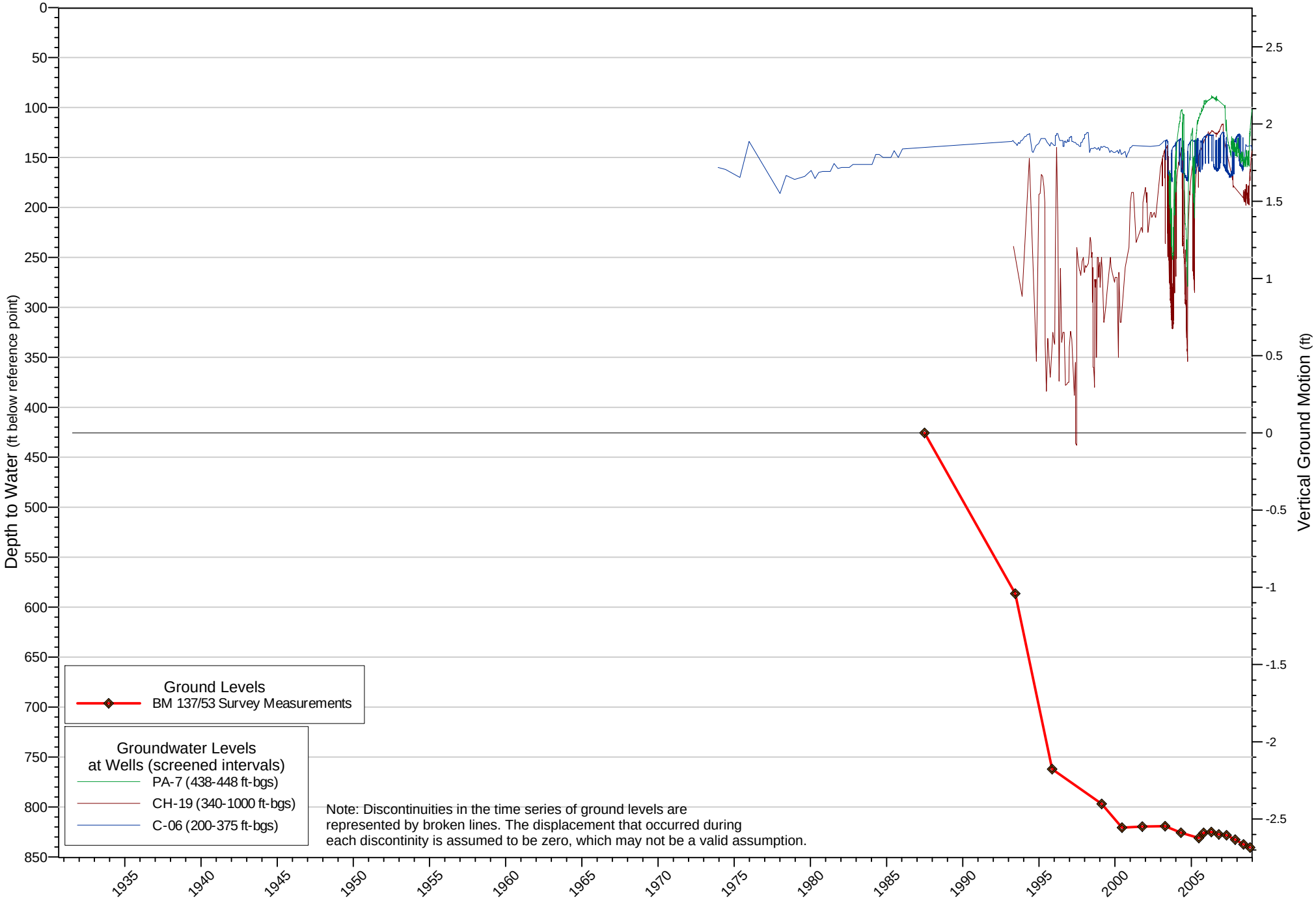


Figure 5-6
Groundwater Levels versus Ground Levels in the Central MZ1 Area - 1993 to 2009

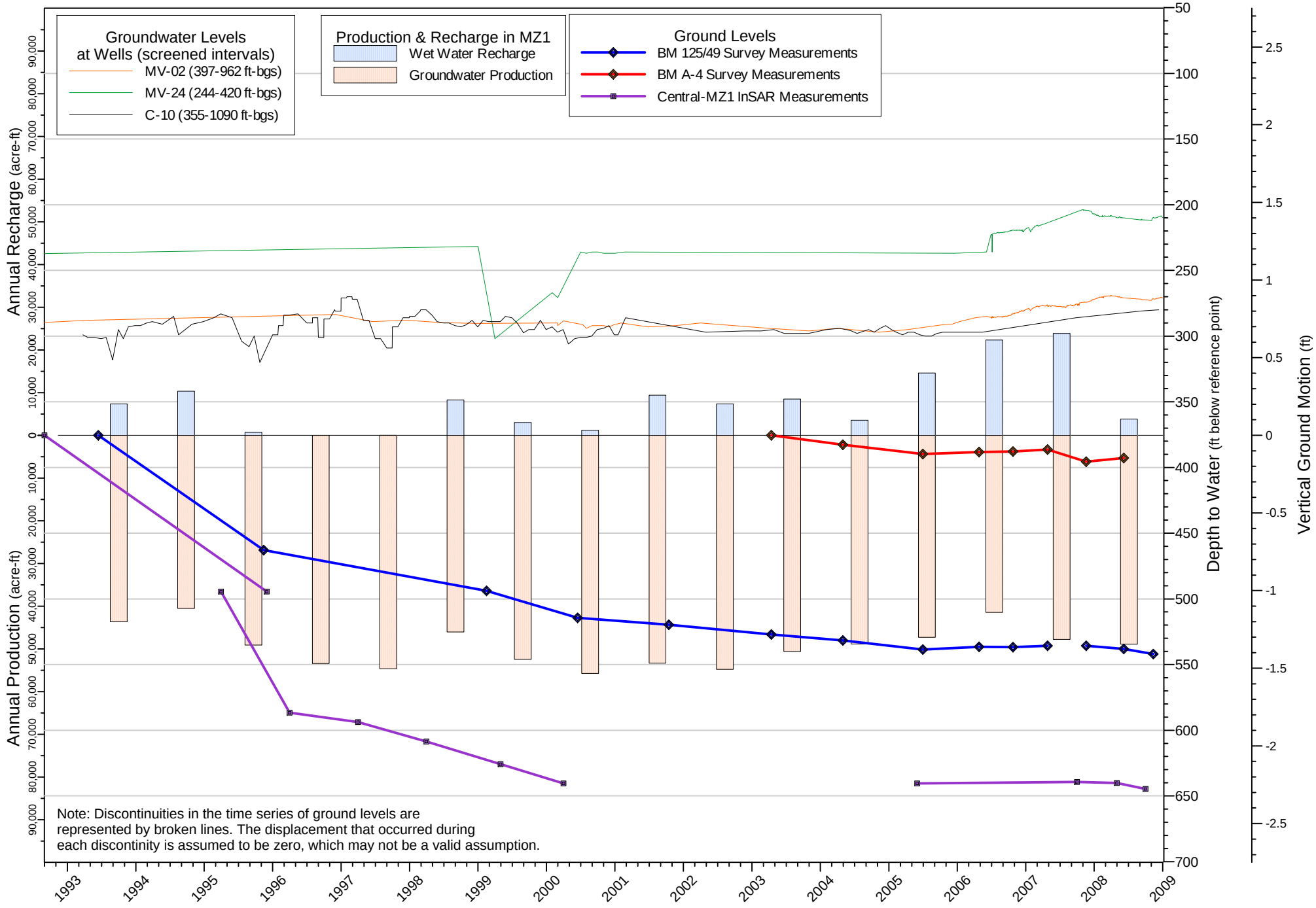


Figure 5-7
Groundwater Levels versus Ground Levels in the Central MZ1 Area - 1935 to 2009

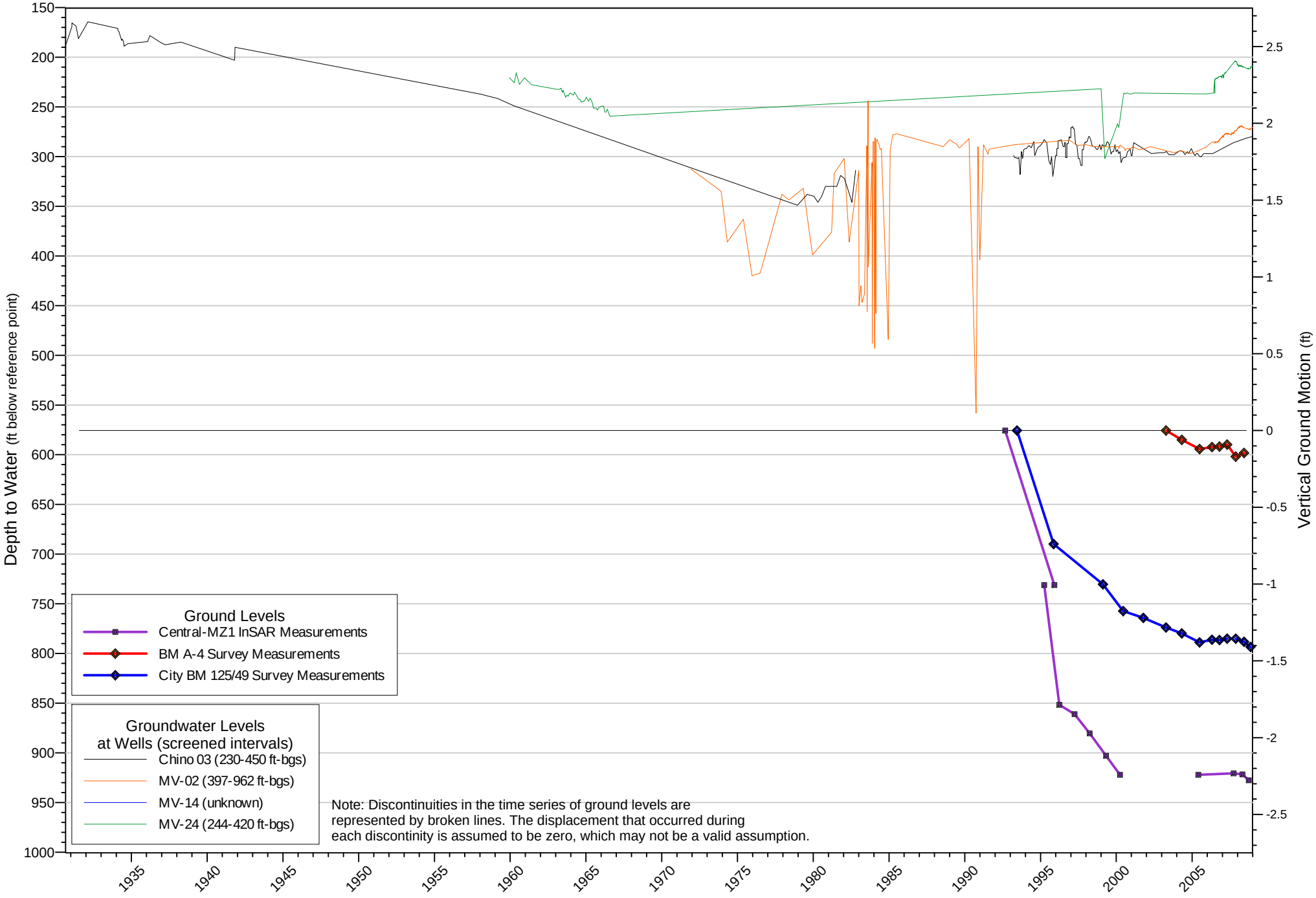


Figure 5-8
Groundwater Levels versus Ground Levels in the Pomona Area - 1993 to 2009

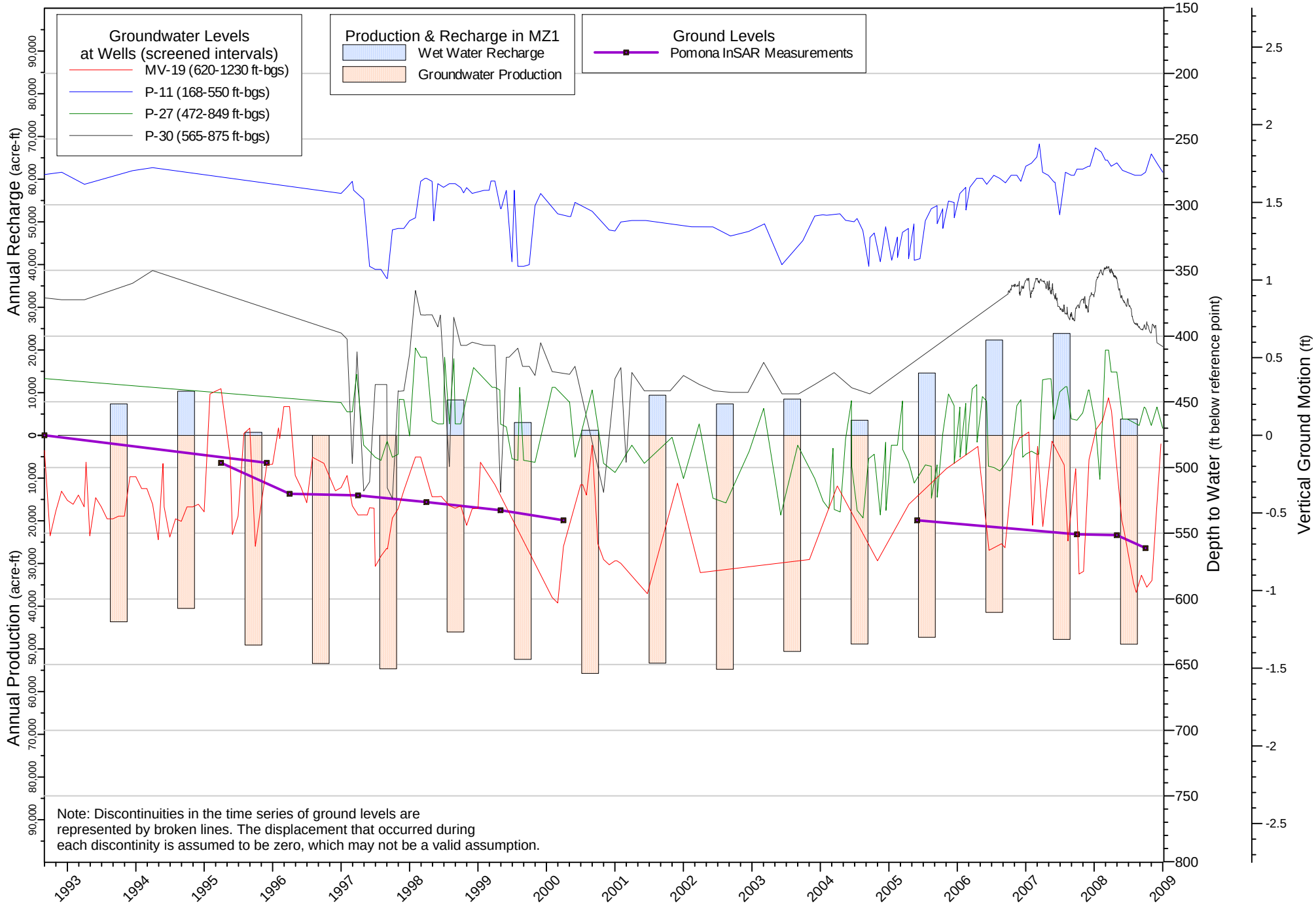


Figure 5-9
Groundwater Levels versus Ground Levels in the Pomona Area - 1935 to 2009

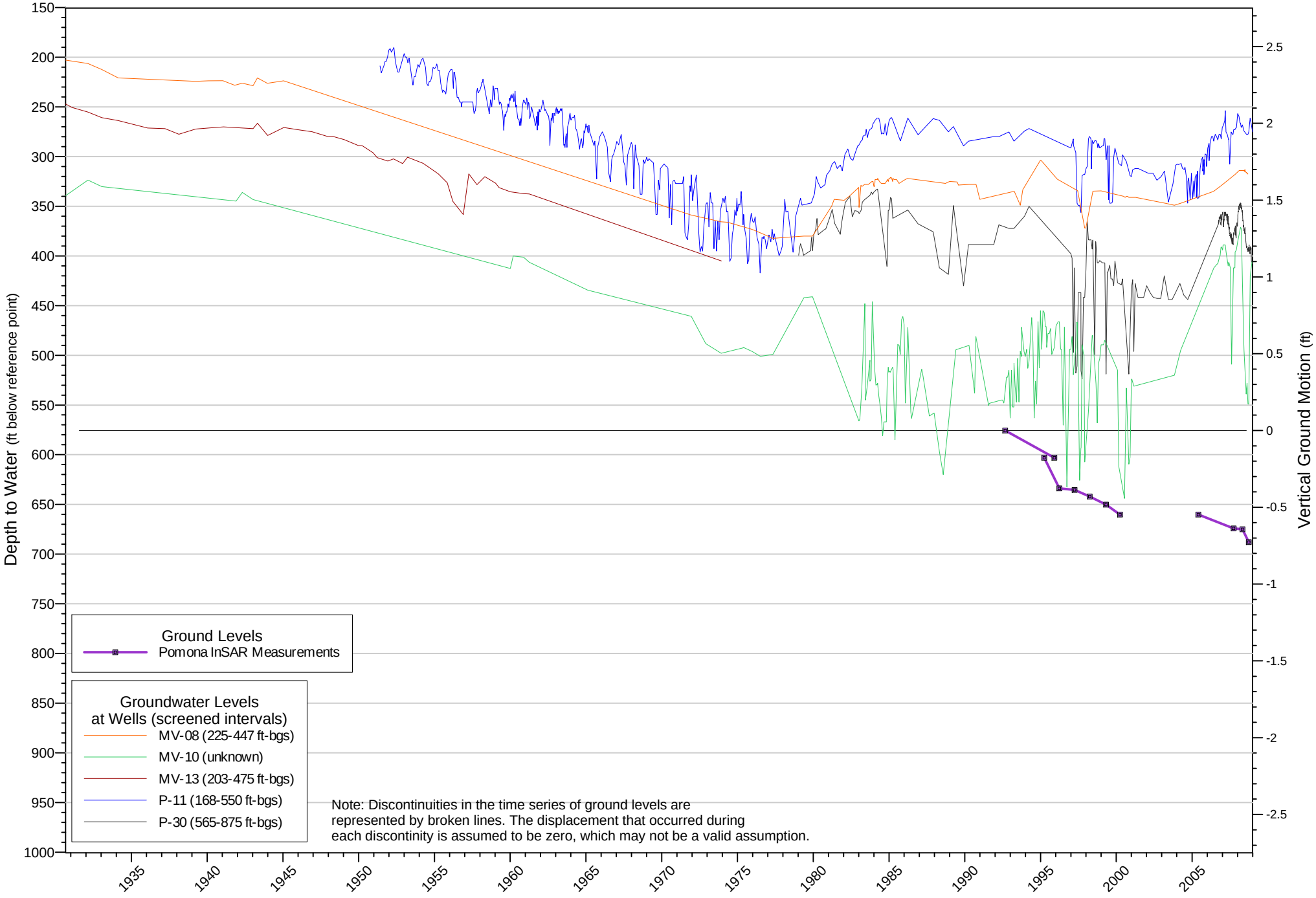


Figure 5-10
Groundwater Levels versus Ground Levels in the Ontario Area - 1993 to 2009

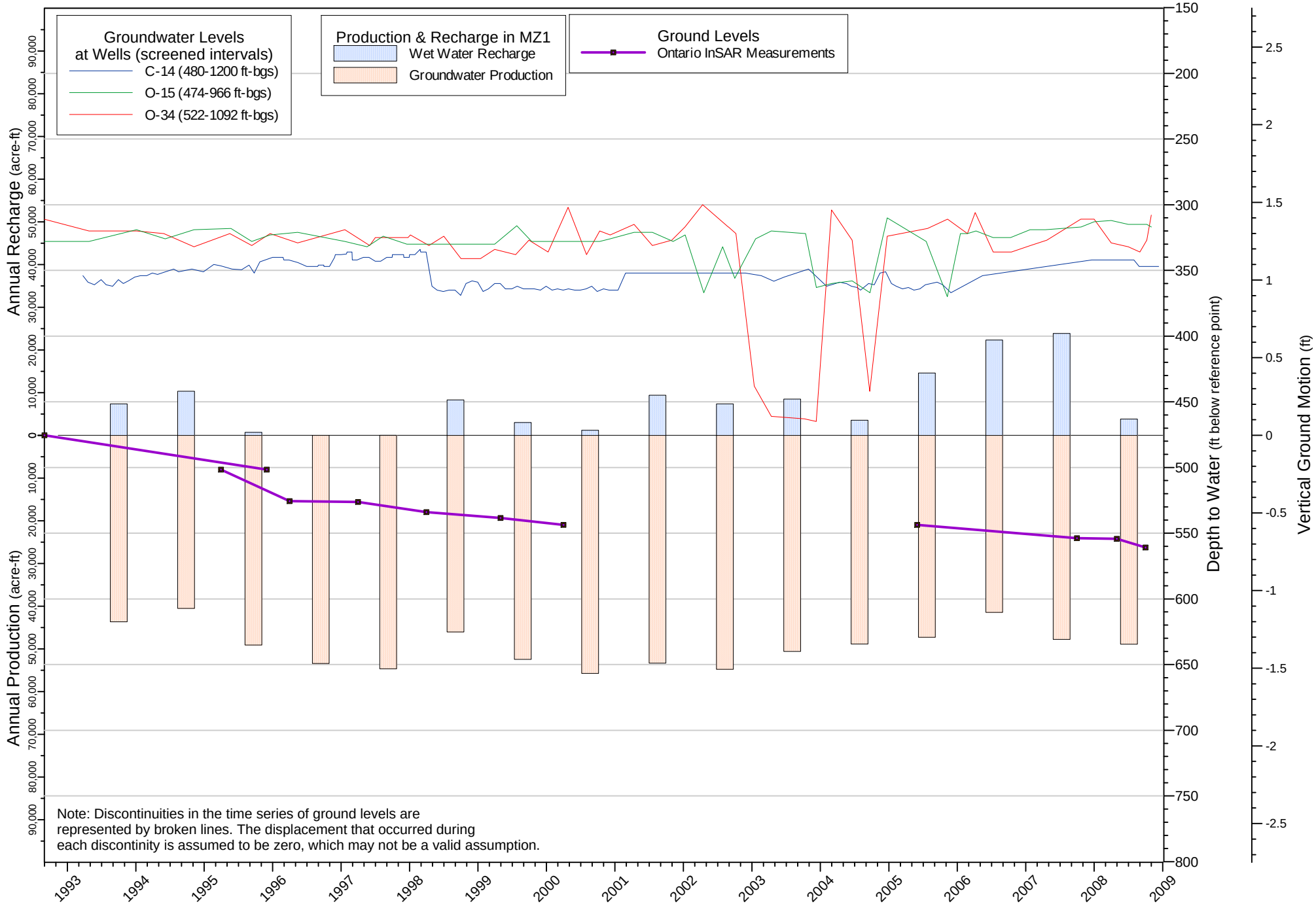


Figure 5-11
Groundwater Levels versus Ground Levels in the Ontario Area - 1930 to 2009

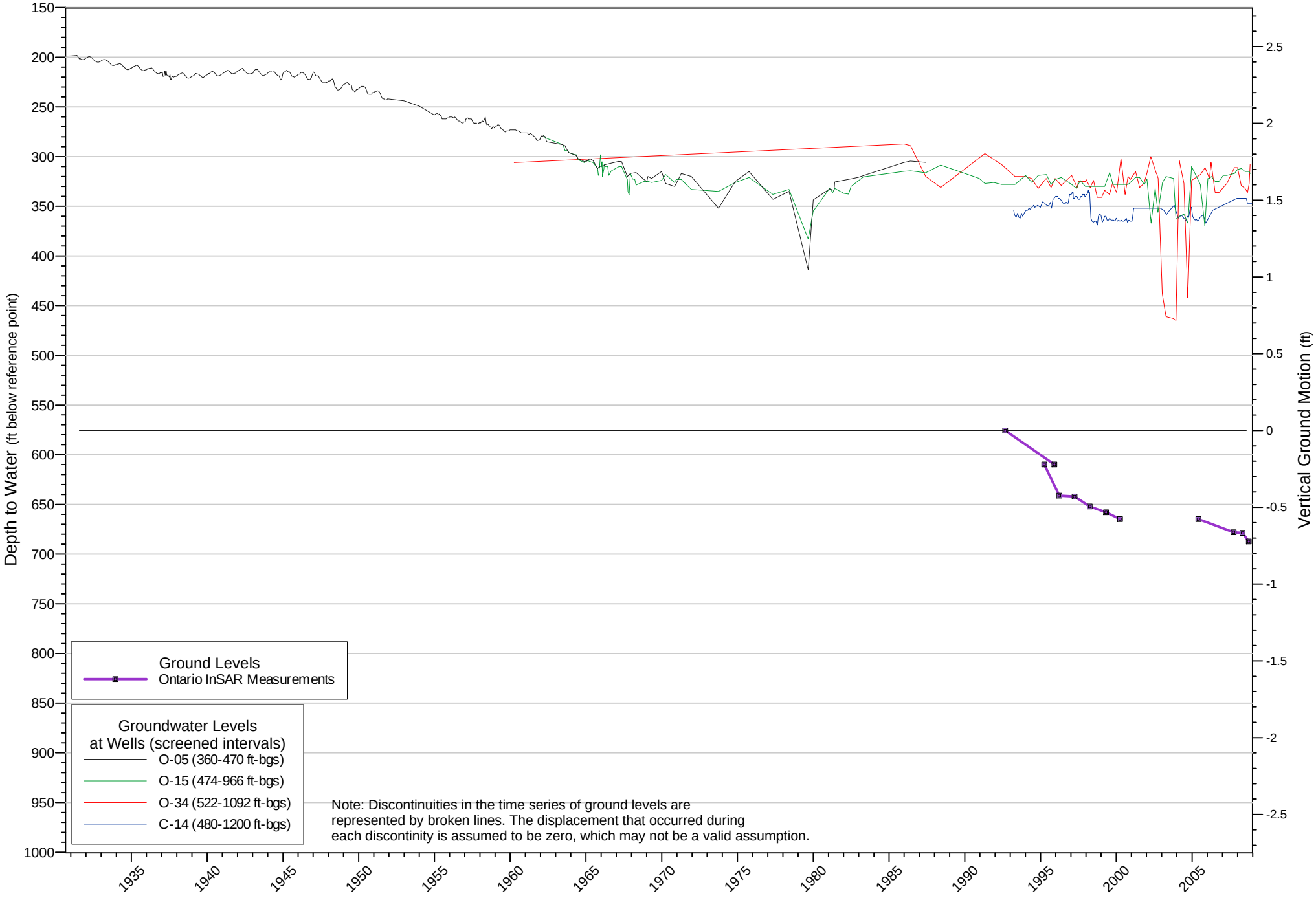


Figure 5-12
Groundwater Levels versus Ground Levels in the Southeast Area - 1993 to 2009

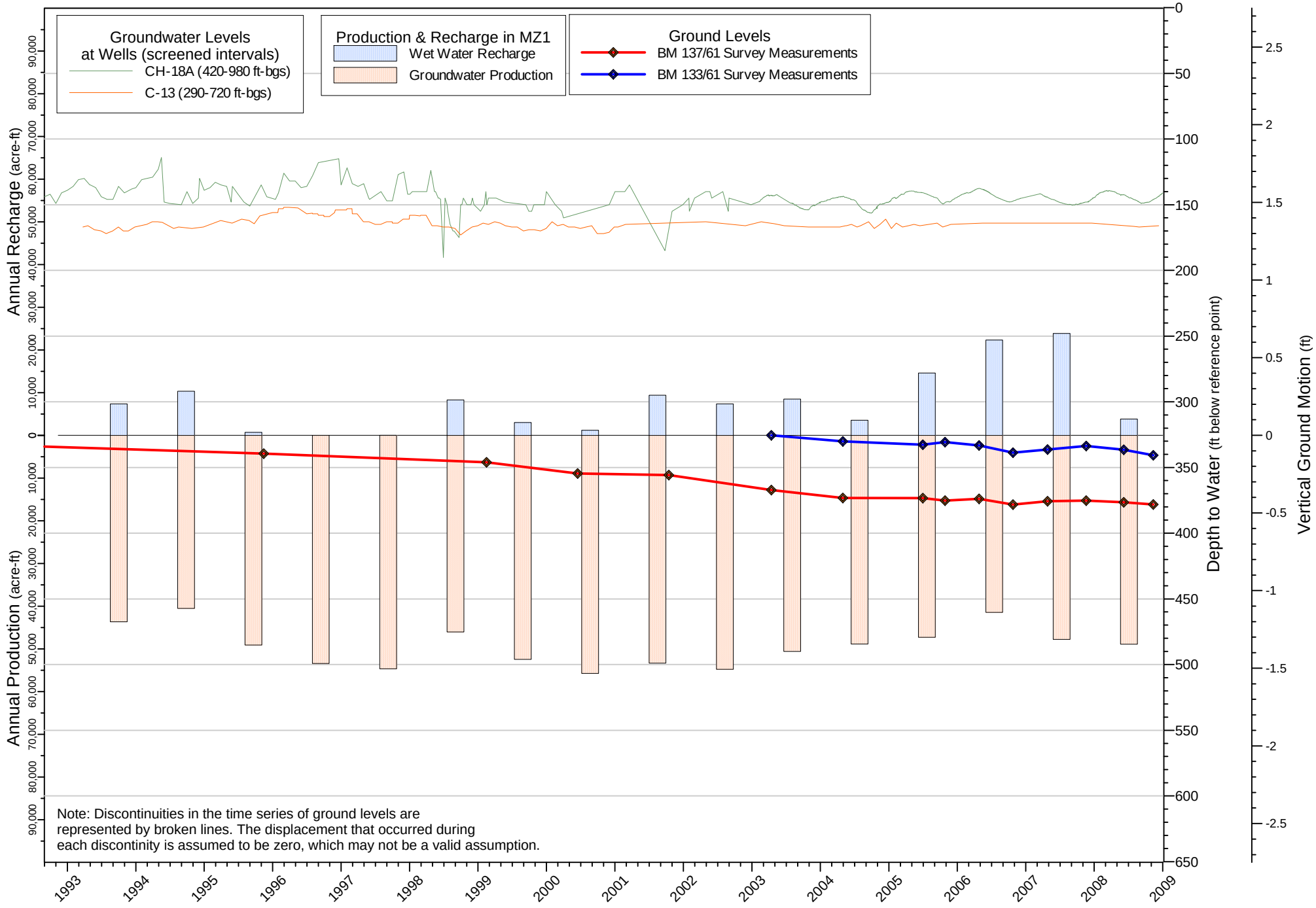
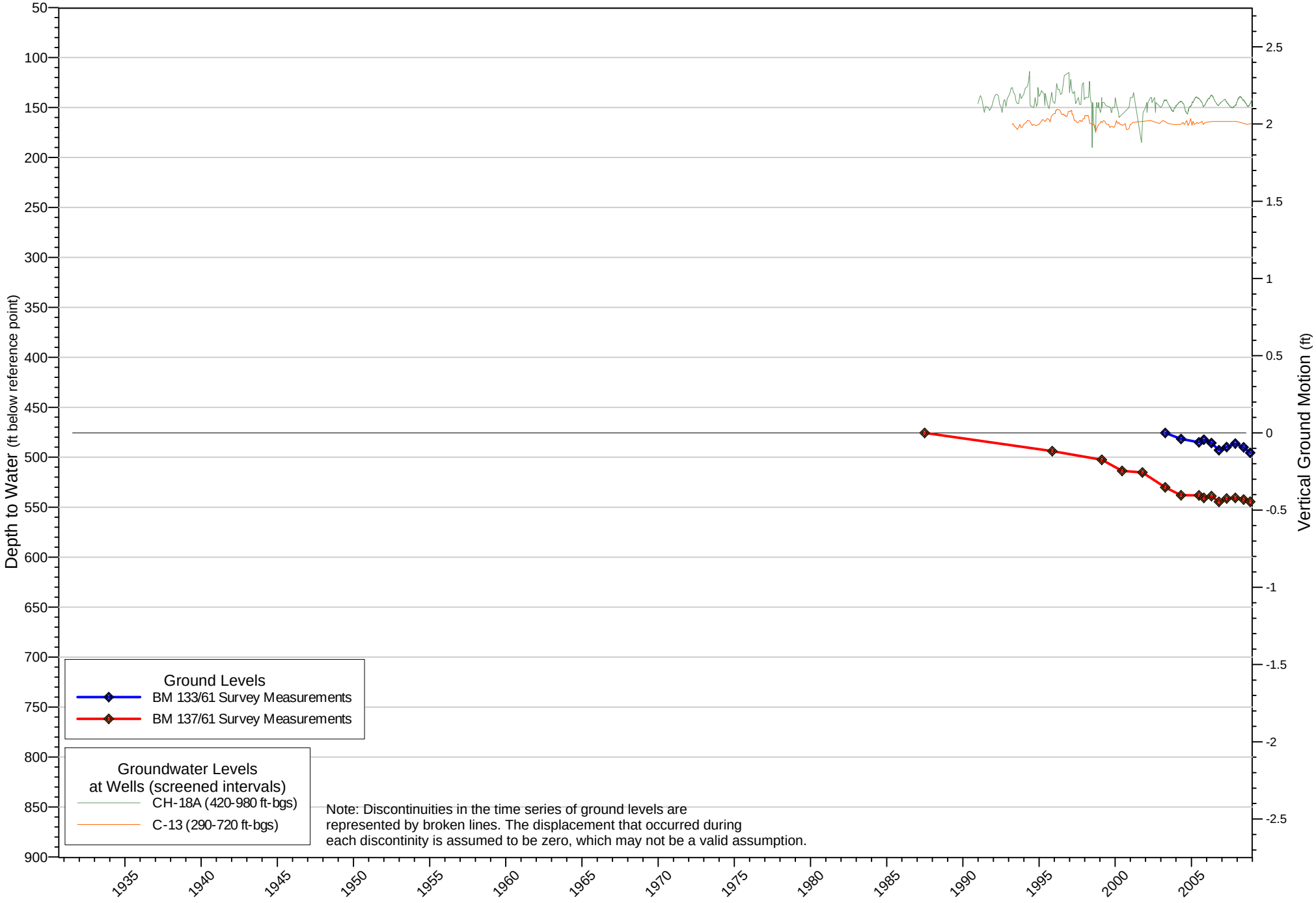


Figure 5-13
Groundwater Levels versus Ground Levels in the Southeast Area - 1930 to 2009



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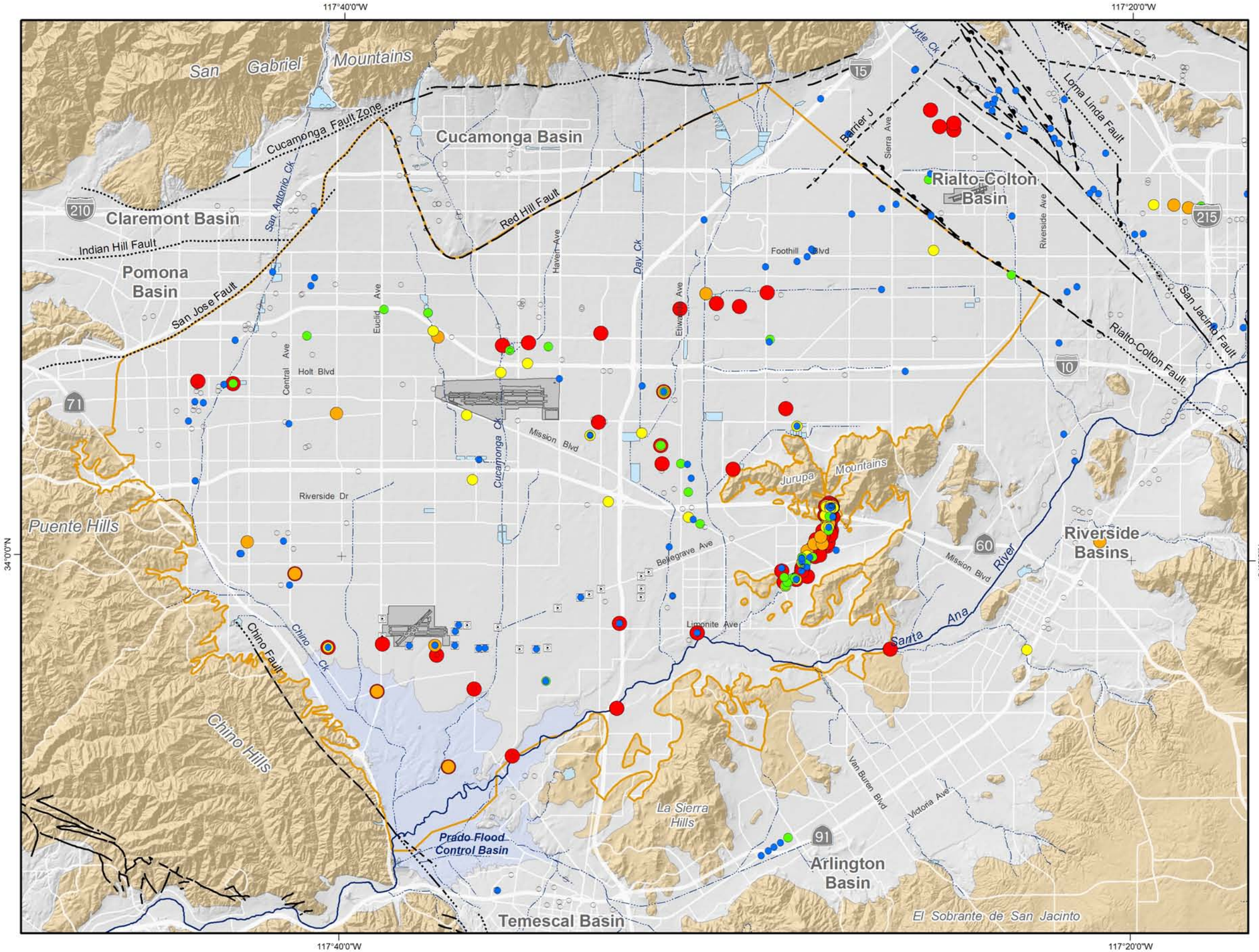
Appendix A

Groundwater Level Map

Appendix B

Groundwater Quality Maps



Main Features

Aluminum (mg/L)

- ND
- < 0.10
- 0.10 - 0.20
- 0.20 - 0.40
- 0.40 - 0.80
- > 0.80

Secondary EPA MCL = 2 mg/L
Primary CA MCL = 1 mg/L
Secondary CA MCL = 0.2 mg/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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0 1 2 3 4 5 Miles
0 2 4 6 8 KM

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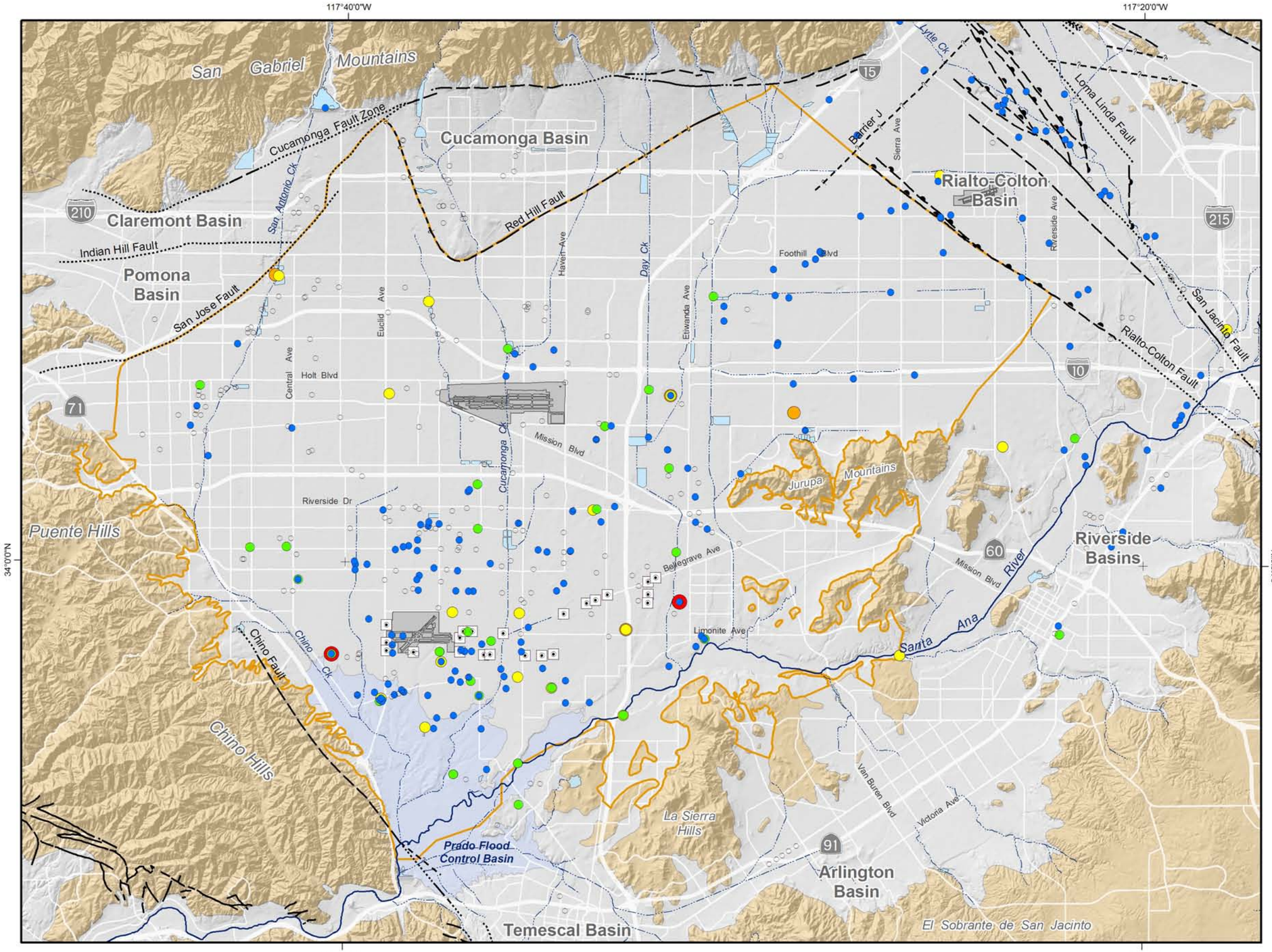
Appendix B

Aluminum in Groundwater

Maximum Concentration (July 2003 - June 2008)

Appendix B



Main Features

Color (Color Units)

- ND
- < 7.5
- 7.5 - 15
- 15 - 30
- 30 - 60
- > 60

Secondary EPA MCL = 15 Color Units
Secondary CA MCL = 15 Color Units

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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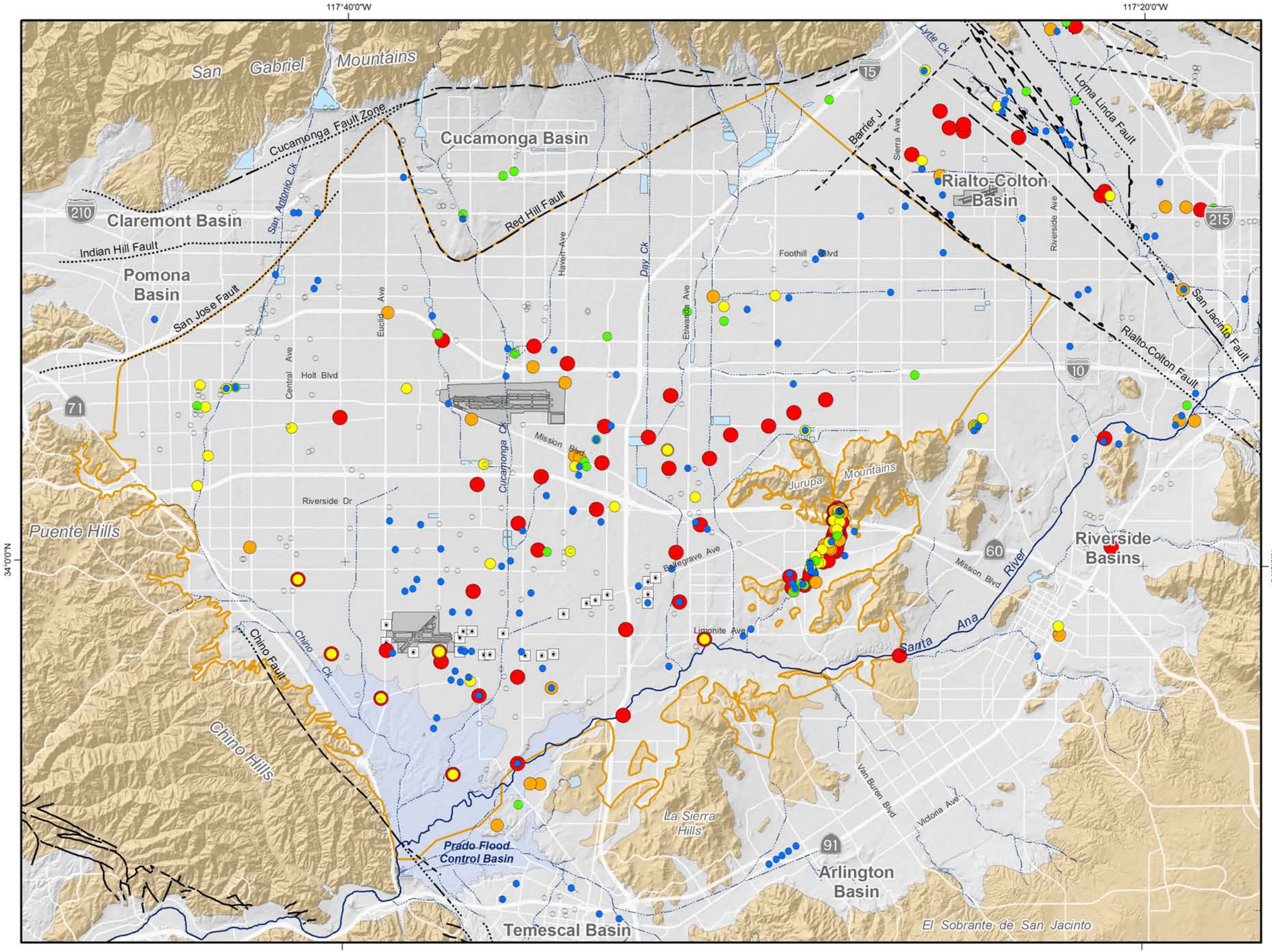
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Appendix B

Color in Groundwater

Maximum Concentration (July 2003 - June 2008)

Appendix B



Main Features

Iron (mg/L)

- ND
- < 0.15
- 0.15 - 0.30
- 0.30 - 0.60
- 0.60 - 1.2
- > 1.2

Secondary EPA MCL = 0.3 mg/L
Secondary CA MCL = 0.3 mg/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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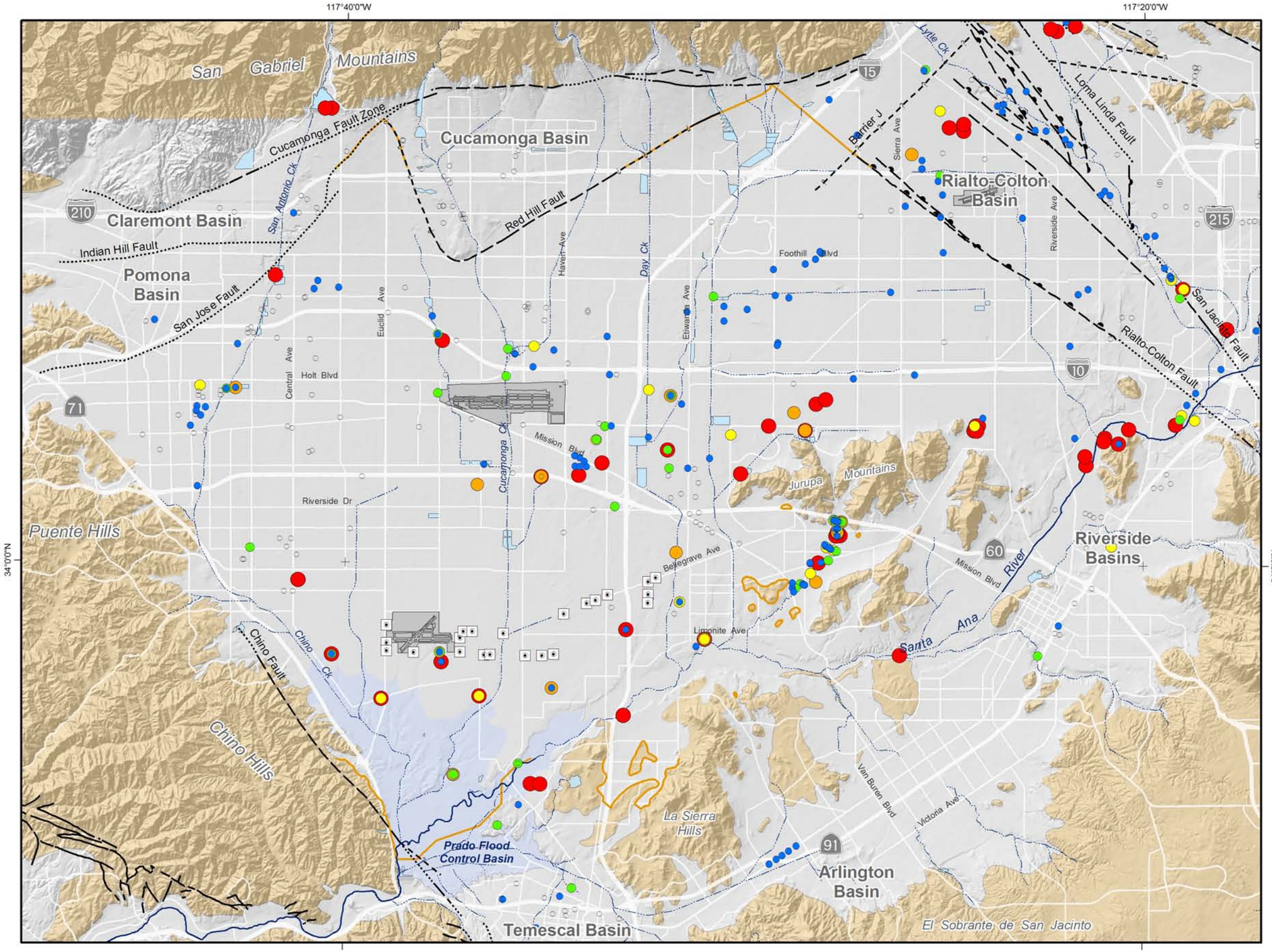
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Appendix B

Iron in Groundwater

Maximum Concentration (July 2003 - June 2008)

Appendix B



Main Features

Manganese (mg/L)

- ND
- < 0.025
- 0.025 - 0.050
- 0.050 - 0.10
- 0.10 - 0.20
- > 0.20

Secondary EPA MCL = 0.05 mg/L
Secondary CA MCL = 0.05 mg/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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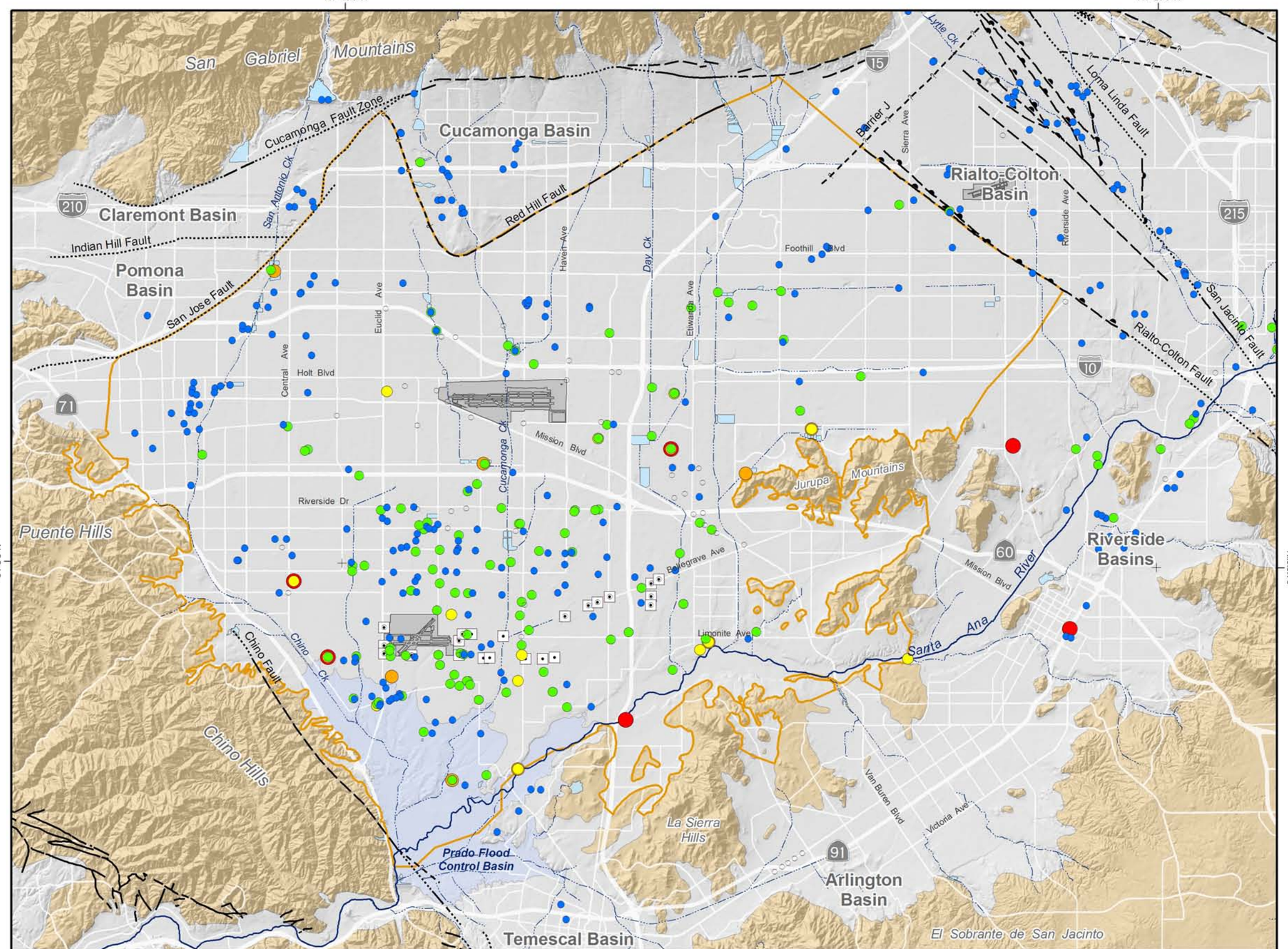
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Appendix B

Manganese in Groundwater

Maximum Concentration (July 2003 - June 2008)

Appendix B



Main Features

Odor (TON)

- ND
- < 1.5
- 1.5 - 3
- 3 - 6
- 6 - 12
- > 12

Secondary EPA MCL = 3 TON
Secondary CA MCL = 3 TON

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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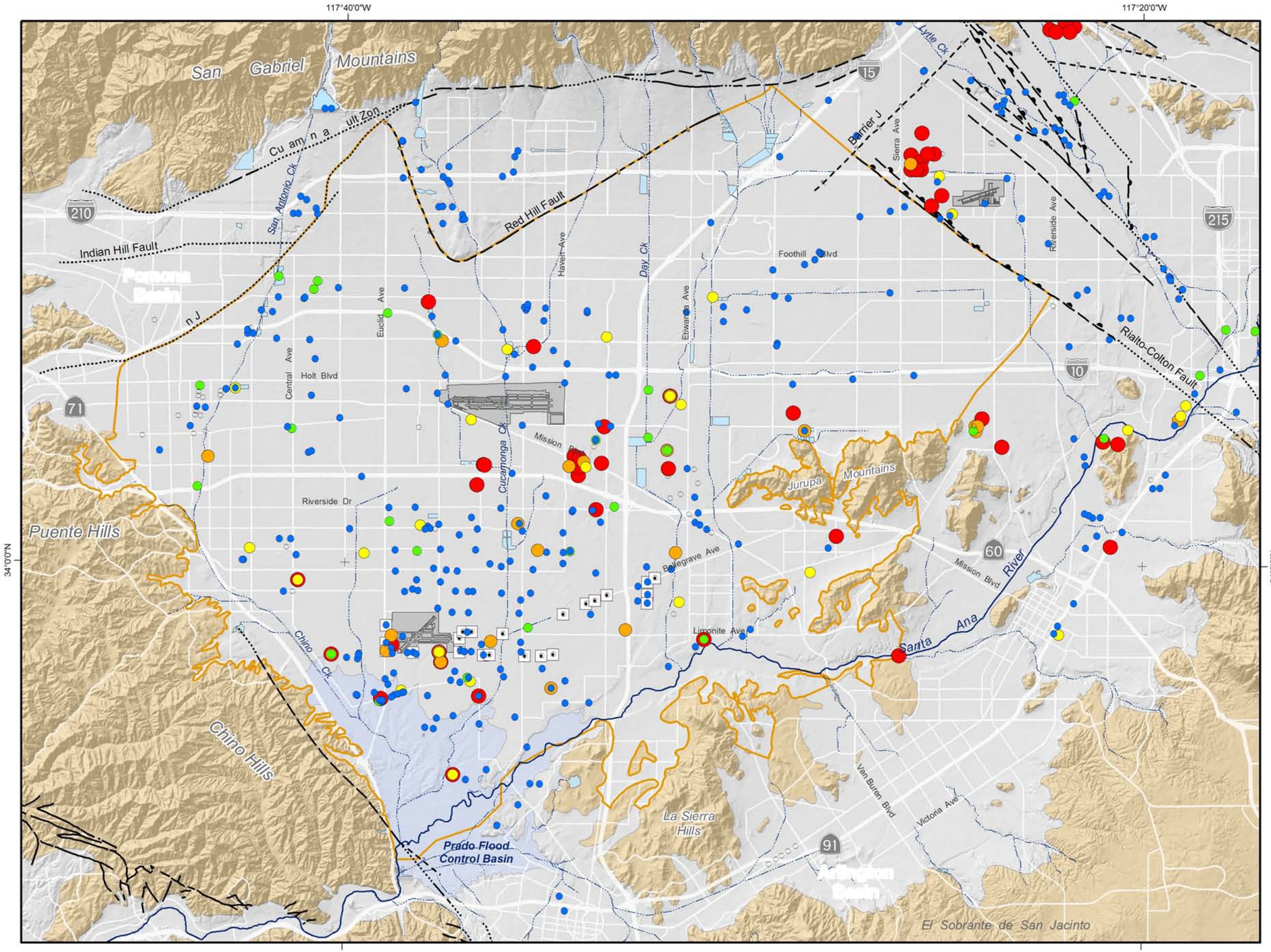
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Appendix B

Odor in Groundwater

Maximum Concentration (July 2003 - June 2008)

Appendix B



Main Features

Turbidity (NTU)

- ND
- < 2.5
- 2.5 - 5
- 5 - 10
- 10 - 20
- > 20

Secondary EPA MCL = 5 NTU
Secondary CA MCL = 5 NTU

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Appendix B

Turbidity in Groundwater

Maximum Concentration (July 2003 - June 2008)

Appendix B

Appendix C

Groundwater Quality Exceedance Report

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical	Unit	Primary EPA MCL	Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
1,1,1-Trichloroethane	**ug/L**	**200**	**n/a**	**200**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.46	0.7	1.02	1.36	4.46	1.446	2641	499	5	0

1,1,2,2-Tetrachloroethane	**ug/L**	**n/a**	**n/a**	**1**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						2313	477	0	0

1,1,2-Trichloro-1,2,2-trifluoroethane	**ug/L**	**n/a**	**n/a**	**1200**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.5	0.63	1.1	6.5	185	32.488	1694	396	6	0

1,1,2-Trichloroethane	**ug/L**	**5**	**n/a**	**5**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.11	0.45	0.81	2.3	3.8	1.293	2625	499	5	0

1,1-Dichloroethane	**ug/L**	**n/a**	**n/a**	**5**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.1	0.56	1.3	3.4	6013	23.667	2730	509	39	11

1,1-Dichloroethene	**ug/L**	**7**	**n/a**	**6**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.19	1.94	5.4	11.8	190	13.667	2709	507	56	31

1,2,3-Trichloropropane	**ug/L**	**n/a**	**n/a**	**n/a**	**n/a**	**0.005**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0.012	0.13	0.94	3.1	0.491	1192	375	25	23

1,2,4-Trichlorobenzene	**ug/L**	**70**	**n/a**	**5**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.5	0.5	0.5		0.5	0.5	1008	285	1	0

1,2,4-Trimethylbenzene	**ug/L**	**n/a**	**n/a**	**n/a**	**n/a**	**330**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						2062	440	0	0

1,2-Dibromo-3-chloropropane	**ug/L**	**0.2**	**n/a**	**0.2**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.01	0.11	0.16	0.24	0.639	0.185	880	301	16	4

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical	Unit	Primary EPA MCL	Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
1,2-Dichlorobenzene	**ug/L**	**600**	**n/a**	**600**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						1200	292	0	0

1,2-Dichloroethane	**ug/L**	**5**	**n/a**	**0.5**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.1	0.34	0.45	0.6	3.1	0.611	2714	508	27	17

1,2-Dichloropropane	**ug/L**	**5**	**n/a**	**5**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.12	0.36	0.5	1.1	3.6	0.933	2607	502	25	0

1,3,5-Trimethylbenzene	**ug/L**	**n/a**	**n/a**	**n/a**	**n/a**	**330**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						1538	373	0	0

1,3-Dichloropropene	**ug/L**	**n/a**	**n/a**	**0.5**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
94	94	94		96.5	95.25	790	238	2	2

1,4-Dichlorobenzene	**ug/L**	**75**	**n/a**	**5**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.13	0.15	0.17	0.21	0.57	0.215	1271	295	1	0

1,4-Dioxane	**ug/L**	**n/a**	**n/a**	**n/a**	**n/a**	**3**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.1	0.29	0.5	0.99	46	1.289	577	63	10	3

2,3,7,8-Tetrachlorodibenzo-p-dioxin	**ug/L**	**3E-05**	**n/a**	**3E-05**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0	0		0	0	192	98	1	0

2,4-Dichlorophenoxyacetic acid	**ug/L**	**70**	**n/a**	**70**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						227	118	0	0

2-Chlorotoluene	**ug/L**	**n/a**	**n/a**	**n/a**	**n/a**	**140**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						1531	364	0	0

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical			Unit	Primary EPA MCL		Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
4-Chlorotoluene			**ug/L**	**n/a**		**n/a**	**n/a**	**n/a**	**140**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						1532	365	0	0
Alachlor			**ug/L**	**2**		**n/a**	**2**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						262	129	0	0
Aluminum			**mg/L**	**n/a**		**2**	**1**	**0.2**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.005	0.058	0.2	1.1	240	3.145	1437	355	250	153
Antimony			**ug/L**	**6**		**n/a**	**6**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.159	0.6	0.8	1.1	8.3	1.066	1341	350	46	1
Arsenic			**mg/L**	**0.01**		**n/a**	**0.05**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0.002	0.003	0.005	0.14	0.005	1565	381	247	24
Asbestos			**MFL**	**7**		**n/a**	**7**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.26	0.26	0.26		0.26	0.26	153	100	1	0
Atrazine			**ug/L**	**3**		**n/a**	**1**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.06	0.06	0.08	0.1	1.04	0.32	303	142	3	1
Barium			**mg/L**	**2**		**n/a**	**1**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0.042	0.07	0.13	160	0.629	1396	354	291	10
Bentazon			**ug/L**	**n/a**		**n/a**	**18**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						221	112	0	0
Benzene			**ug/L**	**5**		**n/a**	**1**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.11	0.14	0.16	0.52	1.5	0.4	2674	508	6	1

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical	Unit	Primary EPA MCL	Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
Benzo(a)pyrene	**ug/L**	**0.2**	**n/a**	**0.2**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.02	0.02	0.02		0.02	0.02	265	131	1	0

Beryllium	**mg/L**	**0.004**	**n/a**	**0.004**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0	0	0.001	0.008	0.001	1346	350	52	2

Boron	**mg/L**	**n/a**	**n/a**	**n/a**	**n/a**	**1**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
-0.004	0.1	0.161	0.3	2.5	0.228	1260	299	105	3

Bromate	**mg/L**	**0.01**	**n/a**	**0.01**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						2	1	0	0

Cadmium	**mg/L**	**0.005**	**n/a**	**0.005**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0	0	0	0.009	0	1355	351	140	1

Carbofuran	**ug/L**	**40**	**n/a**	**18**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						210	116	0	0

Carbon Disulfide	**ug/L**	**n/a**	**n/a**	**n/a**	**n/a**	**160**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.28	0.3	0.54	6.6	15.7	3.862	1102	272	8	0

Carbon Tetrachloride	**ug/L**	**5**	**n/a**	**0.5**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.16	0.16	0.9	1.2	1.2	0.753	2323	477	3	2

Chlorate	**mg/L**	**n/a**	**n/a**	**n/a**	**n/a**	**0.8**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.021	0.021	0.061	0.063	0.063	0.048	3	2	2	0

Chlordane	**ug/L**	**2**	**n/a**	**0.1**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						227	118	0	0

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical			Unit	Primary EPA MCL		Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
Chloride			**mg/L**	**n/a**		**250**	**n/a**	**250**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
2.3	12	30	95	2700	68.323	2361	428	428	25
Chlorine			**mg/L**	**4**		**n/a**	**4**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
4.1	50	73	130	486	97.758	110	96	95	95
Chlorine Dioxide			**mg/L**	**0.8**		**n/a**	**0.8**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						1	1	0	0
Chlorite			**mg/L**	**1**		**n/a**	**1**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						4	3	0	0
Chlorobenzene			**ug/L**	**100**		**n/a**	**70**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.28	0.6	0.79	1.4	1.7	0.962	2337	478	4	0
Chromium			**ug/L**	**100**		**n/a**	**50**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	3.5	6.5	13	1500	23.765	1762	372	329	30
Cis-1,2-Dichloroethene			**ug/L**	**70**		**n/a**	**6**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.1	0.7	2.4	6.3	71	6.832	2690	509	43	10
Color			**Assessment**	**n/a**		**15**	**n/a**	**15**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
1	3	5	5	100	6.707	1483	377	182	21
Copper			**mg/L**	**1.3**		**1**	**1.3**	**1**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0.001	0.002	0.004	150	0.504	1768	370	277	8
Cyanide			**ug/L**	**200**		**n/a**	**150**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
8.46	8.46	8.46		8.46	8.46	450	173	1	0

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical			Unit	Primary EPA MCL		Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
Dalapon			**ug/L**	**200**		**n/a**	**200**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						227	118	0	0
Di(2-ethylhexyl)adipate			**ug/L**	**400**		**n/a**	**400**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						260	128	0	0
Di(2-ethylhexyl)phthalate			**ug/L**	**6**		**n/a**	**4**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.77	1.3	3.3	8.3	440	36.405	261	124	9	4
Dichlorodifluoromethane			**ug/L**	**n/a**		**n/a**	**n/a**	**n/a**	**1000**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.17	0.5	0.8	2.5	29	3.07	2323	476	17	0
Dichloromethane			**ug/L**	**5**		**n/a**	**5**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.15	0.17	0.25	0.9	3	0.589	2468	482	53	0
Dinoseb			**ug/L**	**7**		**n/a**	**7**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						227	118	0	0
Diquat			**ug/L**	**20**		**n/a**	**20**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						198	108	0	0
Endothall			**ug/L**	**100**		**n/a**	**100**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						215	109	0	0
Endrin			**ug/L**	**2**		**n/a**	**2**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						231	122	0	0
Ethylbenzene			**ug/L**	**700**		**n/a**	**300**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.5	0.6	0.8	1.3	1.7	1.025	2380	481	8	0

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical	Unit	Primary EPA MCL	Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
Ethylene Dibromide	**ug/L**	**0.05**	**n/a**	**0.05**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*
0.02	0.02	0.02	0.02	0.02	0.02	1227
# of Wells Sampled	*# of Wells with Detects*	*# of Wells with Exceedances*				
360	1	0				
Fluoride	**mg/L**	**4**	**2**	**2**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*
0.05	0.2	0.3	0.7	7.6	0.538	1553
# of Wells Sampled	*# of Wells with Detects*	*# of Wells with Exceedances*				
271	265	4				
Foaming Agents	**mg/L**	**n/a**	**0.5**	**n/a**	**0.5**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*
0.005	0.06	0.08	0.14	18	0.237	1140
# of Wells Sampled	*# of Wells with Detects*	*# of Wells with Exceedances*				
226	76	2				
Glyphosate	**ug/L**	**700**	**n/a**	**700**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*
						196
# of Wells Sampled	*# of Wells with Detects*	*# of Wells with Exceedances*				
109	0	0				
Gross Alpha	**pci/L**	**15**	**n/a**	**15**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*
0	1.6	2.91	4.94	42	4.283	440
# of Wells Sampled	*# of Wells with Detects*	*# of Wells with Exceedances*				
127	93	7				
Haloacetic Acids 5 (HAA5)	**ug/L**	**60**	**n/a**	**60**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*
1.5	8.9	11.8	13.6	90	14.747	24
# of Wells Sampled	*# of Wells with Detects*	*# of Wells with Exceedances*				
7	4	1				
Heptachlor	**ug/L**	**0.4**	**n/a**	**0.01**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*
						232
# of Wells Sampled	*# of Wells with Detects*	*# of Wells with Exceedances*				
122	0	0				
Heptachlor Epoxide	**ug/L**	**0.2**	**n/a**	**0.01**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*
						231
# of Wells Sampled	*# of Wells with Detects*	*# of Wells with Exceedances*				
122	0	0				
Hexachlorobenzene	**ug/L**	**1**	**n/a**	**1**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*
						271
# of Wells Sampled	*# of Wells with Detects*	*# of Wells with Exceedances*				
137	0	0				
Hexachlorocyclopentadiene	**ug/L**	**50**	**n/a**	**50**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*
						265
# of Wells Sampled	*# of Wells with Detects*	*# of Wells with Exceedances*				
131	0	0				

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical			Unit	Primary EPA MCL		Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
Iron			**mg/L**	**n/a**		**0.3**	**n/a**	**0.3**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.001	0.063	0.231	1.19	1714	7.298	2174	451	299	185
Isopropylbenzene			**ug/L**	**n/a**		**n/a**	**n/a**	**n/a**	**770**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						2015	438	0	0
Lead			**mg/L**	**0.015**		**n/a**	**0.015**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0	0.001	0.002	0.087	0.002	1365	353	189	7
Lindane			**ug/L**	**0.2**		**n/a**	**0.2**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						231	122	0	0
Manganese			**mg/L**	**n/a**		**0.05**	**n/a**	**0.05**	**0.5**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0.006	0.022	0.065	140	0.499	1752	281	167	58
Mercury			**mg/L**	**0.002**		**n/a**	**0.002**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0	0	0	0.002	0	1067	327	55	0
Methoxychlor			**ug/L**	**40**		**n/a**	**30**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						227	120	0	0
Methyl Isobutyl Ketone			**ug/L**	**n/a**		**n/a**	**n/a**	**n/a**	**120**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
5.3	5.3	5.3		5.3	5.3	2233	440	1	0
Methyl Tert-Butyl Ether			**ug/L**	**n/a**		**n/a**	**13**	**5**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.3	11	41	93	5800	136.23	2364	488	11	3
Molinate			**ug/L**	**n/a**		**n/a**	**20**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						298	133	0	0

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical	Unit	Primary EPA MCL	Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
n-Butylbenzene	**ug/L**	**n/a**	**n/a**	**n/a**	**n/a**	**260**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						1531	364	0	0

N-Nitrosodimethylamine	**ug/L**	**n/a**	**n/a**	**n/a**	**n/a**	**0.01**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.006	0.006	0.006		0.006	0.006	68	34	1	0

N-Nitrosodipropylamine	**ug/L**	**n/a**	**n/a**	**n/a**	**n/a**	**0.01**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						3	1	0	0

n-Propylbenzene	**ug/L**	**n/a**	**n/a**	**n/a**	**n/a**	**260**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						1532	365	0	0

Naphthalene	**ug/L**	**n/a**	**n/a**	**n/a**	**n/a**	**17**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.6	0.6	0.6	0.7	0.7	0.633	987	259	3	0

Nickel	**mg/L**	**n/a**	**n/a**	**0.1**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0.002	0.003	0.007	0.66	0.013	1340	349	253	7

Nitrate-Nitrogen	**mg/L**	**10**	**n/a**	**10**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.009	3.388	7.677	15.806	200	12.759	8891	594	588	395

Nitrite-Nitrogen	**mg/L**	**1**	**n/a**	**1**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0.05	0.1	0.15	35	1.759	1827	402	124	6

Odor	**TON**	**n/a**	**3**	**n/a**	**3**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
1	1	1	2	40	1.69	1371	366	315	28

Oxamyl	**ug/L**	**200**	**n/a**	**50**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						210	116	0	0

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical			Unit	Primary EPA MCL		Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
Pentachlorophenol			**ug/L**	**1**		**n/a**	**1**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						234	123	0	0
Perchlorate			**ug/L**	**n/a**		**n/a**	**6**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.81	6	11	20	870	21.406	2260	513	252	188
pH			**pH**	**n/a**		**8.5**	**n/a**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	7.3	7.64	7.9	770	7.921	2319	394	394	14
Picloram			**ug/L**	**500**		**n/a**	**500**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						227	118	0	0
Polychlorinated Biphenyls			**ug/L**	**0.5**		**n/a**	**0.5**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						225	117	0	0
Propachlor			**ug/L**	**n/a**		**n/a**	**n/a**	**n/a**	**90**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						183	85	0	0
Ra 226 + Ra 228			**pci/L**	**5**		**n/a**	**5**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.16	0.5	0.5	0.57	0.8	0.513	20	15	6	0
Sec-Butylbenzene			**ug/L**	**n/a**		**n/a**	**n/a**	**n/a**	**260**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						1518	364	0	0
Selenium			**mg/L**	**0.05**		**n/a**	**0.05**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0.002	0.004	0.006	0.045	0.005	1333	350	196	0
Silver			**mg/L**	**n/a**		**0.1**	**n/a**	**0.1**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0	0	0	0.014	0	1369	350	80	0

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical			Unit	Primary EPA MCL		Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
Silvex			**ug/L**	**50**		**n/a**	**50**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						227	118	0	0
Simazine			**ug/L**	**4**		**n/a**	**4**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.05	0.05	0.2	0.4	0.92	0.274	311	148	6	0
Specific Conductance (lab)			**umhos/cm**	**n/a**		**n/a**	**n/a**	**900**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
60	375	540	1100	1600000	3016.663	2124	335	335	121
Strontium-90			**pci/L**	**n/a**		**n/a**	**8**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
-0.35	0	0.103	0.3	1.2	0.217	63	19	18	0
Styrene			**ug/L**	**100**		**n/a**	**100**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						2291	478	0	0
Sulfate			**mg/L**	**n/a**		**250**	**n/a**	**250**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
2.4	17	50	120	1200	82.22	2913	527	527	41
TDS			**mg/L**	**n/a**		**500**	**n/a**	**500**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
48	260	380	760	4790	553.745	3945	425	425	221
Tert-Butyl Alcohol			**ug/L**	**n/a**		**n/a**	**n/a**	**n/a**	**12**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
2	2.1	9.7	22	150	37.16	968	232	3	1
Tert-Butylbenzene			**ug/L**	**n/a**		**n/a**	**n/a**	**n/a**	**260**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						1530	365	0	0
Tetrachloroethene			**ug/L**	**5**		**n/a**	**5**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.14	1	1.8	5.7	182	7.975	3357	568	114	37

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical			Unit	Primary EPA MCL		Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
Thallium			**ug/L**	**2**		**n/a**	**2**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
-2.406	0.14	0.19	0.38	30.72	1.933	1260	349	41	6
Thiobencarb			**ug/L**	**n/a**		**n/a**	**70**	**1**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						407	159	0	0
Toluene			**ug/L**	**1000**		**n/a**	**150**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.11	0.5	0.71	2	9.8	1.694	2591	490	31	0
Total Xylene			**ug/L**	**10000**		**n/a**	**1750**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						1543	392	0	0
Toxaphene			**ug/L**	**3**		**n/a**	**3**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						227	118	0	0
Trans-1,2-Dichloroethene			**ug/L**	**100**		**n/a**	**10**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.2	0.28	0.72	1.7	7.73	1.313	2703	509	12	0
Trichloroethene			**ug/L**	**5**		**n/a**	**5**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.13	1.8	3.8	18	5620	64.883	3412	569	241	115
Trichlorofluoromethane			**ug/L**	**n/a**		**n/a**	**150**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.07	0.3	0.42	0.62	19	1.663	2042	420	18	0
Trihalomethanes			**ug/L**	**80**		**n/a**	**80**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.5	1.6	4.8	64.5	87.3	28.432	618	215	23	2
Tritium			**pci/L**	**n/a**		**n/a**	**20000**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
-199	-12.6	25.7	287	596	118.69	65	18	18	0

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical			Unit	Primary EPA MCL		Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
Turbidity			**NTU**	**5**		**n/a**	**n/a**	**5**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0.21	0.52	2.6	2880	21.599	1699	360	320	78
Uranium			**pci/L**	**n/a**		**n/a**	**20**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.48	1.58	2.77	5.48	20.5	4.319	175	54	53	1
Vanadium			**mg/L**	**n/a**		**n/a**	**n/a**	**n/a**	**0.05**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.001	0.009	0.013	0.025	0.31	0.02	817	290	286	25
Vinyl Chloride			**ug/L**	**2**		**n/a**	**0.5**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						2389	483	0	0
Zinc			**mg/L**	**n/a**		**5**	**n/a**	**5**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.001	0.003	0.006	0.014	9.853	0.061	1804	369	264	1

Primary EPA MCL — **Primary EPA MCLs are federally enforceable limits for chemicals in drinking water and are set as close as feasible to the corresponding EPA MCLG.**

Secondary EPA — **Secondary EPA MCLs apply to chemicals in drinking water that adversely affect its odor, taste, or appearance Secondary EPA MCLs are not based on direct health effects associated with the chemical. Secondary MCLs are consdered desireable goals and are not federally enforceable**
.

Primary CA MCL — **Primary CA MCLs are analogous to Primary EPA MCLs and are enforceable at the state level . If the California DHS has adopted a more stringent primary MCL than the EPA MCL, the primary CA MCL sould be enforceable.**

Secondary CA — **Secondary CA MCLs are analogous to Secondary EPA MCLs and are applicable at the state level. If the California DHS has adopted a more stringent secondary MCL than the EPA MCL, the secondary CA MCL would be applied.**

CA NL — **California Notification Levels are health -based criteria similar to US EPA Health Advisories. CA NLs are not enforceable, but are levels at which the California Department of Health Services strongly urges water purveyors to take corrective actions.**

Appendix D

Compact Disk

Chino Basin

Optimum Basin Management Program

2008 State of the Basin Report

Final Report

Prepared for

Chino Basin Watermaster

Prepared by

WILDERMUTH™ ENVIRONMENTAL INC.

NOVEMBER 2009

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Acronyms, Abbreviations, and Initialisms

µg/L	micrograms per liter
1,1,1-TCA	1,1,1-trichloroethane
1,1-DCE	1,1-dichloroethene
1,2,3-TCP	1,2,3-trichloropropane
1,2-DCA	1,2-dichloroethane
AF	acre-feet
AFY	acre-feet per year
B&V	Black & Veatch, Inc.
Basin Plan	Water Quality Control Plan for the Santa Ana River Basin
CAO	Cleanup and Abatement Order
CBWM ID	Chino Basin Watermaster Well Identification
CDA	Chino Desalter Authority
CDFM	cumulative departure from mean precipitation
CDPH	California Department of Public Health (formerly the Department of Health Services)
CIM	California Institution for Men
cis-1,2-DCE	cis-1,2-dichloroethene
COPC	Constituents of Potential Concern
CVWD	Cucamonga Valley Water District
DLR	detection limit for reporting
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
EMP	Evaluation Monitoring Program
EPA	US Environmental Protection Agency
ft	feet
ft-bgs	feet below ground surface
ft-brp	feet below reference point (*e.g.* static surveyed measurement point)
GE	General Electric
GIS	Geographic Information System
GRCC	Groundwater Recharge Coordination Committee
HCMP	Hydraulic Control Monitoring Program
IEUA	Inland Empire Utilities Agency

Acronyms, Abbreviations, and Initialisms

InSAR	Synthetic Aperture Radar Interferometry
ISOB	Initial State of the Basin
JCSD	Jurupa Community Services District
M&RP	Monitoring and Reporting Program
MCL	maximum contaminant level
mg/L	milligrams per liter
MSL	Milliken Sanitary Landfill
MVSL	Mid-Valley Sanitary Landfill
MVWD	Monte Vista Water District
MWDSC	Metropolitan Water District of Southern California
MZ	Management Zone
NDMA	N-nitrosodimethylamine
NO_3 - N	Nitrate expressed as nitrogen
NPL	National Priorities List
OBMP	Optimum Basin Management Program
OIA	Ontario International Airport
PBMZ	Prado Basin Management Zone
PCBs	polychlorinated biphenyls
PCE	tetrachloroethene
ROD	Records of Decision
RP	Regional Plant
RWQCB	Regional Water Quality Control Board
SARWC	Santa Ana River Water Company
SOB	State of the Basin
SWP	State Water Project
SWQIS	State Water Quality Information System
TCE	trichloroethene
TDS	total dissolved solids
TOC	total organic carbon
US EPA	US Environmental Protection Agency
USGS	US Geological Survey
USL	Upland Sanitary Landfill

Acronyms, Abbreviations, and Initialisms

VOC	volatile organic chemical
Watermaster	Chino Basin Watermaster
WEI	Wildermuth Environmental, Inc.
WQS	water quality standard

ES-1 Summary and Background

The baseline for the ISOB was on or about July 1, 2000—the point in time that represents the start of Optimum Basin Management Program (OBMP) implementation. The State of the Basin (SOB) reports serve as a metric for measuring OBMP implementation progress. This current SOB report contains water level, water quality, ground-level, and other data through 2007/08 and describes Watermaster activity through fall 2008.

The intent of this report is twofold:

- During Watermaster fiscal year 2000/01, several OBMP-spawned investigations and initiatives commenced, encompassing groundwater level and quality, ground level, annual recharge assessment, recharge master planning, hydraulic control, desalter planning and engineering, and meter installation. This report describes the progress made in these activities through the fall of 2008.
- This report also describes the general state of the basin with respect to groundwater levels, groundwater quality, subsidence, recharge, and hydraulic control.

ES-2 Section 2 – General Hydrologic Condition

The Chino Basin covers about 220 square miles. Figure 2-1 shows the location of the Chino Basin within the context of the Santa Ana River watershed. The watershed of the Chino Basin is almost identical to the Santa Ana River at Prado, the exception being the addition of the Temescal Creek watershed that enters the Prado Dam reservoir just upstream of the dam and for practical purposes contributes negligible inflow to the Chino Basin. In total, the watershed area for streams crossing the Chino Basin is about 1490 square miles.

The Chino Basin has a semi-arid Mediterranean climate. Precipitation is a major source of local groundwater recharge for the Basin and thus, the availability of this recharge can be understood by analyzing long-term precipitation records.

The hydrologic regime in the Chino Basin has important implications for water supply and groundwater management. The occurrence of long dry periods, characteristic of the region's climate, limit the recharge of precipitation and storm water recharge for years at a time and requires management strategies that conserve precipitation and storm water recharge whenever available. The amount of stormwater produced per unit of precipitation has increased over time due to urbanization and will continue to increase in the future as the remaining undeveloped and agricultural land uses are converted to developed uses.

ES-3 Section 3 – Basin Operations and Groundwater Monitoring

Future re-determinations of safe yield for the Chino Basin will be based largely on accurate estimations of groundwater production, artificial recharge, and basin storage changes over time. Watermaster is actively improving its programs to track production, recharge, and groundwater levels (storage). A meter installation program has improved production estimates in the agricultural areas. Watermaster continues to implement comprehensive, high-frequency,

groundwater-level monitoring programs across the basin to support various OBMP-related activities. Since 2003, Watermaster has been installing pressure transducers/data loggers in many of the wells it monitors for water levels to improve data quality. In addition, nine (9) nested sets of monitoring wells have been installed in the southern Chino Basin for the HCMP and provide highly detailed, depth-specific piezometric (and water quality) data. It is likely that additional monitoring wells will need to be constructed in southern Chino Basin as private wells (that are currently being used for monitoring by Watermaster) are destroyed as agricultural land uses convert to urban.

The following are the general trends in groundwater production:

- There was a basin-wide increase in the number of wells producing over 1,000 AFY between 1978 and 2008. This is consistent with (1) the land use transition from agricultural to urban, (2) the trend of increasing imported water costs, and (3) the use of desalters.
- Since the implementation of the OBMP in 2000, the number of active production wells just north of the Santa Ana River has decreased. This is consistent with the conversion of land use from agricultural to urban that has been occurring in the area.
- Since the implementation of the OBMP in 2000, desalter pumping has commenced and has progressively increased; in 2007/08, desalter pumping reached a historical high of 26,972 AF.
- Since the implementation of the OBMP in 2000, the number of wells that produce over 1,000 AFY on the west side of Chino Basin (west of Euclid Avenue) has decreased. This is consistent with (1) the implementation of the MZ1 Interim Management Plan, which reduced pumping by up to 3,000 AFY in the Chino area, and (2) the reduced pumping by the City of Pomona, the Monte Vista Water District, and the City of Chino Hills from 2003 to 2008 as these agencies have been participating in in-lieu recharge for the Dry Year Yield program.
- Agricultural Pool pumping continues to decline. In 2007/08, total production for the Agricultural Pool fell to 30,910 AF, the lowest production on record for the pool. In accordance with the hypothesis that urbanization is the cause of decreased agricultural production, Appropriative Pool production tends to increase at approximately the same rate that Agricultural Pool production decreases.

As required by the Peace Agreement and summarized in the OBMP Recharge Master Plan, Watermaster initiated the Chino Basin Groundwater Recharge Program. This is a comprehensive program to enhance water supply reliability and improve the groundwater quality of local drinking water wells throughout the Chino Basin by increasing the recharge of storm water, imported water, and recycled water.

There are 21 Chino Basin recharge facilities described in the OBMP Recharge Master Plan, Phase II Report (WEI, 2001).

The following are the general trends in groundwater recharge:

- Since 2000, total storm water recharge has averaged approximately 4,600 AFY. During 2006/07 and 2007/08, total storm water recharge in the Chino Basin was

approximately 4,600 and 9,900 AF, respectively.

- Since 2000, the total supplemental water recharge—consisting of imported and recycled waters—has averaged approximately 11,500 AFY. During 2006/07 and 2007/08, total supplemental water recharge in the Chino Basin was approximately 6,350 and 2,400 AF, respectively.

The Chino Basin groundwater level analysis for fall 2008 revealed notable pumping depressions in the groundwater level surface that interrupt the general flow pattern surrounding the Chino I & Chino II Desalter well fields. There are also discernible groundwater level depressions in the northern portion of MZ1 (Montclair and Pomona areas) and directly southwest of the Jurupa Hills due to local groundwater production.

Watermaster has developed a Geographic Information System model to estimate groundwater storage changes from groundwater level contour maps. This model was utilized to estimate storage changes during the period following OBMP implementation. During the 2006 to 08 period, storage changed by about -54,000 AF. The total change in storage since implementation of the OBMP (2000-08) is approximately -62,000 AF.

With regard to hydraulic control, since 2000, pumping at the Chino I Desalter well field has generally flattened the regional hydraulic gradient within the shallow aquifer system around the western half of the Chino I Desalter well field and has created a capture zone surrounding the eastern half of the well field. Piezometric data suggest a significant reduction in the southward component of the hydraulic gradient around the western half of the Chino I Desalter well field but do not indicate a gradient reversal (northward component) and, hence, do not yet provide compelling evidence for complete hydraulic control at the Chino I Desalter well field. The ultimate fate of groundwater that flows past the Chino I Desalter well field is continued flow southward toward Prado Basin where groundwater rises to become surface water in the tributaries of Prado Basin.

ES-4 Section 4 – Groundwater Quality

Watermaster continues to monitor water quality in the basin and stores these data in a relational database, which also includes all of the historical data that Watermaster has been able to acquire for wells in the region. Watermaster has instituted a cooperative process whereby water quality data are acquired on a routine basis from the appropriators. This alleviates some of the data quality control issues with downloading data from the state water quality database.

Groundwater quality in Chino Basin is generally very good with better groundwater quality found in the northern portion of Chino Basin where recharge occurs. Salinity (TDS) and nitrate-nitrogen concentrations increase in the southern portion of Chino Basin. Between July 2003 and June 2008, 32 percent of the wells south of Highway 60 had TDS concentrations below the secondary MCL, an improvement from the 20 percent reported in the 2006 State of the Basin Report (period of July 2001 through June 2006). In some places, wells with low TDS concentrations are proximate to wells with higher TDS concentrations, suggesting a vertical stratification of water quality. Between July 2003 and June 2008, about 69 percent of the wells

sampled south of Highway 60 had nitrate-nitrogen concentrations greater than the MCL, an improvement from the 80 percent reported in the 2006 State of the Basin Report (period of July 2001 through June 2006). However, please note that these statistical improvements may be an artifact of sampling occurrence and frequency.

Other constituents that impact groundwater quality from a regulatory or Basin Plan standpoint include certain VOCs, arsenic, and perchlorate. As discussed in Section 4.3.4, there are a number of point source releases of VOCs in the Chino Basin that are in various stages of investigation or cleanup. There are also known point source releases of perchlorate (Milliken Valley Sanitary Landfill, Stringfellow, etc.), and non-point source related perchlorate contamination appears to have resulted from natural and anthropogenic sources. Arsenic at levels above the WQS appears to be limited to the deeper aquifer zone near the City of Chino Hills. Hexavalent chromium, while not currently a groundwater quality issue in the Chino Basin, may become so, depending on the promulgation of future standards.

The Initial State of the Basin and subsequent State of the Basin Reports discussed the need for future long-term monitoring. Due to commercial and residential development in the Chino Basin area; many of the private agricultural wells south of State Route 60 that have been used for monitoring activities are being destroyed as land is developed. In response to the loss of historically utilized wells, Watermaster developed a water quality key well program. This program designates a series of wells across a wide areal distribution for long-term monitoring activities. This key well monitoring program provides a good representation of the areal groundwater quality in this portion of the basin. Watermaster's program relies on municipal producers, government agencies, and private consultants to supply their groundwater quality data on a cooperative basis. Watermaster supplements these data with data obtained through its own sampling and analysis program of private wells in the area generally south of State Route 60. As with past water quality monitoring, the results will be added to the Watermaster database.

Point sources of concern are critical to the overall quality of Chino Basin groundwater. To ensure that Chino Basin groundwater remains a sustainable resource, it is of the utmost importance that Watermaster closely monitor point sources and emerging contaminates. It is recommended that Watermaster continue to work closely with the RWQCB and potentially responsible parties within the Chino Basin. This will allow for up-to-date understanding of groundwater quality, investigations, remediation activities, and potential mutually beneficial remedial options through Chino Basin desalting facilities.

ES-5 Section 5 – Ground-Level Monitoring

Implementation of the MZ1 Plan began in 2008. The MZ1 Plan calls for (1) the continued scope and frequency of monitoring implemented during the IMP within the MZ1 Managed Area and (2) expanded monitoring of the aquifer system and land subsidence in other areas of the Chino Basin where the Interim Management Plan (IMP) indicated concern for future subsidence and ground fissuring. The expanded monitoring efforts outside of the MZ1 Managed Area are consistent with the requirements of PE1.

Watermaster's current ground-level monitoring program includes:

- *Piezometric Levels.* Piezometric levels are an important part of the ground-level monitoring program because piezometric changes are the mechanism for aquifer-system deformation and land subsidence.
- *Aquifer-System Deformation.* Watermaster records aquifer-system deformation at the Ayala Park Extensometer facility where two extensometers record the vertical component of aquifer-system compression and/or expansion once every 15 minutes.
- *Vertical Ground-Surface Deformation.* Watermaster monitors vertical ground-surface deformation via the ground-level surveying and remote sensing (InSAR) techniques established during the IMP.
- *Horizontal Ground-Surface Deformation.* Watermaster monitors horizontal ground-surface displacement across the eastern side of the subsidence trough and the adjacent area east of the barrier/fissure zone. These data, obtained by electronic distance measurements (EDMs), are used to characterize the horizontal component of land surface displacement caused by groundwater production on either side of the fissure zone.

The conclusions and recommendations for Watermaster's basin-wide ground-level monitoring program are provided below:

- Land subsidence does not appear to be a concern in the eastern and northernmost portions of Chino Basin. In these areas, the underlying aquifer system is composed primarily of coarse-grained sediments that are not prone to compaction.

- Land subsidence and the potential for ground fissuring are major concerns in the western and southern portions of the Chino Basin. In these areas, the underlying aquifer system consists of interbedded, fine-grained sediment layers (aquitards) that can drain and compact when groundwater levels decline in the adjacent coarse-grained aquifers. Ground fissuring has occurred in the past where land subsidence was differential (i.e. steep gradient of subsidence). Ground fissuring is the main subsidence-related threat to infrastructure.

- Land subsidence has been persistent across most of the western and southern portions of the Chino Basin since, at least, 1987 when land subsidence monitoring began. In many of these areas, land subsidence continues even during periods of groundwater level recovery, indicating that thick, slowly-draining aquitards are compacting in response to the large historical drawdowns of 1935 to 1978.

- Pumping-induced drawdown has caused accelerated occurrences of land subsidence in the recent past, including subsidence in the City of Chino during the early 1990s and, currently, in the vicinity of the Chino I Desalter well field. Watermaster should anticipate similar occurrences of land subsidence in areas (1) that are prone to subsidence and (2) where drawdown will occur in the future.

- Watermaster will continue its basin-wide ground-level monitoring program, using InSAR and ground-level surveys. Watermaster will consider expanding the ground-level surveys to cover the area of the proposed Chino Creek Desalter Well Field. This

is an area that is prone to subsidence, where drawdown is planned near where ground fissuring has occurred in the past, and where InSAR data is not currently available. Watermaster will also consider expanding the ground-level surveys to cover the Pomona and Ontario Areas. In general, InSAR data coverage is continuous and of high quality throughout both areas, so ground-level surveys would primarily provide supporting and confirmation data for the InSAR and would occur at a frequency of once every three to five years.

- Watermaster will consider installing low-cost piezometer/extensometer facilities at appropriate locations in all Areas of Subsidence Concern. This type of facility has been successfully constructed and tested at Ayala Park in Chino. Such facilities record the requisite data (1) to monitor land subsidence and groundwater levels at high resolution and accuracy, (2) to provide the information necessary to characterize the elastic and/or inelastic nature of any land subsidence occurring in an area, and (3) to provide the information necessary to characterize aquifer and aquitard properties that could be used in a predictive computer-simulation model of subsidence.

- Watermaster will consider building and calibrating predictive computer-simulation models of subsidence across all Areas of Subsidence Concern in the Chino Basin. These models would provide information on the rates and ultimate magnitude of land subsidence that could be associated with various basin management planning scenarios (i.e. pumping and recharge patterns). This information would be valuable to affected Watermaster parties.

- Because ground fissuring caused by differential land subsidence is the main threat to infrastructure, Watermaster will periodically inspect for signs of ground fissuring in areas that are experiencing differential land subsidence. In addition, Watermaster will consider monitoring the horizontal strain across these zones of potential ground fissuring in an effort to better understand and manage ground fissuring.

1.1 Background

The Chino Basin Watermaster (Watermaster) completed the *Initial State of the Basin* (ISOB) Report in October 2002. The baseline for the ISOB was on or about July 1, 2000—the point in time that represents the start of Optimum Basin Management Program (OBMP) implementation. The ISOB and subsequent State of the Basin (SOB) reports serve as a metric for measuring OBMP implementation progress. This current SOB report contains water level, water quality, ground-level, and other data through 2007/08 and describes Watermaster activity through fall 2008.

The OBMP was developed for the Chino Basin (see Figure 1-1 for the location of Chino Basin and its management zones) pursuant to the Judgment (Chino Basin Municipal Water District v. City of Chino, et al.) and the February 19, 1998 ruling (WEI, 1999). Pursuant to the OBMP Phase 1 Report, the Peace Agreement and associated Implementation Plan, and the November 15, 2001 Court Order, Watermaster staff has prepared this State of the Basin (SOB) Report. The intent of this report is twofold:

- During Watermaster fiscal year 2000/01, several OBMP-spawned investigations and initiatives commenced, encompassing groundwater level and quality, ground level, annual recharge assessment, recharge master planning, hydraulic control, desalter planning and engineering, and meter installation. This report describes the progress made in these activities through the fall of 2008.
- This report also describes the general state of the basin with respect to groundwater levels, groundwater quality, ground surface levels (subsidence), recharge, and hydraulic control.

1.2 Report Organization

Executive Summary: The Executive Summary provides a brief overview of the OBMP and its results.

Section 1 – Introduction: This section describes the project background, summarizes the project objectives, and provides an outline.

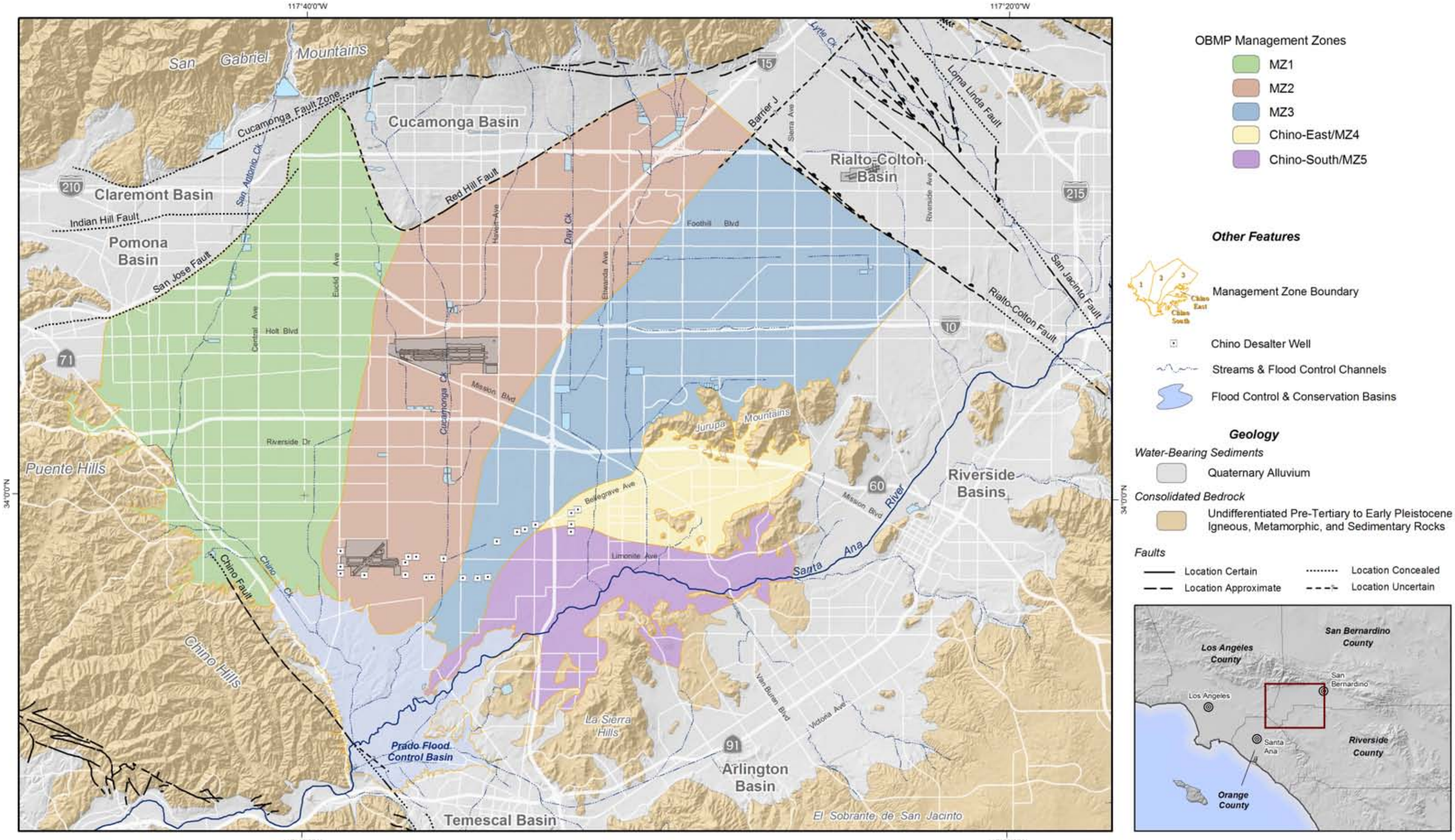
Section 2 – General Hydrologic Condition: Section 2 describes the general hydrologic condition of the Chino Basin.

Section 3 – Basin Operations and Groundwater Level Monitoring: Section 3 describes Basin operations, including groundwater level, groundwater quality, groundwater production, recharge, and ground surface monitoring efforts.

Section 4 – Groundwater Quality: Section 4 describes historical and current groundwater quality and lists and describes point sources of concern.

Section 5 – Ground Level Monitoring: Section 5 describes ground surface monitoring in the Basin using InSAR and traditional leveling surveys, describes areas of subsidence concern, and presents the results of the subsidence analyses.

Section 6 – References: Section 6 contains the references consulted in this investigation.



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0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Introduction

Chino Groundwater Basin

Management Zones

Figure 1-1

The Chino Basin covers about 220 square miles. Figure 2-1 shows the location of the Chino Basin within the context of the Santa Ana River watershed. The watershed of the Chino Basin is almost identical to the Santa Ana River at Prado, the exception being the addition of the Temescal Creek watershed that enters the Prado Dam reservoir just upstream of the dam and for practical purposes contributes negligible inflow to the Chino Basin. The Santa Ana River watershed area tributary to the Chino Basin at the MWD Crossing is about 852 square miles. The area tributary to the Chino Basin down stream of the MWD Crossing is about 414 square miles and includes the watershed areas of San Antonio and Chino Creeks, Cucamonga Creek, Day Creek, the East Etiwanda and San Sevaine Creeks, and small drainages from the Riverside and Arlington areas south of the Santa Ana River. In total, the watershed area for streams crossing the Chino Basin is about 1490 square miles. The time of concentration[1] for the Santa Ana River at the MWD Crossing is estimated to be between one to two days. By contrast the time of concentrations for streams discharging from north to south over the Chino Basin is a few hours.

2.1 Precipitation

The Chino Basin has a semi-arid Mediterranean climate. Precipitation is a major source of local groundwater recharge for the Basin and thus, the availability of this recharge can be understood by analyzing long-term precipitation records. Four precipitation stations in the Basin were used to characterize the long-term precipitation patterns in the Basin. The location of the precipitation station used herein to construct the Claremont/Montclair hybrid (combined records of 1034 and 1137)[2] station and the Ontario hybrid (combined records of 1017 and 1075) station records are shown in Figure 2-1. A third station of historical prominence in the Santa Ana watershed, the San Bernardino Hospital station, was used to characterize the historical precipitation upstream of the Chino Basin. The location of the San Bernardino Hospital station (2146) is shown in Figure 2-1. Table 2-1 lists annual statistics for the stations utilized in this characterization.

Figure 2-2 illustrates the annual precipitation time series and the cumulative departure from the mean (CDFM) precipitation for the 1900 to 2008 period at the Claremont/Montclair hybrid precipitation station. During this period, four series of dry-wet cycles are apparent: prior to 1904 through 1922; 1922 through 1946; 1946 through 1983, and 1983 through 1998. A fifth cycle appears to have started in 1998 and continues through present. The records of the Ontario hybrid and San Bernardino Hospital stations also show the same patterns of dry-wet cycles as the Claremont/Montclair hybrid station during the historic period (see Figures 2-3 and 2-4).

The long-term average annual precipitation for these stations are 17.8 inches at the Claremont/Montclair hybrid station (1900 through 2008), 15.4 inches at the Ontario hybrid

[1] The time of concentration is the time it takes for runoff from the most distant upstream part of the watershed to reach a specified point of interest.

[2] These two precipitation stations are close to each other, their overlapping records are highly correlated, and their records have been combined to produce a hybrid record of over 100 years duration.

station (1914 through 2008) and 16.4 inches at the and San Bernardino Hospital station (1900 through 2008). The ratio of dry years to wet years is about three to two. That is, for every ten years about six years will have below average precipitation and four years will have greater than average precipitation.

The safe yield of the Chino Basin is based on the hydrology during 1965 through 1974, a period of ten years (base period). This base period contains two wet years in 1965 and 1969 with annual precipitation depths of 24 and 26 inches, respectively, at the Claremont/Montclair hybrid station, and 19.8 and 25.6 inches, respectively at the Ontario hybrid station. This base period falls within the longest dry period on record (1946 to 1976). The average annual precipitation for the base period at the Claremont/Montclair hybrid station was 16.3 inches, or 1.5 inches less than the long-term annual average. The average annual precipitation for the base period at the Ontario hybrid station was 14.7 inches, or 0.6 inches less than the long-term annual average. The base period was preceded by a 20-year dry period that was punctuated with a few wet years (1952, 1954, 1957 and 1958).

The Peace Agreement period runs from 2000 to the present, an eight-year period. The Peace Agreement period contains three wet years in 2001, 2004, and 2005 with 19.7, 22.1, and 29.2 inches, respectively, as measured at the Claremont/Montclair hybrid station. The Peace Agreement period lies within a dry period that appears to have started in 1998 and continues to the present. The average annual precipitation for the Peace Agreement period at the Claremont/Montclair hybrid station was 16.6 inches, or 1.2 inches less than the long-term annual average.

2.2 Surface Water Discharge

The principal surface water features of the Chino Basin include the Santa Ana River and its tributaries in the reach between the MWD Crossing and Prado Dam. The main tributaries in this reach of the river include the San Antonio/Chino Creeks, Cucamonga Creek, Day Creek, and East Etiwanda/San Sevaine Creeks. Figure 2 1 shows the locations of these surface water features for the Chino Basin. Figure 2-1 shows the locations of two USGS discharge monitoring stations, one located at the MWD Upper Feeder Crossing of the Santa Ana River (11066460) that measures the discharge into the Chino Basin, and one located just downstream of Prado Dam (11074000) that measures the discharge exiting the watershed at the downstream end of the from the Chino and Temescal Basins.

Figure 2-5 shows the annual time history of storm flow for the Santa Ana River at below Prado Dam from water year 1919/20 to 2007/08 (October to September). Figure 2-5 also has a plot of the CDFM for precipitation at the Ontario hybrid station. Figure 2-5 demonstrates that that the relationship of precipitation to stormwater runoff changed significantly around water year 1977/78, such that more runoff per unit of precipitation was produced after 1977/78. To see this, note the positive slope of the CDFM (indicative of a wet period) during the 1936/37 to 1944/45 period. During this period, about 49 inches of precipitation occurred above the mean precipitation of 15.4 inches per year. From 1977/78 to 1982/83, another wet period, there was about 51 inches of precipitation above the mean but there was much more storm water discharge than occurred between 1937 and 1945. A similar observation can be

made about the 1991/92 to 1997/98 period.

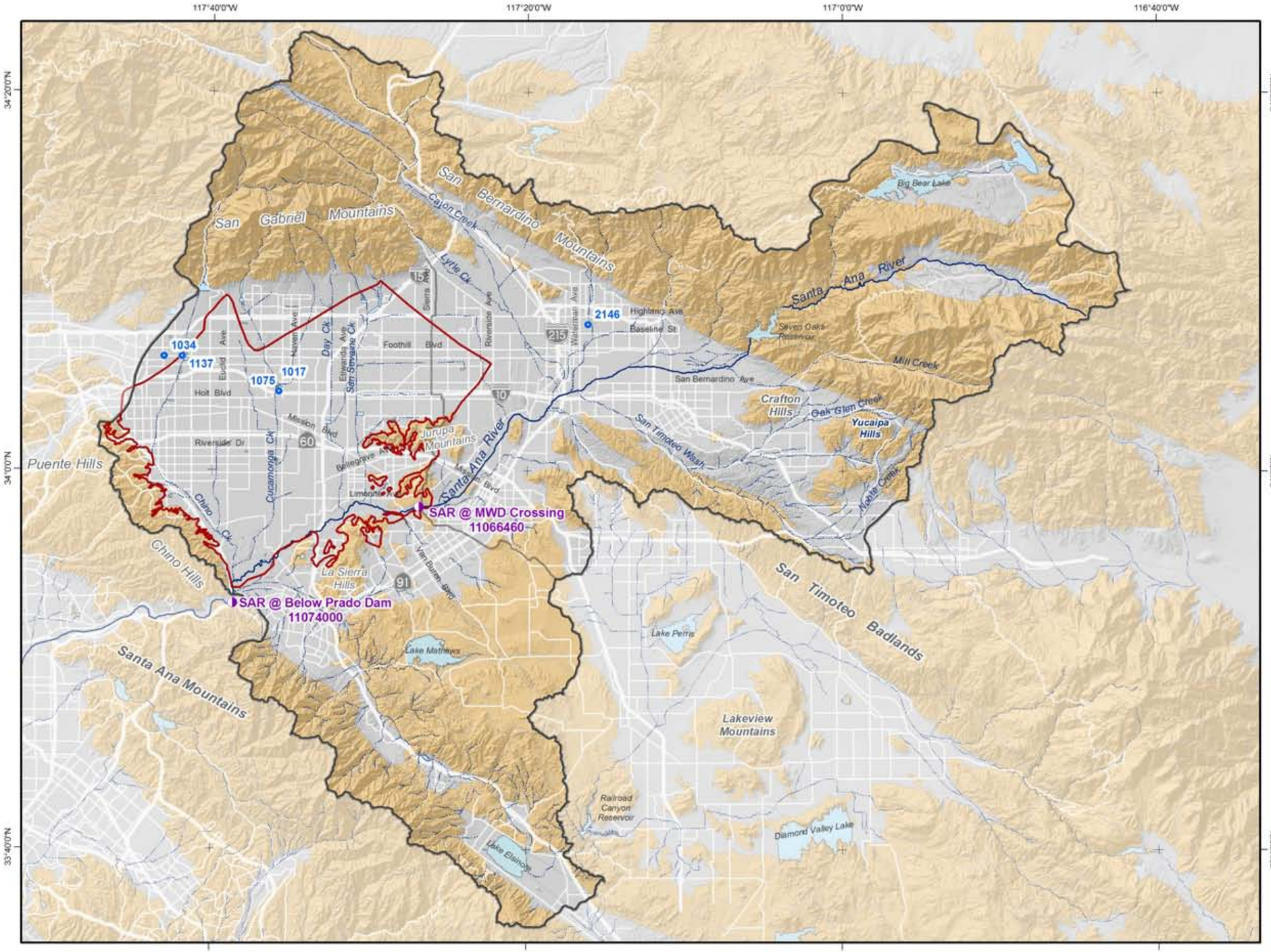
To further illustrate the change in rainfall-runoff relationship, a double mass analysis can be used. A double mass analysis is an arithmetic plot of the accumulated values of observations for two related variables that are paired in time and thought to be related. As long as the relationship between the two variables remains constant, the double mass curve will appear as a straight line (constant slope). A change in slope indicates that the relationship has changed where the break in slope denotes the timing of that change. Figure 2-6 is a double mass curve plot of precipitation at the Claremont/Montclair hybrid, Ontario, and San Bernardino Hospital precipitation stations versus storm water discharge at below Prado Dam for the 1919/20 through 2007/08 period. Note that the slope of the double mass curve after water year 1976/77 is much steeper than prior to 1976/77. The change in curvature denotes that a significant change occurred in the rainfall–runoff relationship. Figure 2-7 is a double mass curve plot of precipitation at the Claremont/Montclair hybrid station and Ontario precipitation stations versus storm water discharge generated in the watershed between the MWD Crossing and Prado Dam. The relationship of storm water discharge and precipitation in Figure 2-7 is similar to that shown in Figure 2-6 with Chino Basin producing about 75 percent of the storm water between the MWD Crossing and Prado Dam. Two observations can be regarding the time history of surface water discharge of the Santa Ana River: 1) there is a steady increase in the baseflow of the river starting around the 1970s and 2) there is an increase in the magnitude of storm water discharge starting in the late 1970s. These changes in discharge have occurred due to urbanization of the watershed. The increase in non-stormwater discharge is due to primarily to increases in recycled water discharges to the Santa Ana River. The increase in stormwater discharge is due to the modification of the land surface caused by the conversion from agricultural to urban uses, lining of stream channels, and other associated improvements in drainage systems.

2.3 Summary/Characterization of Current Hydrologic Regime

The hydrologic regime in the Chino Basin has important implications for water supply and groundwater management. The occurrence of long dry periods, characteristic of the region's climate, limit the recharge of precipitation and storm water recharge for years at a time and requires management strategies that conserve precipitation and storm water recharge whenever available. The amount of stormwater produced per unit of precipitation has increased over time due to urbanization and will continue to increase in the future as the remaining undeveloped and agricultural land uses are converted to developed uses.

Table 2-1
Annual Statistics of Long-Term Records at Precipitation Stations in the Chino Basin
(inches)

Area	Montclair/Claremont	S B Hospital	Ontario
Period of Record	1900 to 2008	1900 to 2008	1914 to 2008
Annual Average	17.78	16.36	15.38
Maximum	37.58	35.65	37.41
Minimum	5.39	5.95	3.84
Standard Deviation	7.66	6.83	7.05
Mean + 1 Standard Deviation	25.44	23.19	22.43
Coefficient of variation	43%	42%	46%



Main Features

- Precipitation Gauge Stations
- USGS Streamflow Stations
- Santa Ana River Watershed
- Chino Basin Boundary

Other Features

- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

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0 2 4 6 8 Miles
0 3 6 9 12 KM

2008 State of the Basin Report
General Hydrologic Condition

Santa Ana River Watershed Tributary to the Chino Basin

Figure 2-1

Figure 2-2
Annual Precipitation in the Claremont/Montclair Area

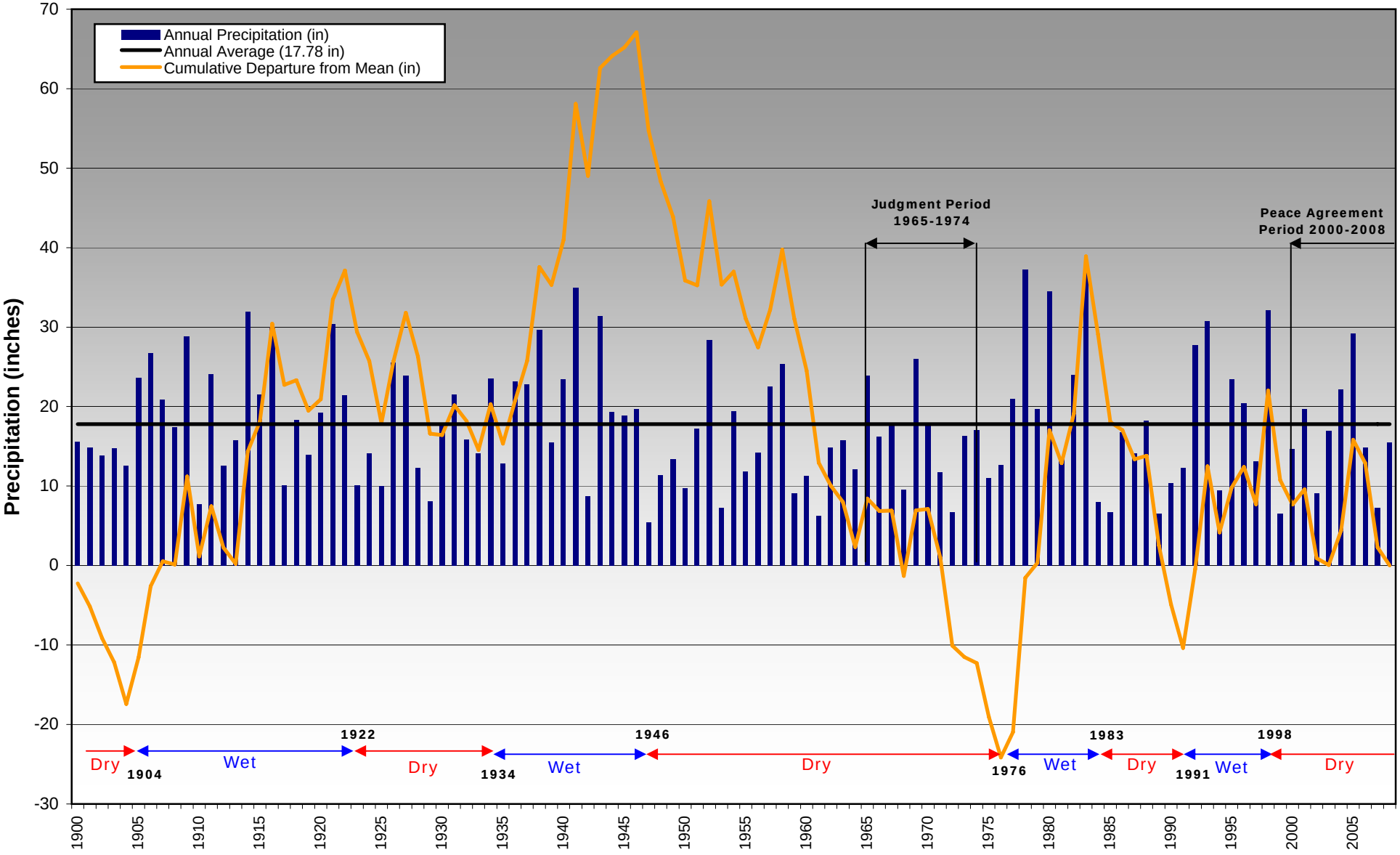

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Figure 2-3
Annual Precipitation in the Ontario Area

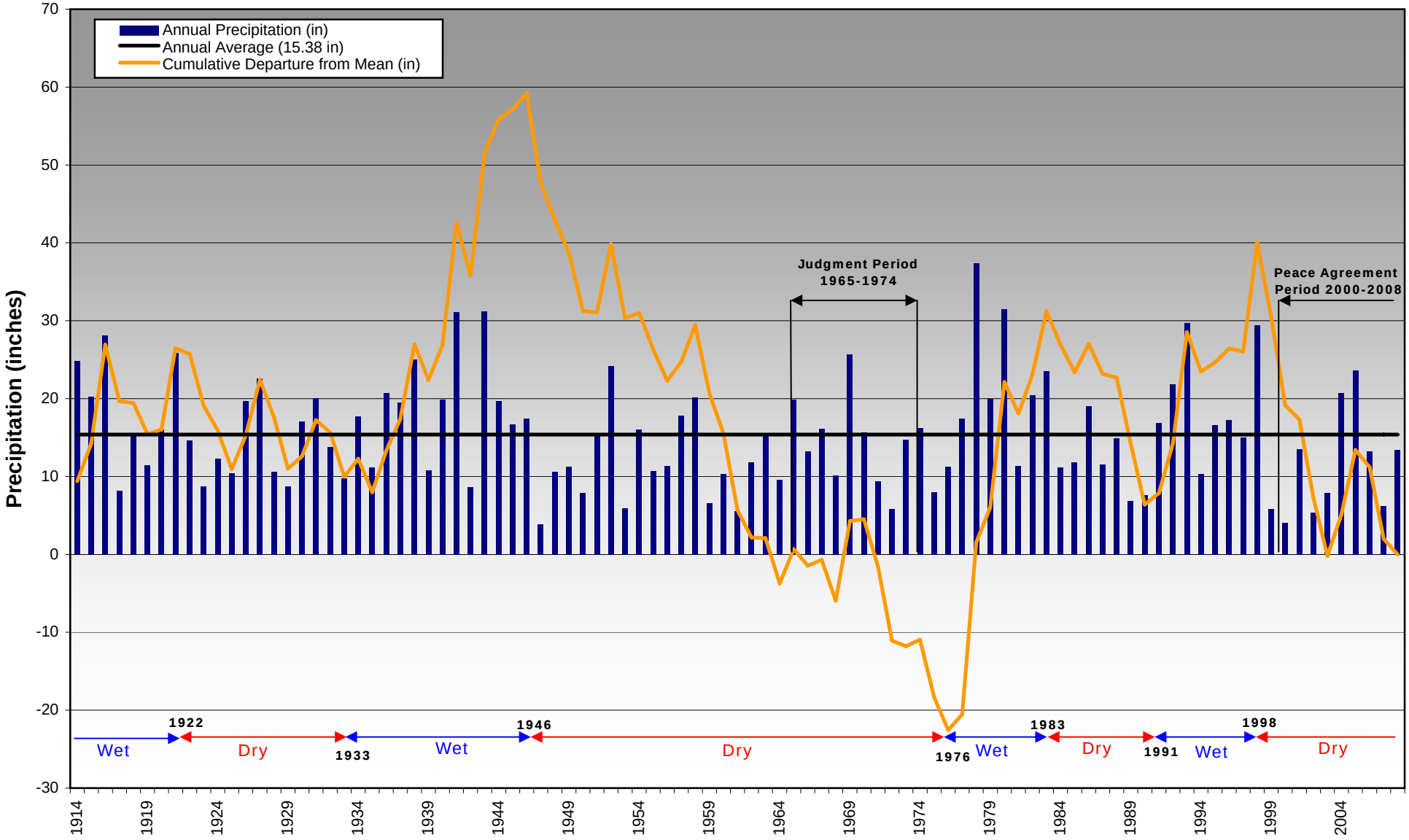

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Figure 2-4
Annual Precipitation at the San Bernardino Hospital Gauge

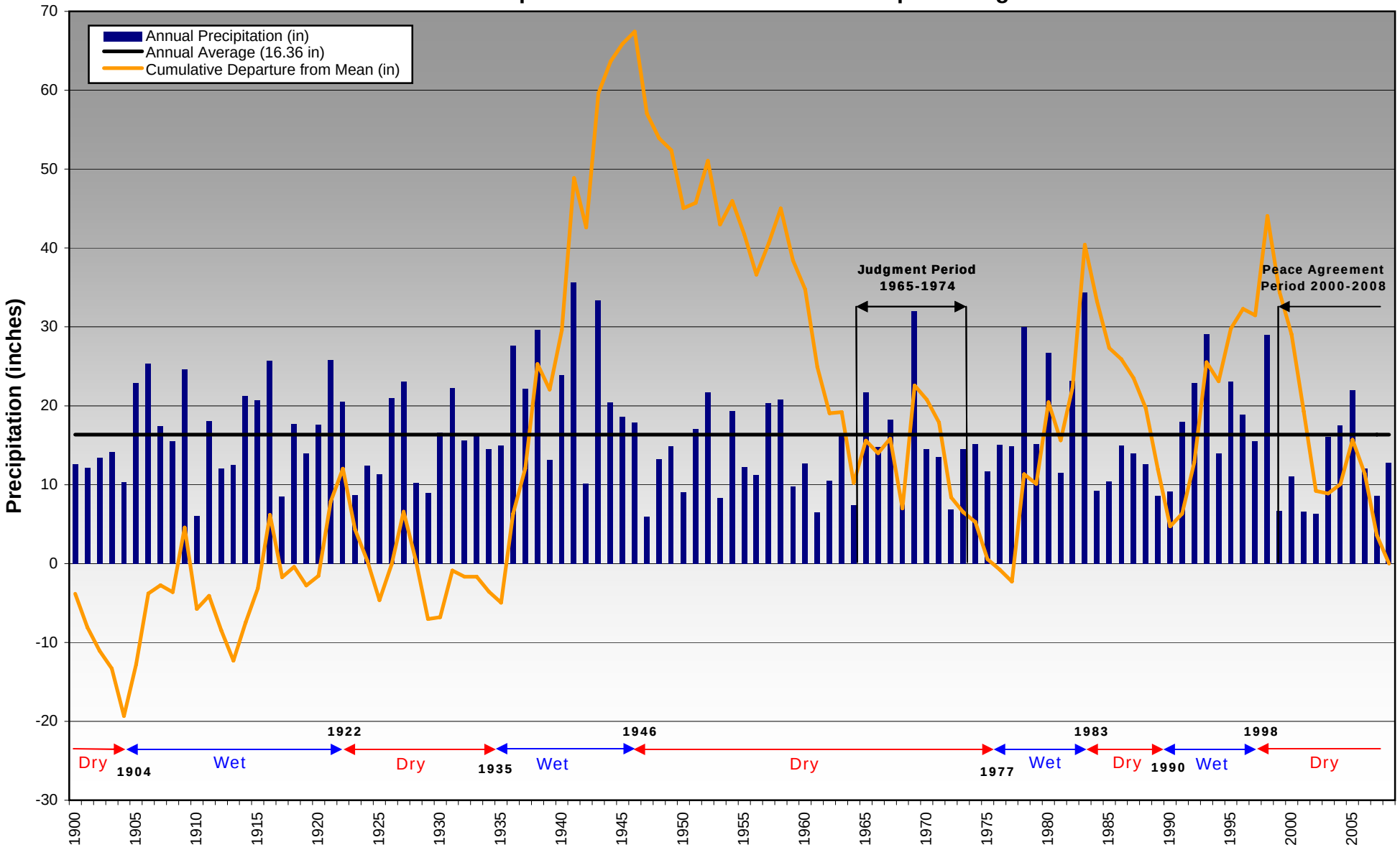

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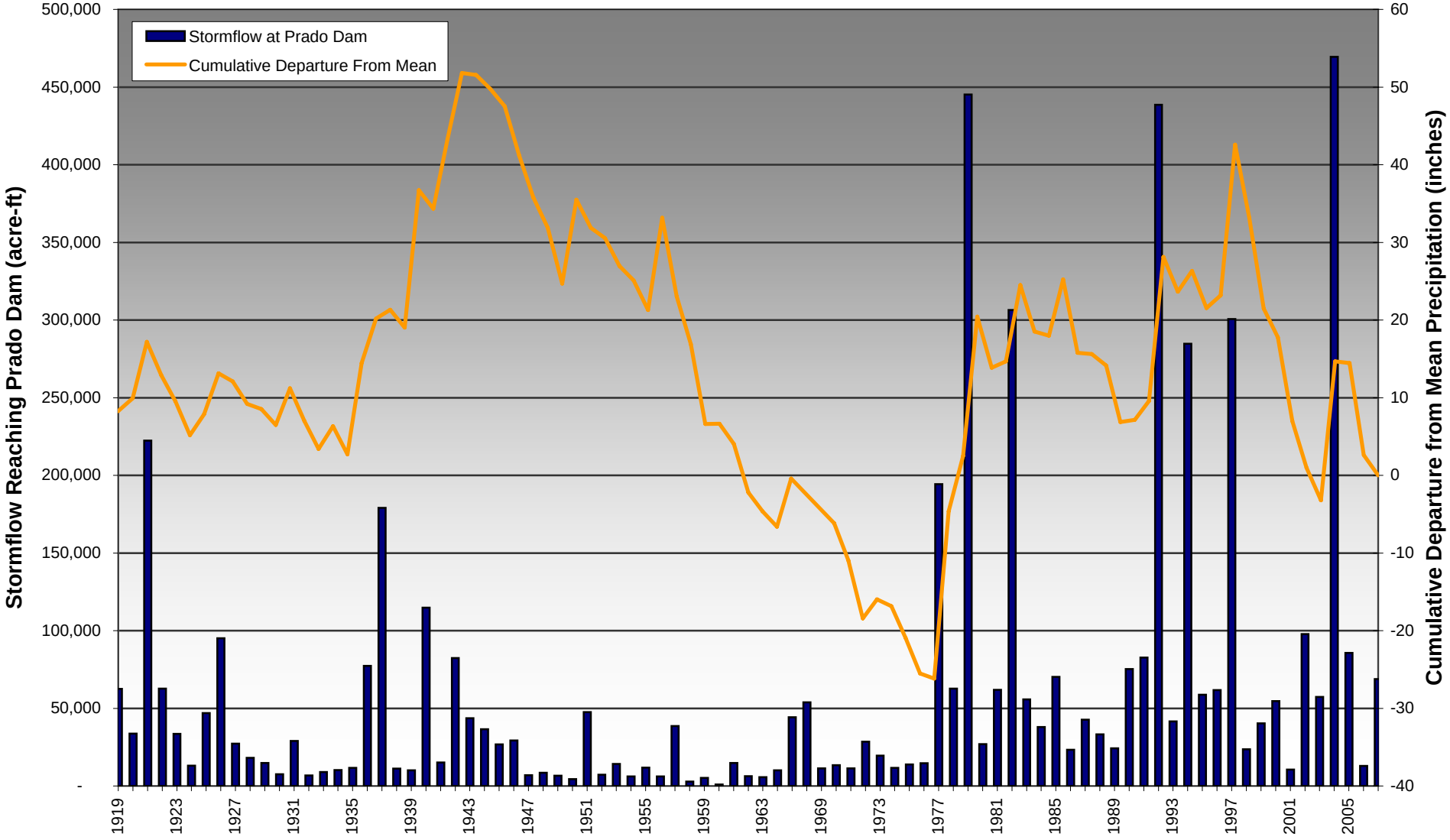
Figure 2-5
Annual Stormflow Measured at below Prado Dam
Water Year 1919/20 - 2007/08



Figs_2-5_to_2-7.xls -- Fig 2-5 Stormflow and CDFM

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Figure 2-6
Double Mass Curve of Precipitation
vs Storm Flow Measured at below Prado Dam
Water Years 1919/20 through 2007/08

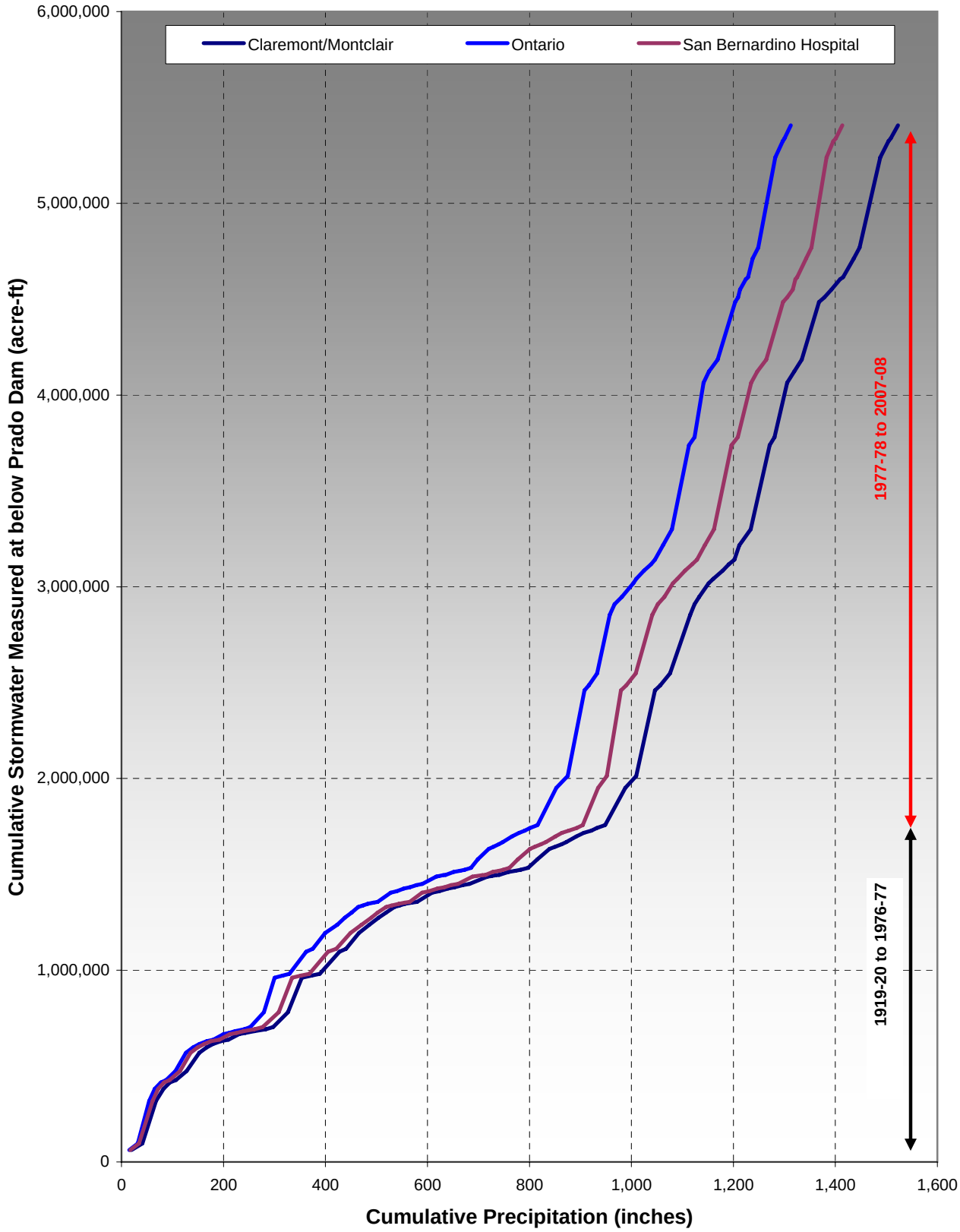

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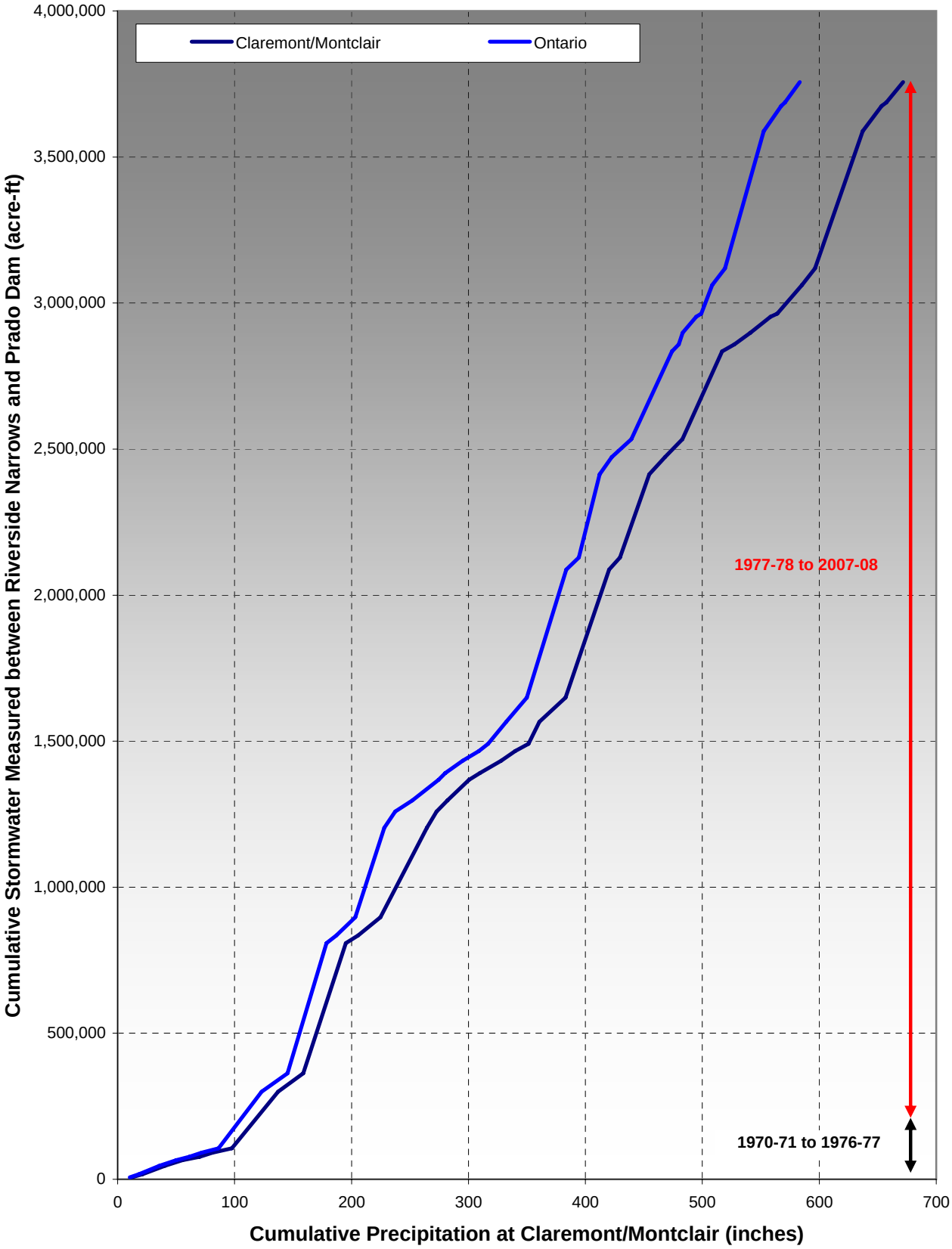
Figure 2-7
Double Mass Curve of Precipitation in Chino Basin vs
Storm Flow Generated between Riverside Narrows and Prado Dam
Water Years 1970/71 through 2007/08



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Section 3 – Basin Operations and Groundwater Monitoring

3.1 Background

The OBMP states that the re-determination of safe yield and the estimation of losses from groundwater storage programs require comprehensive groundwater-level mapping across the basin, analyses of groundwater level time histories at wells, and accurate estimations of groundwater production and artificial recharge activities. Pursuant to the Peace Agreement, Watermaster will re-determine safe yield and establish loss rates from storage in 2010.

The monitoring of basin activities—such as groundwater production and artificial recharge—and potential responses to those activities—such as changes in groundwater levels and storage—is a major component of *OBMP Program Element 1 – Develop and Implement a Comprehensive Monitoring Program*. Program Element 1 was developed, in part, to address the first impediment to *OBMP Goal 1 – Enhance Basin Water Supplies*: "Unless certain actions are taken, safe yield of the Basin will be reduced […] due to groundwater outflow from the southern part of the Basin." (WEI, 1999) This impediment speaks to the possibility of increased groundwater outflow to the Santa Ana River as a result of (1) reduced groundwater production in the southern part of the basin as agricultural land is converted to urban uses and (2) increased groundwater storage due to other management activities, such as artificial recharge and storage and recovery programs. That is, increased groundwater levels in the southern Chino Basin (via reduced groundwater production and/or increased groundwater storage) may result in increased groundwater discharge to the Santa Ana River (i.e. loss of basin yield). This potential loss of safe yield needs to be computed periodically and used in the administration of the Judgment; otherwise, the Chino Basin could be overdrafted.

This section describes the physical state of the Chino Basin with respect to groundwater pumping, artificial recharge, groundwater levels, and groundwater storage. Special attention is given to changes that have occurred since the implementation of the OBMP (2000) and since the last State of the Basin Report (2006).

3.2 Groundwater Flow System

The physical nature of groundwater occurrence and movement with regard to basin boundaries, recharge, groundwater flow, and discharge is described below.

3.2.1 Groundwater Recharge, Flow, and Discharge

While considered one basin from geologic and legal perspectives, the Chino Basin can be hydrologically subdivided into at least five flow systems that act as separate and distinct hydrologic units. Each flow system can be considered a management zone, and the management zones delineated in the OBMP were determined based on these hydrologic units (WEI, 1999), as shown in Figure 1-1. Each management zone has a unique hydrology, and water resource management activities that occur in one management zone have limited impacts on the other management zones.

The predominant sources of recharge to Chino Basin groundwater reservoirs are percolation

of direct precipitation and returns from applied water. The following is a list of other potential sources of recharge:

- Infiltration of flow within unlined stream channels overlying the basin
- Underflow from fractures within the bounding mountains and hills
- Artificial recharge of urban runoff, storm water, imported water, and recycled water at recharge basins
- Underflow from seepage across the bounding faults, including the Red Hill Fault (from Cucamonga basin), the San Jose Fault (from the Claremont Heights and Pomona basins), and the Rialto-Colton Fault (from the Rialto-Colton Basin)
- Deep percolation of precipitation and returns from use
- Intermittent underflow from the Temescal Basin

In general, groundwater flow mimics surface drainage patterns: groundwater flows from the forebay areas of high elevation (areas in the north and east flanking the San Gabriel and Jurupa Mountains) towards areas of discharge near the Santa Ana River within the Prado Flood Control Basin.

In detail, groundwater discharge throughout Chino Basin primarily occurs via:

- Groundwater production
- Rising water within Prado Basin (and potentially other locations along the Santa Ana River, depending on climate and season)
- Evapotranspiration within Prado Basin (and potentially other locations along the Santa Ana River, depending on climate and season) where groundwater is near or at the ground surface
- Intermittent underflow to the Temescal Basin

3.3 Monitoring Programs

3.3.1 Groundwater Pumping Monitoring

Since its establishment in 1978, Watermaster has collected information to develop groundwater production estimates. Appropriative Pool and Overlying Non-Agricultural Pool estimates are based on flow meter data that are provided by producers on a quarterly basis. Agricultural Pool estimates are based on water duty methods and meter data. The Watermaster Rules and Regulations require groundwater producers that produce in excess of 10 acre-feet per year (AFY) to install and maintain meters on their well(s). In 2000, Watermaster initiated a meter installation program for Agricultural Pool wells and a meter-reading program that required at least one reading per year.

In the OBMP Phase I Report (WEI, 1999), it was estimated that up to 600 private wells would need to be equipped with meters. Watermaster staff completed meter installation on the majority of these wells and began reading meters in 2003. Some agricultural wells were not metered due to the anticipated conversion of land from agricultural to urban uses. As of

December 2008, Watermaster had installed or repaired meters at 326 active agricultural wells. Watermaster records production data from these meters on a quarterly basis. These data are then entered into Watermaster's database. Figure 3-1 shows the locations of all active wells in fiscal 2007/08 by pool.

3.3.2 Artificial Recharge Monitoring

Figure 3-2 shows the locations of the basins used for artificial recharge in the Chino Basin. There are four types of water recharged within Chino Basin: imported water from the State Water Project (SWP), storm water, urban runoff, and recycled water. Deliveries of SWP water are monitored using water delivery records supplied by the Metropolitan Water District of Southern California (MWDSC) and the IEUA. Historically, the recharge of storm water and urban runoff was incidental to flood control operations, and many opportunities to measure and record this recharge were missed. Since the implementation of the OBMP, water level data sensors have been installed in each recharge basin. Recorded changes in recharge basin water levels during storm events coupled with elevation-area-volume curves and elevation-outflow relationships allow for the calculation of storm water and urban runoff recharge. Recycled water is recharged at seventeen of the recharge sites, most of which have multiple basins. The IEUA monitors and reports recycled water quality and recharge volumes. Groundwater quality within the vicinity of the recycled water recharge basins is measured and reported quarterly by the IEUA.

3.3.3 Groundwater Level Monitoring

Groundwater level monitoring was inadequate prior to OBMP implementation. Problems with historical groundwater level monitoring included an inadequate areal distribution of wells in monitoring programs, short time histories, questionable data quality, and insufficient resources to develop and conduct a comprehensive program.

The OBMP defined a new, comprehensive groundwater level monitoring program. The program start-up occurred in two steps: an initial survey from 1998 to 2001, followed by long-term monitoring at a set of key wells.

Watermaster has three active groundwater level monitoring programs operating in the Chino Basin: (1) a semiannual basin-wide well monitoring program, (2) a key well monitoring program that is associated with the Chino I/II Desalter well fields and the HCMP, and (3) a piezometric monitoring program that is associated with land subsidence and ground fissuring in Management Zone 1 (MZ1). Monitoring frequency varies with each program. Figure 3-3 shows the locations and measurement frequencies of all the wells that are currently used in Watermaster's groundwater level monitoring programs. In addition to its field programs, Watermaster collects groundwater level data from municipal producers, government agencies, and private entities. All collected water level measurements are entered into Watermaster's relational database.

3.3.3.1 Basin-wide Groundwater Level Monitoring Program

The objective of the basin-wide groundwater level monitoring program is to collect groundwater level data from all wells in the Chino Basin that can be reliably monitored. These wells are shown in Figure 3-2, symbolized by their measurement frequencies. Wells in the other groundwater level monitoring programs (see Sections 3.3.3.2 and 3.3.3.3 below) are, by definition, also part of the basin-wide monitoring program. In total, the basin-wide program consists of about 900 wells. Watermaster staff measures water levels at about 450 private wells at least twice per year (spring and fall). At the remaining wells, water levels are measured by other agencies, including:

- California Department of Toxic Substances and Control (Stringfellow Superfund Site)
- Orange County Water District (Prado Basin)
- Santa Ana Regional Water Quality Control Board (various remediation sites)
- USGS (special investigations)
- County of San Bernardino (landfill monitoring)
- Private Consultants (various remediation sites)

Watermaster collects data for these wells twice per year; though, for some of these wells, data are collected more frequently as part of other monitoring programs (see below).

3.3.3.2 Key Well Water Level Program

Watermaster developed and implemented a key well monitoring program in the southern portion of the Chino Basin. The objective of this program is to increase measurement frequency and data quality at a reduced but representative network of wells. This network of wells and the monitoring program must satisfy the requirements for monitoring desalter impacts to local producers and for determining hydraulic control (see Section 3.6.4 for a description of the HCMP).

In the Chino Basin, development has led to the conversion of land from agricultural to urban uses and has resulted in the destruction of wells that were previously included in Watermaster's key well water level monitoring program. As key wells are lost to development, nearby wells are evaluated for suitability as key well replacements. Currently, there are 159 wells in the key well water level monitoring program. Manual water levels measurements are done monthly at 95 of these wells. The remaining 64 wells contain pressure transducers/data loggers that automatically record water levels once every 15 minutes.

3.3.3.3 MZ1 Monitoring Program

The MZ1 monitoring program is an intensive aquifer-system monitoring program that was implemented beginning in Watermaster fiscal year 2001/02 to provide information that could be used by Watermaster to determine the causes of subsidence in MZ1 and develop a long-term subsidence management plan for MZ1. In fiscal 2002/03, an aquifer system monitoring facility was constructed at Ayala Park in the City of Chino. This facility includes multi-depth piezometers that record depth-specific head once every 15 minutes. In addition, about 30 production and monitoring wells that surround this facility are equipped with pressure transducers that record water levels once every 15 minutes. All of these data are

uploaded to Watermaster's water level database. Several of these wells are also included in the key well water level monitoring program.

3.4 Groundwater Pumping

3.4.1 Historical Groundwater Pumping

Table 3-1 lists Watermaster's records of Chino Basin production by pool for the period fiscal 1977/78 through fiscal 2007/08. Figure 3-4 depicts the distribution of production by pool. Over this period, annual groundwater production has ranged from a high of about 198,000 AF (fiscal 2006/07) to a low of about 123,000 AF (fiscal 1982/83) and has averaged about 154,000 AFY since fiscal 1977/78. The distribution of production by pool has shifted since 1977. Agricultural Pool production, which is mainly concentrated in the southern portion of the basin, dropped from about 54 percent of total production in 1977-78 to about 19 percent in 2007/08. During the same period, Appropriative Pool production, which is mainly concentrated in the northern half of the basin, increased from about 40 percent of total production in 1977-78 to about 79 percent in 2007/08 (sum of production for the appropriative pool and the Chino Desalter Authority [CDA]). Increases in Appropriative Pool production have approximately kept pace with declines in agricultural production. Production in the Overlying Non-Agricultural Pool declined from about 5 percent of total production in fiscal 1977/78 to about 2 percent in the mid-1980s, rose to about 4 percent through the 1990s, and recently decreased to about 2 percent in 2003-04 where it remained through fiscal 2007/08.

Figures 3-5 through 3-9 illustrate the location and magnitude of groundwater production at wells in the Chino Basin for fiscal years 1977/78, 1999/2000, 2005/06, 2006/07, and 2007/08, respectively. A close review of these figures indicates:

- There was a basin-wide increase in the number of wells producing over 1,000 AFY between 1978 and 2008. This is consistent with (1) the land use transition from agricultural to urban, (2) the trend of increasing imported water costs, and (3) the use of desalters.
- Since the implementation of the OBMP in 2000, the number of active production wells just north of the Santa Ana River has decreased. This is consistent with the land use transition from agricultural to urban that has been occurring in the area.
- Since the implementation of the OBMP in 2000, desalter pumping has commenced and progressively increased; in fiscal 2007/08, desalter pumping reached a historical high of 26,972 AFY.
- Since the implementation of the OBMP in 2000, the number of wells that produce over 1,000 AFY on the west side of Chino Basin (west of Euclid Avenue) has decreased. This is consistent with (1) the implementation of the MZ1 Interim Management Plan, which reduced pumping by up to 3,000 AFY in the Chino area, and (2) reduced pumping by the City of Pomona, the Monte Vista Water District, and the City of Chino Hills from 2003 to 2008, as these agencies have been participating in in-lieu recharge for the Dry-Year Yield Program.

3.4.2 Agricultural Pool Pumping

Agricultural Pool pumping has declined steadily since 1978 (see Figure 3-1). In fiscal 2007/08, total production for the Agricultural Pool fell to 30,910 AF—the Agricultural Pool's lowest production on record. Since OBMP implementation in 2000, Agricultural Pool production has decreased from about 40,000 AF in fiscal 2000/01 (24 percent of total basin production) to about 31,000 AF in fiscal 2007/08 (19 percent of total basin production).

3.4.3 Overlying Non-Agricultural Pool Pumping

Since OBMP implementation in 2000, Overlying Non-Agricultural Pool production has accounted for less than 5 percent of total basin production, ranging from about 2,300 AF (1 percent of total production in fiscal 2004/05) to 8,000 AF (5 percent of total production in fiscal 2000/01). In fiscal 2007/08, Overlying Non-Agricultural production of about 3,400 AF accounted for 2 percent of total basin production.

3.4.4 Appropriative Pool Pumping

Since OBMP implementation in 2000, average production by the Appropriative Pool, excluding desalter production, has been about 122,000 AFY, which accounts for about 70 percent of total basin production.

The CDA operates two desalter facilities (Chino I and Chino II) that are supplied with raw groundwater from 22 wells. The desalter facilities belong to the Appropriative Pool. In fiscal 2007/08, the CDA desalters produced more water than in any previous year (26,972 AF). Since the CDA began pumping in 2000, its production has accounted for about 16 percent of total Appropriative Pool production and about 8 percent of total basin production. During 2005/06, the Chino II Desalter facility became operational, and as a result, CDA groundwater production increased by about 60 percent from the previous year. Average annual production by the CDA since 2000 has been about 14,800 AFY.

Since OBMP implementation in 2000, average annual production by the Appropriative Pool, including desalter production, has been about 137,000 AFY. Approximately 130,000 AF were produced in fiscal 2007/08. As a percent of total basin production, Appropriative Pool production increased from about 72 percent in fiscal 2000/01 to about 79 percent in fiscal 2007/08.

3.5 Artificial Recharge

Watermaster initiated the Chino Basin Groundwater Recharge Program as required by the Peace Agreement. This program is an integral part of Watermaster's OBMP and is summarized in the OBMP Recharge Master Plan. This comprehensive program aims to enhance water supply reliability and improve the groundwater quality of local drinking water wells throughout the Chino Basin by increasing the recharge of storm water, imported water, and recycled water.

Below, the physical volumes of water percolated at recharge basins in the Chino Basin are

discussed. Specific source waters include storm water and supplemental water, which consists of State Water Project (SWP) water and recycled water.

3.5.1 Recharge Facilities

There are 21 recharge facilities described in the OBMP Recharge Master Plan, Phase II Report (B&V & WEI, 2001). Table 3-2 lists the operable recharge facilities in the Chino Basin and summarizes annual wet water recharge (by type) for the period of July 1, 2000 through June 30, 2008. Figure 3-2 shows the locations of the groundwater recharge facilities. Detailed descriptions of these facilities and their operating characteristics can be found in *Chino Basin Recharge Facilities Operating Procedures* (GRCC, 2006).

3.5.2 Regulatory Requirements for Recharge in the Chino Basin

The general recharge requirements for the Chino Basin are outlined in Section 5.1 of the Chino Basin Peace Agreement – Recharge and Replenishment. The requirements of the Peace Agreement are further discussed and expanded on in the OBMP Recharge Master Plan (WEI, 2001).

The Recycled Water Groundwater Recharge Program, which is being implemented by the IEUA and Watermaster, is subject to the following requirements:

- California Regional Water Quality Control Board, Santa Ana Region. Monitoring and Reporting Program (M&RP) No. R8-2005-0033 for IEUA and Chino Basin Watermaster. Phase 1 Chino Basin Recycled Water Groundwater Recharge Project, San Bernardino County. April 15, 2005.
- California Regional Water Quality Control Board, Santa Ana Region. Order No. R8-2007-0039. Water Recycling Requirements for Inland Empire Utilities Agency and Chino Basin Watermaster, Chino Basin Recycled Groundwater Recharge Program, Phase I and Phase II Projects, San Bernardino County. June 29, 2007.

3.5.3 Historical Recharge

3.5.3.1 Storm Water Recharge

Storm Water recharge is monitored by the IEUA pursuant to the Chino Basin Recharge Facilities Operating Procedures (GRCC, 2006). Transducers have been installed in each recharge basin that receives storm water. The percolation rate in each basin is measured directly and used in conjunction with established elevation-storage-area tables to calculate recharge.

Since 2000, total storm water recharge has averaged approximately 4,600 AFY. During fiscal years 2006/07 and 2007/08, total storm water recharge in Chino Basin was approximately 4,600 and 9,900 AF, respectively (see Table 3-2).

3.5.3.2 Supplemental Water Recharge

SWP water for artificial recharge is currently available to the region from the MWDSC. The MWDSC delivers SWP water into the Chino Basin from the Foothill Feeder, which flows from east to west across the northern half of the Chino Basin. During fiscal 2006/07, total SWP water recharge in Chino Basin was approximately 6,500 AF. During fiscal 2007/08, there was no SWP water recharge in the Chino Basin. The aggregate average SWP water recharge that has occurred since the OBMP was implemented is about 10,100 AFY.

During fiscal 2007/08, the Banana, Hickory, 7th and 8th Street, and Ely Basins were used to recharge recycled water. During fiscal years 2006/07 and 2007/08, total recycled water recharge in Chino Basin was approximately 3,000 and 2,400 AF, respectively. The aggregate average recycled water recharge that has occurred since the OBMP was implemented is about 1,000 AFY.

During fiscal years 2006/07 and 2007/08, supplemental water recharge—consisting of imported and recycled waters—was approximately 6,350 and 2,400 AF, respectively. The aggregate average supplemental water recharge that has occurred since the OBMP was implemented is about 11,500 AFY.

3.6 Groundwater Levels

This subsection analyzes groundwater levels at wells in the various management zones (MZs) throughout the Chino Basin and discusses changes in groundwater storage since the implementation of the OBMP in 2000 and since the 2006 State of the Basin report.

3.6.1 Historical Groundwater Level Trends

Figure 3-10 shows the locations of wells with groundwater level time histories discussed herein and the Chino Basin management zone boundaries. Wells were selected based on length of record, density of data points, quality of data, geographical distribution, and aquifer system. Wells are identified by their local name (usually owner abbreviation and well number) or their Watermaster ID (CBWM ID) if privately owned.

Figures 3-11 through 3-15 are groundwater level time history charts for the wells shown in Figure 3-10. Some of the short-term groundwater level fluctuations shown in these figures result from the inclusion of static and dynamic observations. Below, by management zone, the behavior of groundwater levels at specific wells is compared to climate, groundwater production, wet water recharge activities, and other factors as appropriate.

To compare groundwater levels to climate, a cumulative departure from mean precipitation (CDFM) curve has been plotted on the groundwater level time history charts. Positive sloping lines on the CDFM curve show wet years or wet periods. Negatively sloping lines show dry years or dry periods. For example, the period from 1978 to 1983 was an extremely wet period, and it is represented by a positively sloping line. To compare groundwater levels to pumping and recharge activities, bar charts that show groundwater production and wet water recharge by management zone have been superimposed on the groundwater level time history charts.

3.6.1.1 Management Zone 1

MZ1 is an elongate region, running generally north-south, and comprises the westernmost area of the Chino Basin. It is bounded by MZ2 to the east, various basin-boundary faults to the north, and sedimentary bedrock outcrops to the west and south.

Figure 3-11 shows groundwater level time histories for the following wells: Monte Vista Water District Well 10 (MVWD-10), City of Pomona Well 11 (P-11), City of Chino Well 10 (C-10), and Chino Hills Wells 15A and 16 (CH-15A and CH-16). The Montclair, College Heights, Upland, and Brooks Street Basins are located in the northern portion of MZ1 and are the primary sites for artificial recharge.

Wells MVWD-10 and P-11 exhibit representative groundwater levels for the northern portion of MZ1. An analysis of static groundwater levels at these wells shows a decline from 1995 to 2001, a period of increased groundwater production in MZ1. Since 2001, water levels have risen by about 100 feet at MVWD-10 and by about 45 feet at P-11. This increase is most likely attributed to a decrease in local production and an increase in wet water recharge in MZ1 since 2001.

Well C-10 is located in central MZ1. Water levels at C-10 peak in the mid-1990s but decline by about 20 feet from 1995 to 2000, which is likely due to increased groundwater production in MZ1. Unlike other wells in MZ1 that experienced significant water level recovery from 2000 to 2006, C-10's water levels remained essentially unchanged. Since 2006, water levels have risen by approximately 20 feet. This increase is due to a decrease in local production and an increase in wet water recharge.

Water levels measured at CH-15A are representative of the shallow aquifer system in the southern portion of MZ1. The recent land subsidence investigation (Section 5) has shown that in southern MZ1, the aquifer system is hydrologically stratified. The shallow aquifer system is unconfined to semi-confined while the deep aquifer system is confined. Water levels in CH-15A have historically been stable at around 80-90 ft-bgs and have experienced small variations in response to nearby pumping. Though, since 2000, water levels have risen by about 10 feet. This is primarily due to the decrease in local production associated with the MZ1 Interim Management Plan.

CH-16 is perforated in the confined deep aquifer system, which is characterized by large changes in piezometric pressure due to nearby pumping. In 2003 and 2004, during a series of pumping tests conducted by Watermaster in southern MZ1, water levels in CH-16 dropped by approximately 100 feet, and the period of recovery lasted several months. These tests demonstrated that piezometric levels in CH-16 (and the deep aquifer system in general) are heavily influenced by changes in pumping from local wells screened within the deep aquifer system. The static water levels at CH-16 declined by about 100 feet from 1995 to 2000 and subsequently recovered by about 140 feet from 2000 to 2006. At the end of 2008, static water levels had declined by about 30 feet from the 2006 highs with a maximum drawdown of about 60 feet observed in the summer of 2008.

3.6.1.2 Management Zone 2

Management Zone 2 (MZ2) is a large, central, elongate area of the Chino Basin (see Figure 3-10). Figure 3-12 shows groundwater level time histories for Cucamonga Valley Water District (CVWD) Wells CB-3 and CB-5 (CVWD CB-3 and CVWD CB-5), City of Ontario Well 16 (O-16), CBWM ID 600394, and Hydraulic Control Monitoring Program Wells 2/1 and 2/2 (HCMP-2/1, and HCMP-2/2). These wells are aligned north to south, approximately along a groundwater flow line. The San Sevaine, Etiwanda, Lower Day, Victoria, Turner, and Ely Basins are located in the northern and central regions of MZ2 and are the primary sites for artificial recharge.

The groundwater level time histories for the northernmost wells—CVWD CB-3 and CB-5 and O-16—show a general water level increase following 1978, which is likely due to a combination of the 1978 to 1983 wet period, the reduction in overdraft following the implementation of the Chino Basin Judgment, and the start of artificial replenishment with imported water in the San Sevaine and Etiwanda Basins. Following the early 1990s, water levels at these wells began to decrease and have continued to decrease to present. The static water levels at CB-3 and CB-5 decreased by approximately 30 feet between 2003 and 2006. Long-term water level decreases in this area of MZ2 are likely due to decreased wet water recharge from 1996 to 2003 and increased groundwater production from 1995 to present.

Well CBWM ID 600394 is located in the central portion of MZ2, north of the Chino I Desalter well field. Water levels at this well have decreased by about 15 feet since 2000.

Wells HCMP 2/1 and HCMP 2/2 are located at the southern end of MZ2 near the Chino I Desalter well field. These wells were completed and the first measurements were recorded in early 2005. HCMP 2/1 is perforated in the shallow aquifer system, and HCMP 2/2 is perforated in the deep aquifer system. Contrary to that of of MZ1, the deeper aquifer in this MZ behaves much more like the shallow, unconfined aquifer, which is indicative of a greater degree of hydraulic communication between the two aquifer systems. Both wells exhibited similar groundwater level increases (15-20 feet) from 2005 to 2006. It is likely that this was due to changes in local production—especially at some of the nearby Chino I Desalter wells, which experienced a production decrease in 2005 and 2006. Since 2006, water levels have decreased by 5-10 feet in both wells.

3.6.1.3 Management Zone 3

Management Zone 3 (MZ3) consists of the area along the eastern boundary of the Chino Basin. It is bounded by MZ2 to the west, Chino-East (MZ4) and Chino-South (MZ5) to the south, and the Rialto-Colton Fault to the east (see Figure 3-10). Figure 3-13 shows water level time histories for Fontana Water Company Wells F30A and F35A (F30A and F35A), Milliken Landfill Well M-3 (M-3), County of San Bernardino MIL M-06B, CBWM ID 3602468, and HCMP Well 7/1 (HCMP 7/1). These wells are aligned northeast to southwest, approximately along a groundwater flow line. The RP-3 and Declez Basins are located in the central region of MZ3 and are the primary sites for artificial recharge.

Wells F30A and F35A are located in the northeastern portion of MZ3. The groundwater level time histories of these two wells show relatively stable water levels from 1978 until the late

1990s. From 2000 to 2006, the wells experienced a progressive decline in water levels of about 25 feet. This decline is likely due to increased production in MZ3. Their lack of responsiveness to climate is likely due to the absence of significant sources of recharge. Since 2006, water levels at F35A have remained relatively unchanged, and water levels at F30A have fluctuated ±5 to 10 feet.

Wells M-3/M-06B and CBWM ID 3602468 are located in the central portion of MZ3. From 2000 to 2006, a groundwater decline of about 30 feet was observed at these wells.

The southernmost well, HCMP-7/1, experienced a groundwater level decline of about 20 feet from 2005 to the end of 2008. Similar water level declines can be observed in most wells throughout MZ3. This regional drawdown in MZ3 is likely due to the steady increase in production within MZ3 over the past 30 years and a lack of artificial recharge.

3.6.1.4 Management Zone 4

MZ4 – also known as Chino-East – is bounded by the Jurupa Hills to the north, the Pedley Hills to the east, MZ5 to the south, and MZ3 to the west (see Figure 3-10). Figure 3-14 shows groundwater level time histories for HCMP Well 9/1 (HCMP-9/1), Jurupa Community Services District Well 10 (JCSD-10), and CBWM ID 3300718. There are no major recharge basins in MZ4, and very little groundwater production occurs in this area.

Groundwater levels at these wells decreased by about 30 feet between 2000 and 2008. These declines are likely due to groundwater production at nearby wells, including the Chino II desalter well field, which is located near the western boundary of the MZ.

3.6.1.5 Management Zone 5

MZ5 – also known as Chino-South – is bounded by MZ4 to the north, MZ3 to the west, the Riverside Narrows to the east, and various unnamed hills to the south (see Figure 3-10). Figure 3-15 shows groundwater level time histories for USGS Well Archibald-1, HCMP Well 8/1 (HCMP 8/1), and Santa Ana River Water Company Well 07 (SARWC-07). There are no groundwater recharge basins in MZ5, but the Santa Ana River is a major source of groundwater recharge.

These wells exhibit very little groundwater level variation due to the stabilizing effects of the Santa Ana River. Production in MZ5 decreased steadily from 1978 to 2008 due to the destruction of many private agricultural wells. Current production is approximately 3,000 AFY (see Figure 3-15). Groundwater levels in HCMP-8/1 and SARWC-07 have declined about 10-15 feet since 2006. This decline is likely due to the onset of pumping at nearby Chino II Desalter wells.

3.6.2 Current Groundwater Levels

The groundwater level data collected from the various monitoring programs described in Section 3.3 were used to create groundwater level elevation contour maps of the Chino Basin for fall 2000 (Figure 3-16), fall 2003 (Figure 3-17), fall 2006 (Figure 3-18), and fall 2008 (Figure 3-19). Appendix A is an E-sized water level map that includes the point data used to

contour the fall 2008 groundwater levels. The following procedures were used in the creation of these maps:

- Extract the entire time history of groundwater level data from Watermaster's groundwater level database for all wells in the Chino Basin.
- Plot and explore groundwater elevation time histories for all wells.
- Choose one "static" groundwater level elevation data point per well that is representative of the fall 2008 period.
- Plot groundwater level elevation data on maps with background geologic/hydrologic features.
- Contour and digitize groundwater elevation data.

The groundwater elevation contours for fall 2008 (Figure 3-19) are generally consistent with past groundwater elevation contour maps (see, for example, Figures 3-16, 3-17, and 3-18). These maps show that groundwater generally flows in a south-southwest direction from the primary areas of recharge in the northern parts of the basin toward the Prado Flood Control Basin in the south. There are notable pumping depressions in the groundwater level surface that interrupt the general flow patterns in the northern portion of MZ1 (Montclair and Pomona areas) and directly southwest of the Jurupa Hills. There is a discernible depression in groundwater levels surrounding the Chino I & Chino II Desalter well fields.

Close inspection of the groundwater level data used to construct these maps suggests the existence of hydraulically distinct aquifer systems—primarily in MZ1 and the western parts of MZ2. Previous investigations have concluded that two distinct aquifer systems exist in these areas: a shallow unconfined to semi-confined aquifer and deeper confined aquifer. The groundwater levels shown in these maps correspond to the shallow aquifer system and do not reflect the piezometric levels of the deeper aquifers.

3.6.3 Changes in Groundwater Storage

Watermaster developed a GIS model to estimate groundwater storage changes from the groundwater level contour maps discussed above. In preparing this model, Watermaster compiled a comprehensive library of well driller's logs for wells in the Chino Basin. Lithologic descriptions of borehole cuttings and associated depth intervals were digitized and added to Watermaster's database. All lithologic descriptions were then assigned a value of specific yield based on USGS investigations (Johnson, 1967). These data were then used to estimate the average specific yield across each hydrostratigraphic layer in the Chino Basin (see Section 2 of this report for additional details).

The storage change model and the procedures for estimating storage change include:

- Create groundwater elevation contour maps of the Chino Basin for the beginning and ending of the period for which a storage change will be estimated (e.g. fall 2000, fall 2003, and fall 2006).
- Create three-dimensional raster surfaces (ESRI grids) of the groundwater elevation contour maps.

- Create a 400-meter by 400-meter grid (polygon shapefile) of the Chino Basin.
- Assign attributes to each grid cell for (1) surface area, (2) overlying management zone, (3) beginning groundwater elevation surface (e.g. fall 2003), (4) ending groundwater elevation surface (e.g. fall 2006), (5) top and bottom elevations for the model layers, and (6) the specific yield of sediments for each model layer.
- Export the attribute table of the 400-meter grid to spreadsheet format to calculate the volumetric storage change.

Figure 3-20 shows the 400x400-meter grid, symbolized by the storage change between fall 2000 and fall 2003. Basin-wide, the groundwater storage model estimates a change in storage of about -93,400 AF over this three-year period. Based on this figure, the following sub-areas experienced a decrease in storage:

- In the northwest near Pomona and Montclair
- In the northeast near Fontana and eastern Ontario and Rancho Cucamonga
- Near the Chino I Desalter well field, which began producing groundwater in 2000

And, the following sub-areas experienced an increase in storage:

- In the southwest within the City of Chino where pumping decreased in association with the land subsidence investigation and the Forbearance Agreement
- In the south, just north of the Santa Ana River, where many agricultural wells are being destroyed as land use transitions from agricultural to urban

Figure 3-21 shows the 400x400-meter grid, symbolized by the storage change between fall 2003 and fall 2006. Basin-wide, the groundwater storage model estimates a change in storage of about +46,500 AF over this three-year period. Based on this figure, the following sub-areas experienced a decrease in storage:

- In the northeast near Fontana as well as in eastern Ontario and Rancho Cucamonga in MZ2 and MZ3
- In the area directly west of the Jurupa Mountains in MZ3
- In the area immediately surrounding the eastern portions of the Chino I Desalter well field (During this period, increased production in this area was mainly due to the onset of pumping at the Chino I Desalter expansion wells.)

And, the following sub-areas experienced an increase in storage:

- In the northwest near Pomona and Montclair in MZ1 where pumping decreased in association with in-lieu recharge for the Dry-Year Yield program
- In the southwest within the City of Chino where pumping decreased in association with the land subsidence investigation and the Forbearance Agreement
- In the southern region of MZ2 on the west side of the Chino I Desalter well field
- In the south, just north of the Santa Ana River, where many agricultural wells are being destroyed as land use transitions from agricultural to urban

Figure 3-22 shows the 400x400-meter grid, symbolized by the storage change between

fall 2006 and fall 2008. Basin-wide, the groundwater storage model estimates a change in storage of about -53,600 AF over this two-year period. Based on this figure, the following sub-areas experienced a decrease in storage:

- In the area directly west and southwest of the Jurupa Mountains in MZ3 (This area is influenced by groundwater production at wells owned by the Jurupa Community Services District.)
- In the area immediately surrounding the eastern portion of the Chino I Desalter well field (During this period, increased production in this area was mainly due to the continued pumping at the Chino I Desalter expansion wells.)
- In the area immediately surrounding the Chino II Desalter well field (During this period, increased production in this area was due to increased pumping at the Chino II Desalter wells.)

And, the following sub-areas experienced an increase in storage:

- In the northwest near Pomona and Montclair in MZ1 where pumping decreased in association with in-lieu recharge for the Dry-Year Yield program
- In the southwest where pumping decreased in association with the land subsidence investigation and the Forbearance Agreement
- In the south, just north of the Santa Ana River, where many agricultural wells are being destroyed as land use transitions from agricultural to urban

The total change in storage since implementation of the OBMP (2000-08) is approximately -62,000 AF.

3.6.4 Assessment of Hydraulic Control

The hydrologic conceptual model of Chino Basin describes an aquifer system where groundwater flows from areas of recharge in the Chino-North MZ (a grouping of the northern portions of MZs 1, 2, and 3) toward areas of historical surface discharge in the south near the Prado Basin and the Santa Ana River (WEI, 2006a). One of the intended purposes of the Chino Desalter well fields is to intercept (capture) groundwater originating in the Chino-North MZ before discharges to the Prado Basin or the Santa Ana River as surface water.

Piezometric data collected from monitoring and production wells in the southern portion of the Chino Basin during the period of 1997 through 2008 were analyzed to determine the state of hydraulic control. For a full discussion of hydraulic control, see the *Chino Basin Maximum Benefit Monitoring Program 2008 Annual Report* (WEI, 2009). Figure 3-23 shows groundwater elevation contours and data for the shallow aquifer system in spring 2000—prior to any significant pumping by the Chino I Desalter wells. The contours depict regional groundwater flow from the northeast to the southwest. Figure 3-24 shows groundwater elevation contours and data for the shallow aquifer system in spring 2006—after six years of pumping from the Chino I Desalter wells but prior to any significant pumping from the Chino II Desalter wells. Note that desalter pumping in 2006 interrupts the regional flow pattern of 2000. Specifically, the contours to the north and southeast of the desalter well field swing in towards the eastern

half of the well field where the desalter wells are perforated primarily within the shallow aquifer system. Figure 3-26 shows groundwater elevation contours and data for the shallow aquifer system in spring 2008, approximately eight years after the commencement of Chino I Desalter pumping and two years after the commencement of Chino II Desalter pumping. The Chino II Desalter well field began producing groundwater in mid-2006, causing the contours to swing in toward the well field from the north and the southeast. The data continue to suggest a reduction in the southward component of the hydraulic gradient around the western half of the Chino I Desalter well field; however, the contours do not indicate a gradient reversal and, hence, do not provide compelling evidence for hydraulic control in this region.

Since 2000, pumping at the Chino I Desalter well field has generally flattened the regional hydraulic gradient within the shallow aquifer system around the western half of the Chino I Desalter well field and has created a capture zone surrounding the eastern half of the well field. Around the western half of the Chino I Desalter well field, piezometric data suggest a significant reduction in the southward component of the hydraulic gradient but do not indicate a gradient reversal (northward component) and, hence, do not yet provide compelling evidence for complete hydraulic control at the Chino I Desalter well field. Pumping at the Chino II Desalter well field, where all wells are perforated within the shallow and deep aquifer systems, began in mid-2006. A depression continues to develop in the piezometric surface. The ultimate fate of groundwater that flows past the western portion of the Chino I Desalter well field is continued flow southward toward the Prado Basin where groundwater rises to become surface water in the tributaries of the Prado Basin.

Table 3-1
Summary of Recharge and Discharge
(acre-ft)

Fiscal Year	Safe Yield	Wet Water Recharge to the Chino Basin: Wet Water Recharge[1]							Total Inflow	Discharge[7]: Pumping						Pumping Distribution (% of Total)				
		Replenish	Cyclic or Conj Use	MZ1 Program	Recycled	New Storm Water[5]	Desalter Induced SAR Inflow[6]	Total		Appropriative Pool less CDA Desalters[2, 3, 4]	Chino Desalter Authority	Total Appropriative Pool	Agricultural Pool	Overlying Non-Ag Pool	Total	Appropriative Pool less CDA Desalters[2, 3, 4]	Chino Desalter Authority	Total Appropriative Pool	Agricultural Pool	Overlying Non-Ag Pool
1977 - 1978	140,000	10,680	0	0	0	0	0	10,680	150,680	60,659	0	60,659	83,934	10,082	154,675	39%	0%	39%	54%	7%
1978 - 1979	140,000	12,638	15,757	0	0	0	0	28,395	168,395	60,597	0	60,597	73,688	7,127	141,412	43%	0%	43%	52%	5%
1979 - 1980	140,000	2,507	14,243	0	0	0	0	16,751	156,751	63,834	0	63,834	69,369	7,363	140,566	45%	0%	45%	49%	5%
1980 - 1981	140,000	12,228	8,662	0	0	0	0	20,890	160,890	70,726	0	70,726	68,040	5,650	144,416	49%	0%	49%	47%	4%
1981 - 1982	140,000	16,609	5,047	0	0	0	0	21,656	161,656	66,731	0	66,731	65,117	5,684	137,532	49%	0%	49%	47%	4%
1982 - 1983	140,000	13,188	15,501	0	0	0	0	28,689	168,689	63,481	0	63,481	56,759	2,395	122,635	52%	0%	52%	46%	2%
1983 - 1984	140,000	13,777	7,960	0	0	0	0	21,737	161,737	70,558	0	70,558	59,033	3,208	132,799	53%	0%	53%	44%	2%
1984 - 1985	140,000	12,188	8,709	0	0	0	0	20,897	160,897	76,912	0	76,912	55,543	2,415	134,870	57%	0%	57%	41%	2%
1985 - 1986	140,000	16,332	2,095	0	0	0	0	18,427	158,427	80,859	0	80,859	52,061	3,193	136,113	59%	0%	59%	38%	2%
1986 - 1987	140,000	10,086	9,921	0	0	0	0	20,007	160,007	84,662	0	84,662	59,847	2,559	147,068	58%	0%	58%	41%	2%
1987 - 1988	140,000	2,494	0	0	0	0	0	2,494	142,494	91,579	0	91,579	57,865	2,958	152,402	60%	0%	60%	38%	2%
1988 - 1989	140,000	7,407	0	0	0	0	0	7,407	147,407	93,617	0	93,617	46,762	3,619	143,998	65%	0%	65%	32%	3%
1989 - 1990	140,000	0	0	0	0	0	0	0	140,000	101,344	0	101,344	48,420	4,856	154,620	66%	0%	66%	31%	3%
1990 - 1991	140,000	3,291	503	0	0	0	0	3,793	143,793	86,658	0	86,658	48,085	5,407	140,150	62%	0%	62%	34%	4%
1991 - 1992	140,000	3,790	1,761	0	0	0	0	5,551	145,551	91,982	0	91,982	44,682	5,240	141,904	65%	0%	65%	31%	4%
1992 - 1993	140,000	12,535	1,677	0	0	9,041	0	23,253	163,253	86,367	0	86,367	44,092	5,464	135,923	64%	0%	64%	32%	4%
1993 - 1994	140,000	8,859	7,634	0	0	0	0	16,493	156,493	80,798	0	80,798	44,298	4,586	129,682	62%	0%	62%	34%	4%
1994 - 1995	140,000	0	10,300	0	0	0	0	10,300	150,300	93,419	0	93,419	55,022	4,327	152,768	61%	0%	61%	36%	3%
1995 - 1996	140,000	82	0	0	0	0	0	82	140,082	101,606	0	101,606	43,639	5,424	150,669	67%	0%	67%	29%	4%
1996 - 1997	140,000	0	17	0	0	0	0	17	140,017	110,163	0	110,163	44,809	6,309	161,281	68%	0%	68%	28%	4%
1997 - 1998	140,000	8,323	0	0	0	0	0	8,323	148,323	97,435	0	97,435	43,344	4,955	145,734	67%	0%	67%	30%	3%
1998 - 1999	140,000	5,697	0	0	0	0	0	5,697	145,697	107,723	0	107,723	47,538	7,006	162,267	66%	0%	66%	29%	4%
1999 - 2000	140,000	1,001	0	0	507	0	0	1,508	141,508	126,645	0	126,645	44,401	7,774	178,820	71%	0%	71%	25%	4%
2000 - 2001	140,000	30	0	6,500	500	0	3,995	7,030	147,030	113,437	7,989	121,426	39,954	8,084	169,464	67%	5%	72%	24%	5%
2001 - 2002	140,000	0	0	6,500	505	0	4,729	7,005	147,005	121,489	9,458	130,947	39,494	5,548	175,989	69%	5%	74%	22%	3%
2002 - 2003	140,000	0	0	6,499	185	0	5,220	6,684	146,684	120,557	10,439	130,996	38,487	4,853	174,336	69%	6%	75%	22%	3%
2003 - 2004	140,000	4,020	2,463	3,558	48	0	5,303	10,089	150,089	136,834	10,605	147,439	41,978	2,915	192,332	71%	6%	77%	22%	2%
2004 - 2005	140,000	4,380	0	7,877	158	12,500	4,927	24,915	164,915	127,811	9,854	137,665	34,450	2,327	174,441	73%	6%	79%	20%	1%
2005 - 2006	140,000	33,756	0	1,554	1,304	12,999	4,944	49,613	189,613	124,315	16,479	140,794	33,900	3,026	177,720	70%	9%	79%	19%	2%
2006 - 2007	140,000	32,991	0	0	2,989	4,770	7,907	40,750	180,750	130,826	26,356	157,182	37,295	3,369	197,846	66%	13%	79%	19%	2%
2007 - 2008	140,000	0	0	0	2,340	10,243	8,092	12,583	152,583	103,078	26,972	130,050	30,910	3,440	164,400	63%	16%	79%	19%	2%
Totals	4,340,000	248,888	112,249	32,489	8,536	49,553	45,114	451,715	4,791,715	2,946,702	118,152	3,064,853	1,552,816	151,162	4,768,832					
Average	140,000	8,029	3,621	1,048	275	1,598	1,455	14,571	154,571	95,055	14,769	98,866	50,091	4,876	153,833	59%	8%	63%	35%	3%
Max	140,000	33,756	15,757	7,877	2,989	12,999	8,092	49,613	189,613	136,834	26,972	157,182	83,934	10,082	197,846	73%	16%	79%	55%	7%
Min	140,000	0	0	0	0	0	0	0	140,000	60,597	0	60,597	33,900	2,327	122,635	39%	0%	39%	19%	1%

[1] Includes only water actually spread
[2] Includes only actual water produced and does not include MWD exchanges
[3] Includes adjustment for Ontario production of 633 AF in FY 2001-02
[4] Includes adjustment for Jurupa, Niagara, and Chino production correction of 1,030 AF in FY 2002-03
[5] Includes 9,041 acre-ft of surface water recharge in the Chino Basin that would otherwise have recharged the Claremont Heights Basin in FY 1992-93; and CBFIP stormwater capture of 12,500 acre-ft/yr beginning in FY 2004-05.
[6] Watermaster has assumed that half of the desalter pumping has been replenished by induced recharge in the Santa Ana River through FY 2004-05 and that 30 percent of the desalter pumping has been replenished by induced recharge in the Santa Ana River in FY 2005-06
[7] The only discharge considered herein is pumping, the other discharges are assumed netted out in the safe yield

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Table 3-2
Summary of Annual Wet Water Recharge in the Chino Basin

Basin Name	2000/2001				2001/2002				2002/2003				2003/2004			
	Storm Water	Imported Water	Recycled Water	Total Recharge	Storm Water	Imported Water	Recycled Water	Total Recharge	Storm Water	Imported Water	Recycled Water	Total Recharge	Storm Water	Imported Water	Recycled Water	Total Recharge
Banana Basin	390	0	0	390	184	0	0	184	366	0	0	366	188	0	0	188
Declez Basin	--	0	0	0	--	0	0	0	--	0	0	0	--	0	0	0
Etiwanda Conservation Ponds	--	0	0	0	--	0	0	0	--	0	0	0	--	0	0	0
Hickory Basin	37	0	0	37	105	0	0	105	551	0	0	551	224	0	0	224
Jurupa Basin	--	0	0	0	--	0	0	0	--	0	0	0	--	0	0	0
RP-3 Basins	--	0	0	0	--	0	0	0	--	0	0	0	--	0	0	0
Turner Basin	167	0	0	167	100	0	0	100	192	0	0	192	0	0	0	0
7th and 8th Street Basins	--	0	0	0	--	0	0	0	--	0	0	0	--	0	0	0
Brooks Street Basin	0	0	0	0	104	0	0	104	676	0	0	676	--	0	0	0
College Heights Basins	--	0	0	0	--	0	0	0	--	0	0	0	--	0	0	0
Ely Basins	--	0	500	500	--	0	505	505	--	0	185	185	--	0	48	48
Etiwanda Spreading Basins	--	0	0	0	--	0	0	0	--	0	0	0	--	2,812	0	2,812
Lower Day Basin	--	0	0	0	--	0	0	0	--	0	0	0	--	0	0	0
Montclair Basins	2,890	6,530	0	9,420	773	6,500	0	7,273	1,328	6,499	0	7,827	--	3,558	0	3,558
San Sevaine	--	0	0	0	--	0	0	0	--	0	0	0	--	1,211	0	1,211
Upland Basin	--	0	0	0	--	0	0	0	--	0	0	0	--	0	0	0
Victoria Basin	--	0	0	0	--	0	0	0	--	0	0	0	--	0	0	0
Totals:	3,484	6,530	500	10,514	1,266	6,500	505	8,271	3,113	6,499	185	9,797	412	7,582	48	8,042

Basin Name	2004/2005				2005/2006				2006/2007				2007/2008			
	Storm Water	Imported Water	Recycled Water	Total Recharge	Storm Water	Imported Water	Recycled Water	Total Recharge	Storm Water	Imported Water	Recycled Water	Total Recharge	Storm Water	Imported Water	Recycled Water	Total Recharge
Banana Basin	459	0	0	459	221	206	529	956	226	783	643	1,652	278	0	157	435
Declez Basin	--	0	0	0	737	0	0	737	0	0	0	0	730	0	0	730
Etiwanda Conservation Ponds	--	197	0	197	--	0	0	0	0	0	0	0	0	0	0	0
Hickory Basin	653	0	0	653	517	623	586	1,726	536	212	646	1,394	949	0	625	1,574
Jurupa Basin	--	0	0	0	--	0	0	0	0	0	0	0	0	0	0	0
RP-3 Basins	--	0	0	0	767	0	0	767	802	0	0	802	511	0	0	511
Turner Basin	297	310	0	607	2,575	346	0	2,921	406	313	1237	1,956	1542	0	0	1,542
7th and 8th Street Basins	--	0	0	0	1,271	0	0	1,271	640	0	0	640	959	0	1,054	2,013
Brooks Street Basin	--	0	0	0	524	2033	0	2,557	205	1604	0	1,809	475	0	0	475
College Heights Basins	--	0	0	0	108	5,432	0	5,540	1	3,125	0	3,126	172	0	0	172
Ely Basins	--	0	158	158	1,531	0	188	1,719	631	0	466	1,097	1,603	0	562	2,165
Etiwanda Spreading Basins	--	2,137	0	2,137	20	2,488	0	2,508	0	1,160	0	1,160	10	0	0	10
Lower Day Basin	--	107	0	107	624	2,810	0	3,434	78	2,266	0	2,344	303	0	0	303
Montclair Basins	--	7,887	0	7,887	1,296	5,536	0	6,832	355	10,681	0	11,036	859	0	0	859
San Sevaine	--	1,621	0	1,621	2,072	9,172	0	11,244	244	5,749	0	5,993	749	0	0	749
Upland Basin	--	0	0	0	214	5,922	0	6,136	195	7068	0	7,263	312	0	0	312
Victoria Basin	--	0	0	0	330	0	0	330	260	0	0	260	427	0	0	427
Totals:	1,409	12,258	158	13,825	12,807	34,568	1,303	48,678	4,579	32,961	2,992	40,532	9,879	0	2,398	12,277

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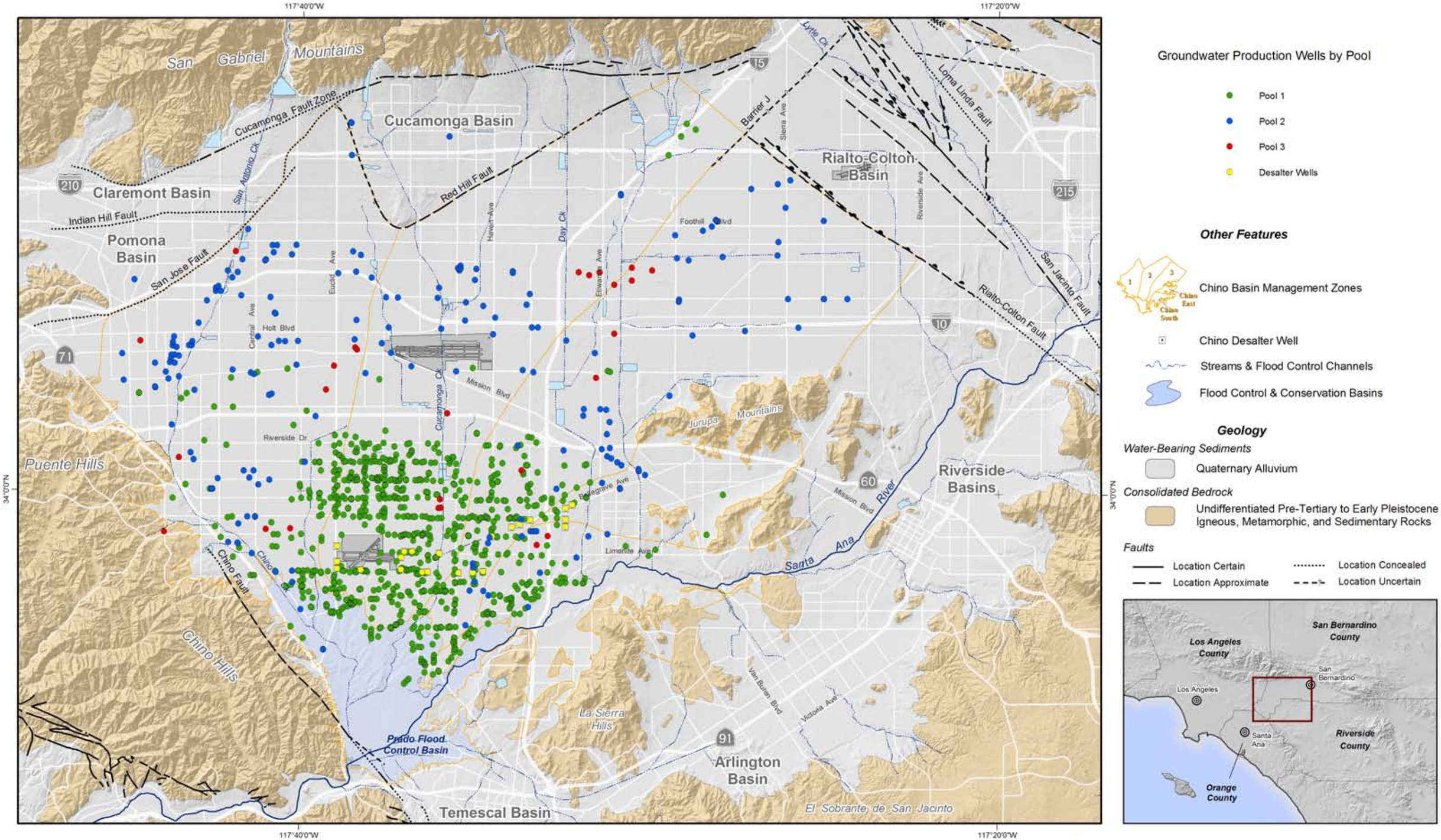

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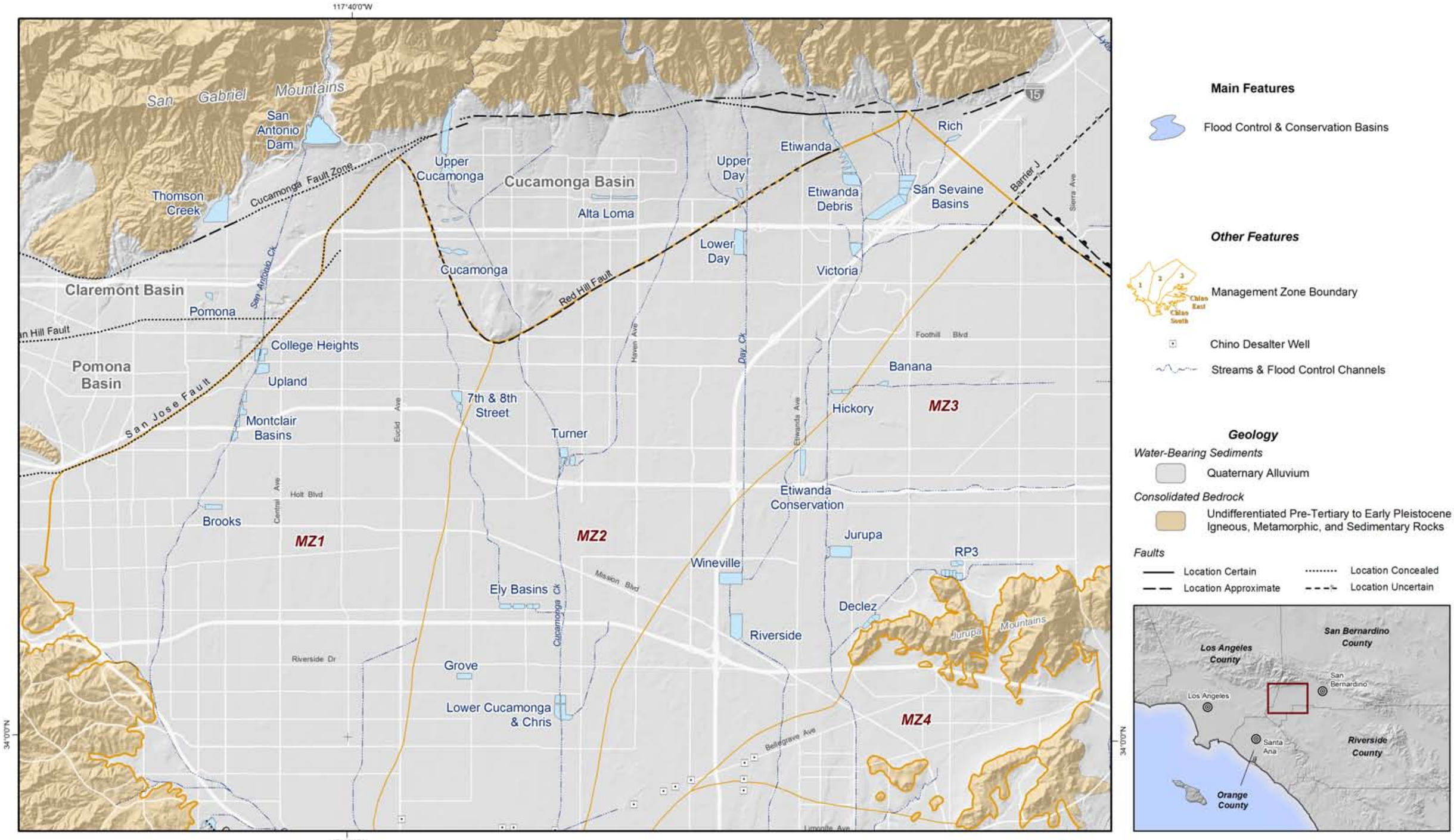
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Basin Operations and Groundwater Level Monitoring

Active Production Wells by Pool

Production Wells as of Fiscal Year 2007-08

Figure 3-1



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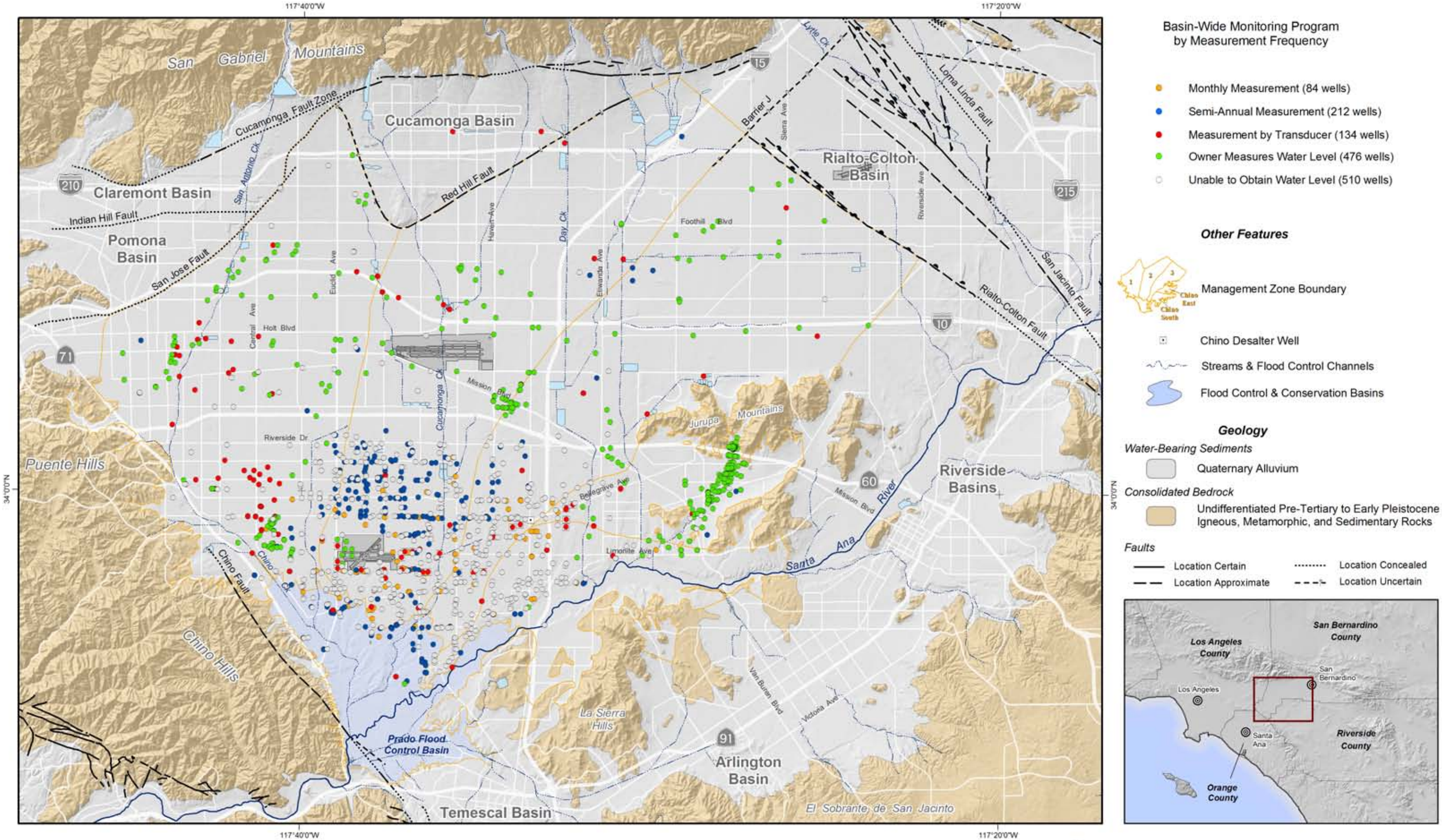
2008 State of the Basin Report
Basin Operations and Groundwater Level Monitoring

Recharge Basin Locations

Figure 3-2



Basin-Wide Monitoring Program
by Measurement Frequency

- Monthly Measurement (84 wells)
- Semi-Annual Measurement (212 wells)
- Measurement by Transducer (134 wells)
- Owner Measures Water Level (476 wells)
- Unable to Obtain Water Level (510 wells)

Other Features

- Management Zone Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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0 1 2 3 4 5 Miles
0 2 4 6 8 KM

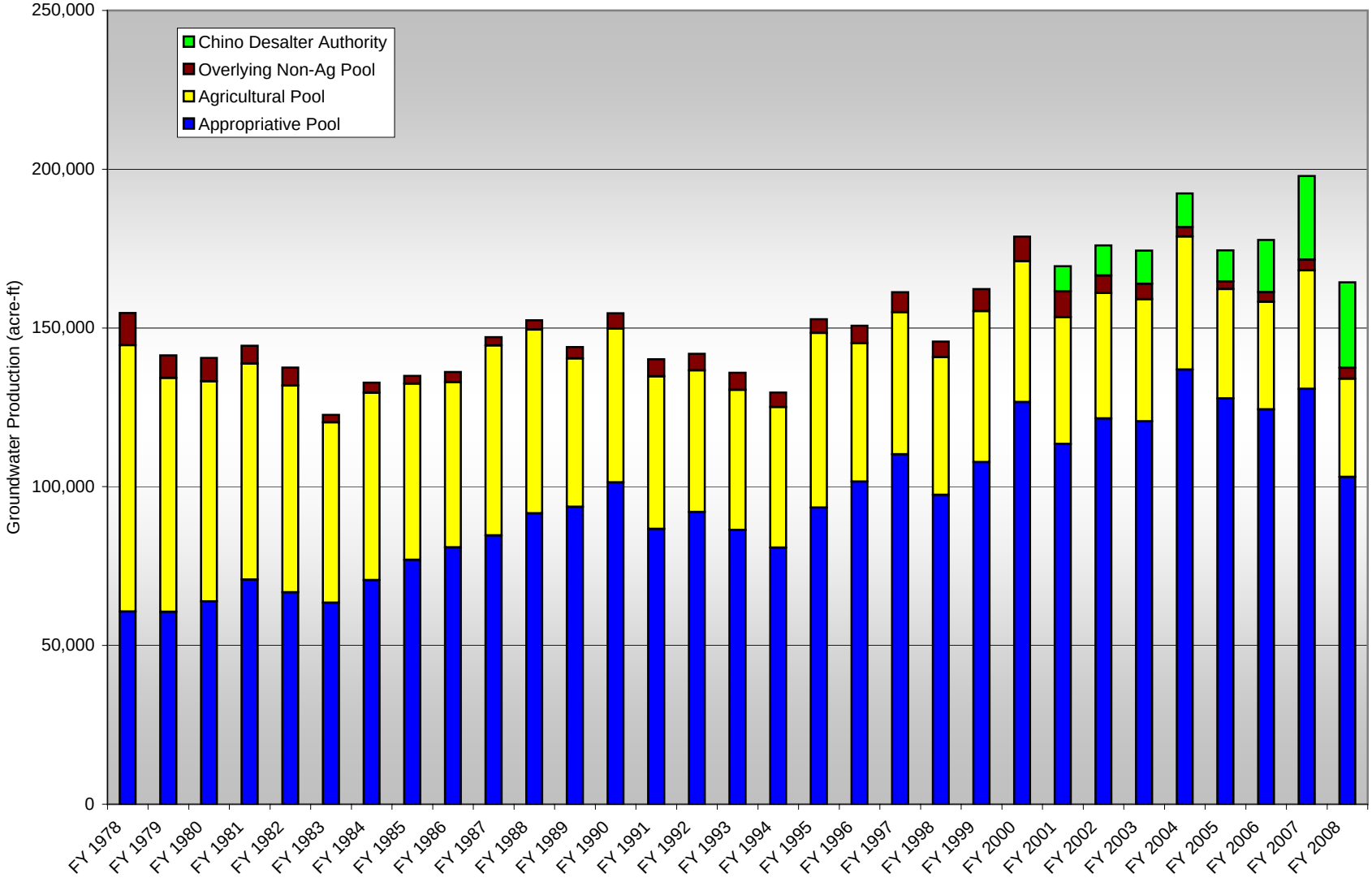
2008 State of the Basin Report
Basic Operations and Groundwater Level Monitoring

Groundwater Level Monitoring Network

Well Locations and Measurement Frequency

Figure 3-3

Figure 3-4
Distribution of Groundwater Production by Pool



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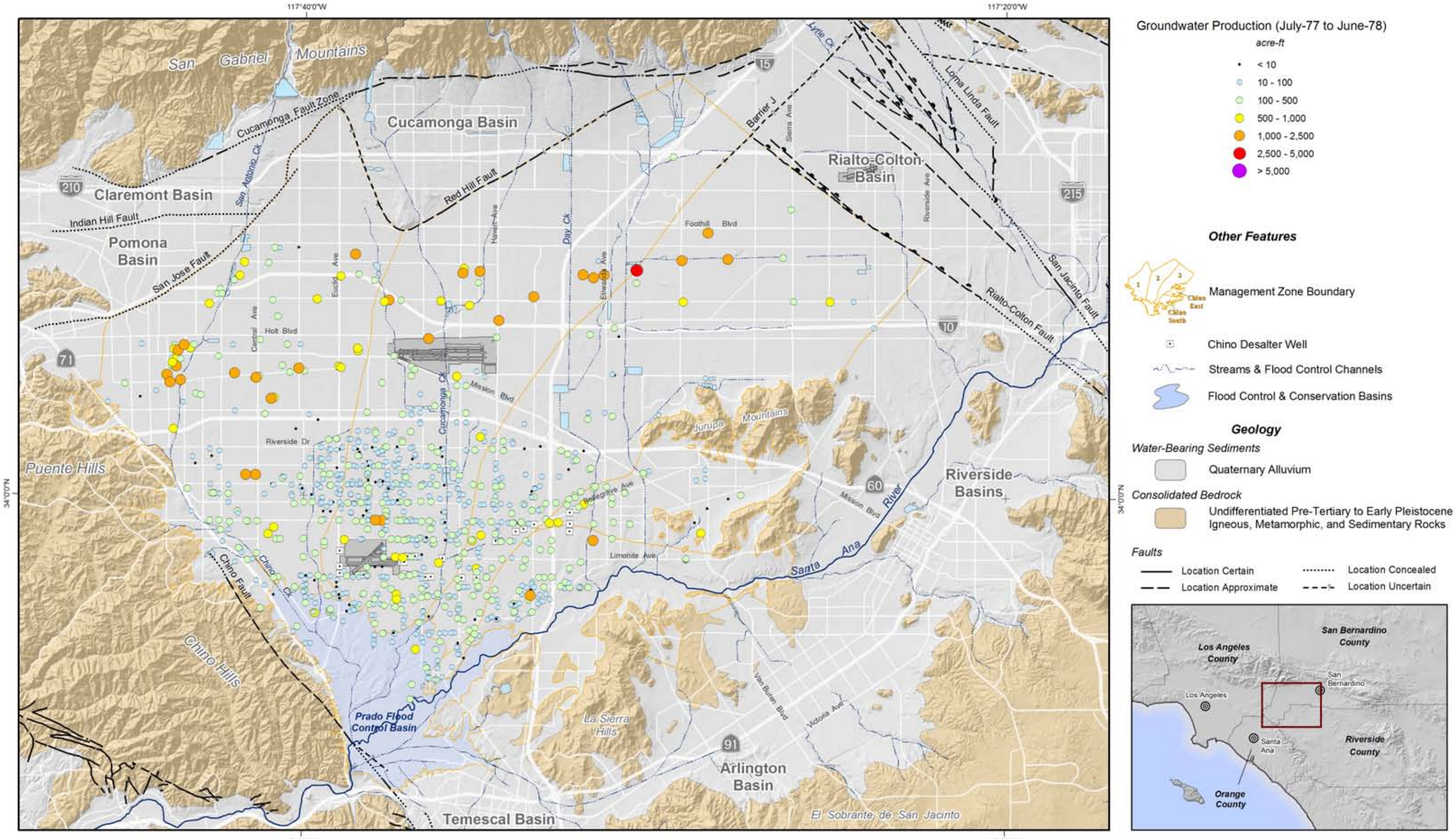

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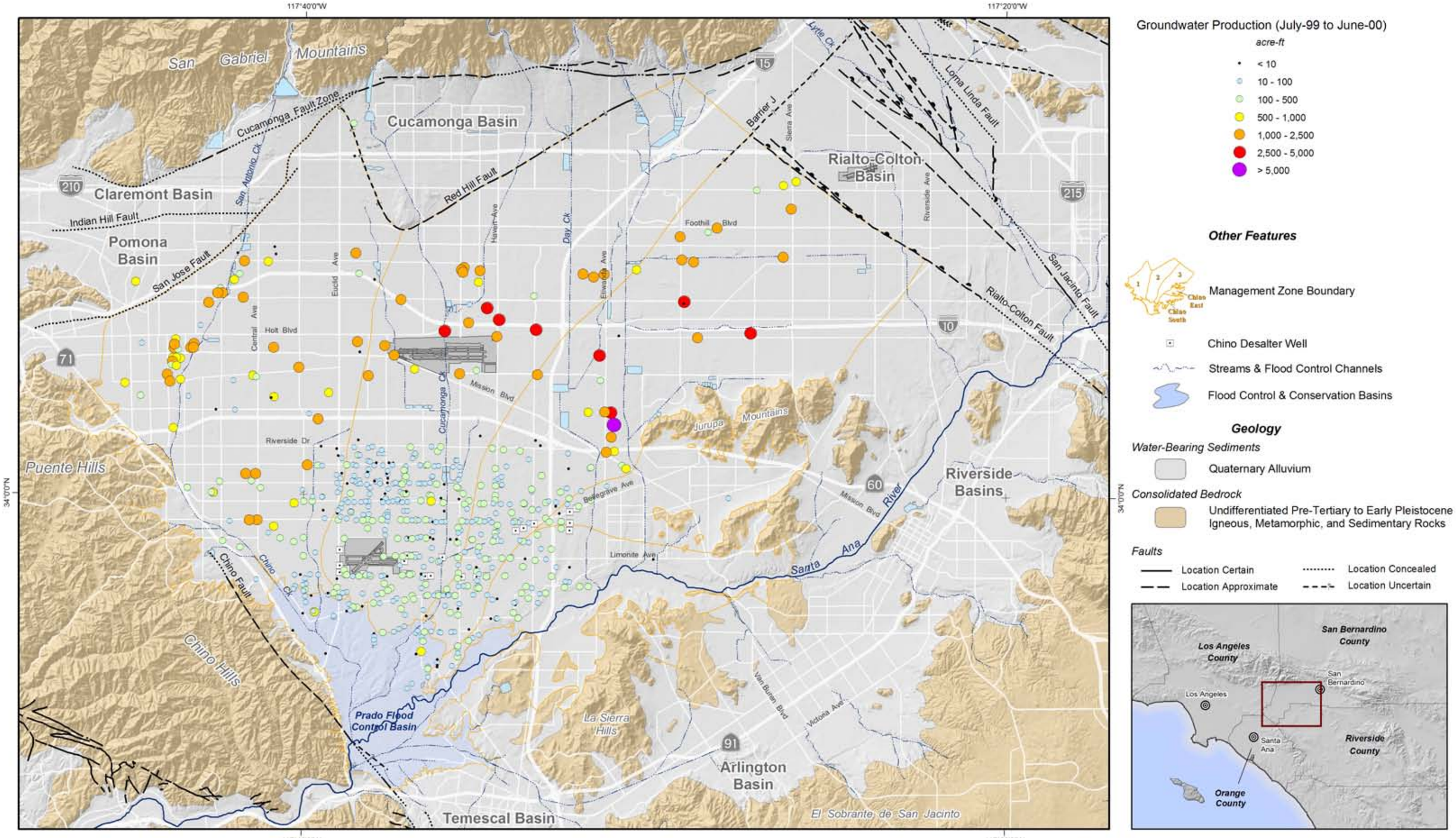
2008 State of the Basin Report
Groundwater Pumping

Groundwater Production by Well

Fiscal Year 1977-1978

Figure 3-5



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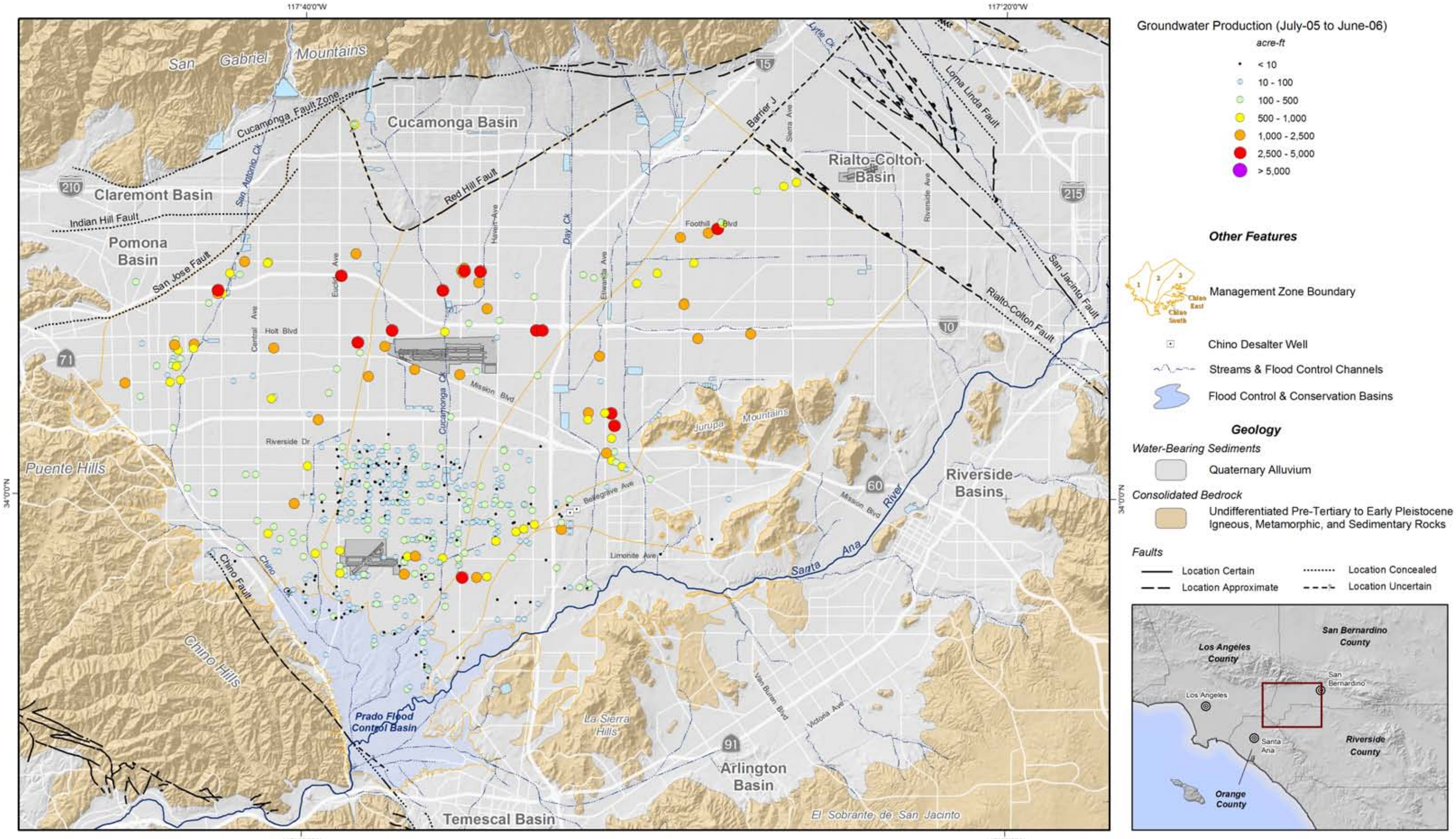
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Pumping

Groundwater Production by Well

Fiscal Year 1999-2000

Figure 3-6



Groundwater Production (July-05 to June-06)

acre-ft

- < 10
- 10 - 100
- 100 - 500
- 500 - 1,000
- 1,000 - 2,500
- 2,500 - 5,000
- > 5,000

Other Features

Management Zone Boundary

Chino Desalter Well

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

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

Faults

Location Certain — Location Concealed

Location Approximate — Location Uncertain

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0 1 2 3 4 5 Miles

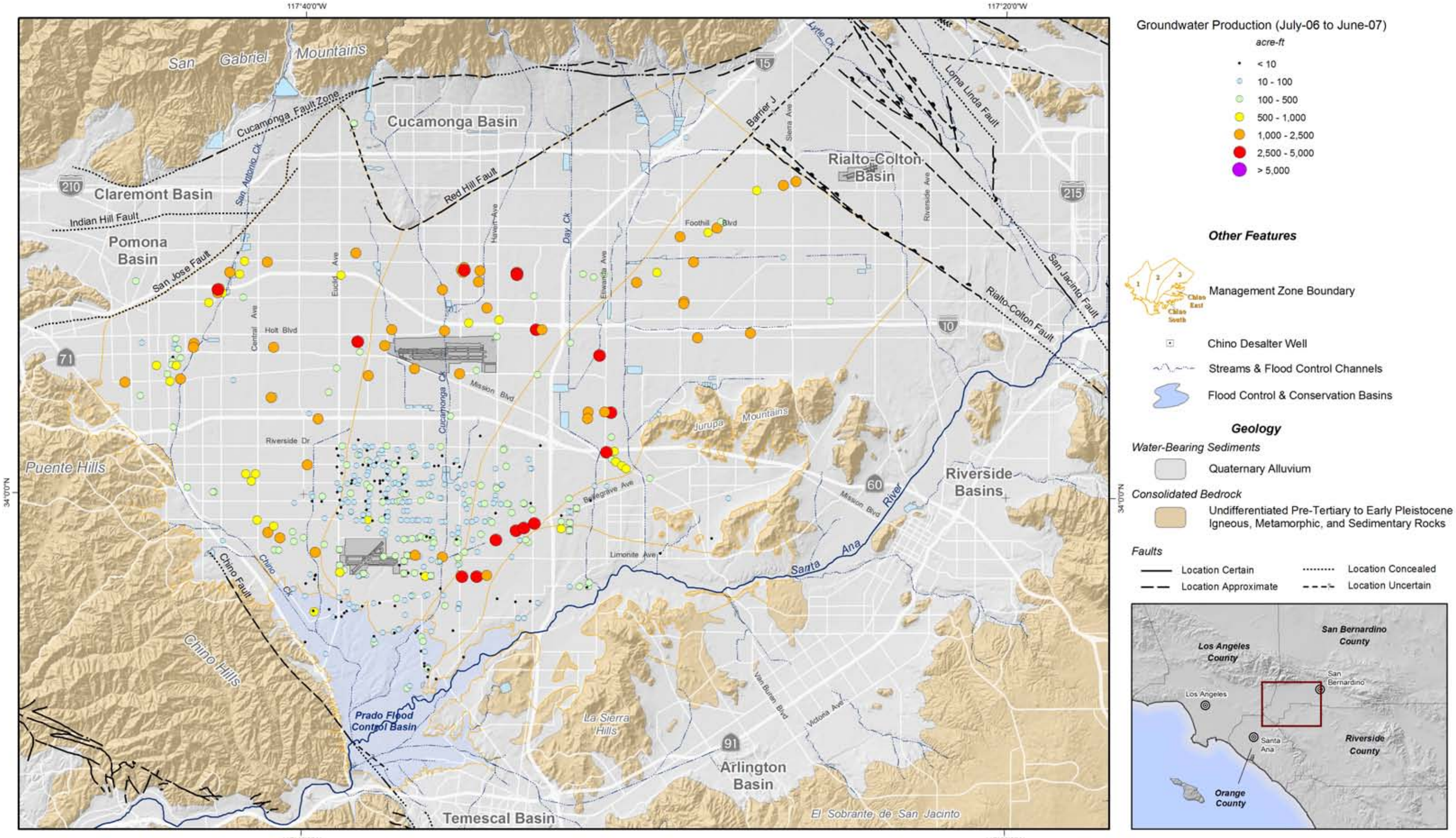
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Pumping

Groundwater Production by Well

Fiscal Year 2005-2006

Figure 3-7



Groundwater Production (July-06 to June-07)

acre-ft

- < 10
- 10 - 100
- 100 - 500
- 500 - 1,000
- 1,000 - 2,500
- 2,500 - 5,000
- > 5,000

Other Features

Management Zone Boundary

Chino Desalter Well

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

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

Faults

Location Certain — Location Concealed

Location Approximate — Location Uncertain

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0 1 2 3 4 5 Miles

0 2 4 6 8 KM

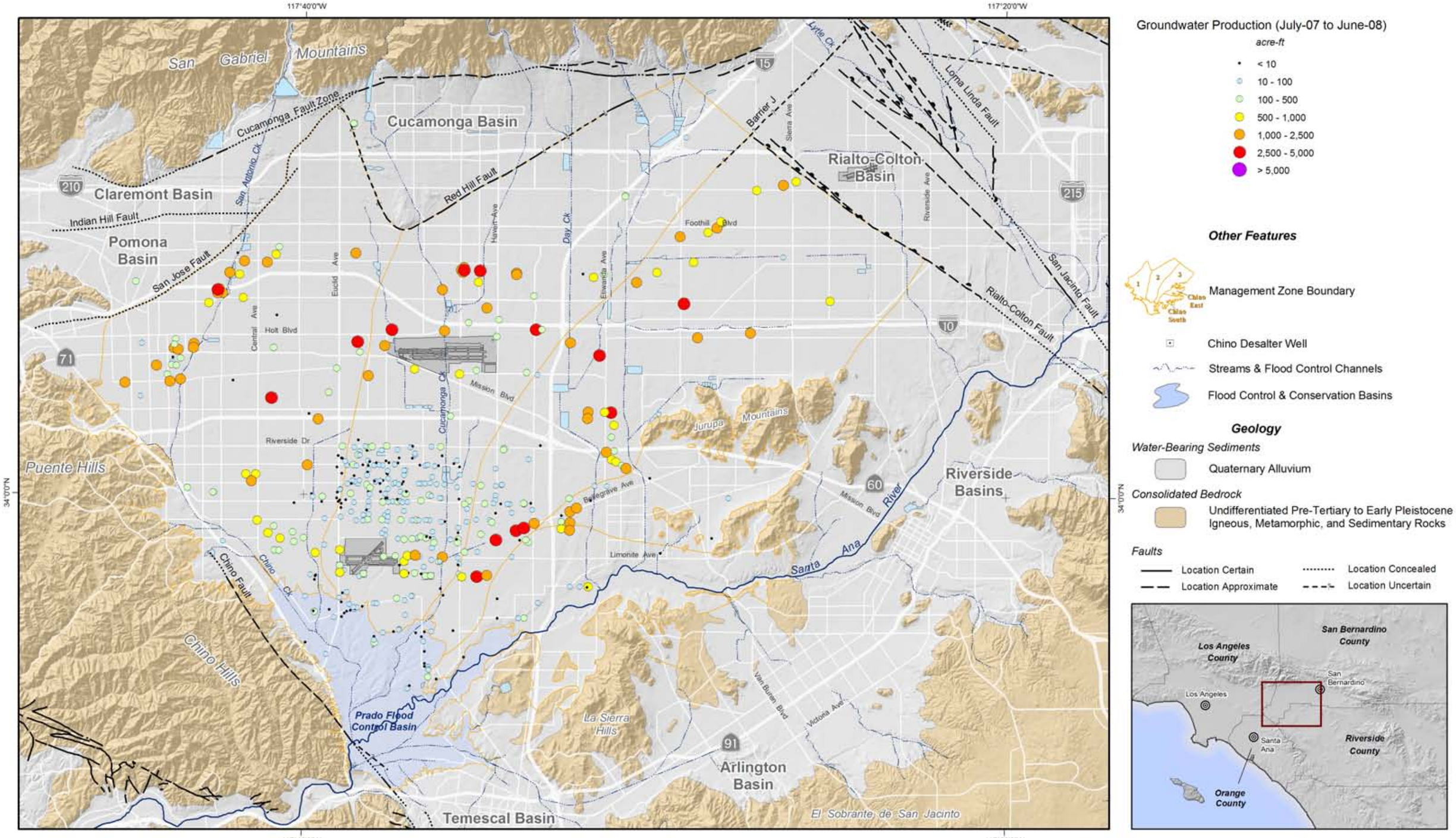
2008 State of the Basin Report

Groundwater Pumping

Groundwater Production by Well

Fiscal Year 2006-2007

Figure 3-8



Groundwater Production (July-07 to June-08)

acre-ft

- < 10
- 10 - 100
- 100 - 500
- 500 - 1,000
- 1,000 - 2,500
- 2,500 - 5,000
- > 5,000

Other Features

Management Zone Boundary

Chino Desalter Well

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

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Faults

Location Certain — Location Concealed

Location Approximate — Location Uncertain

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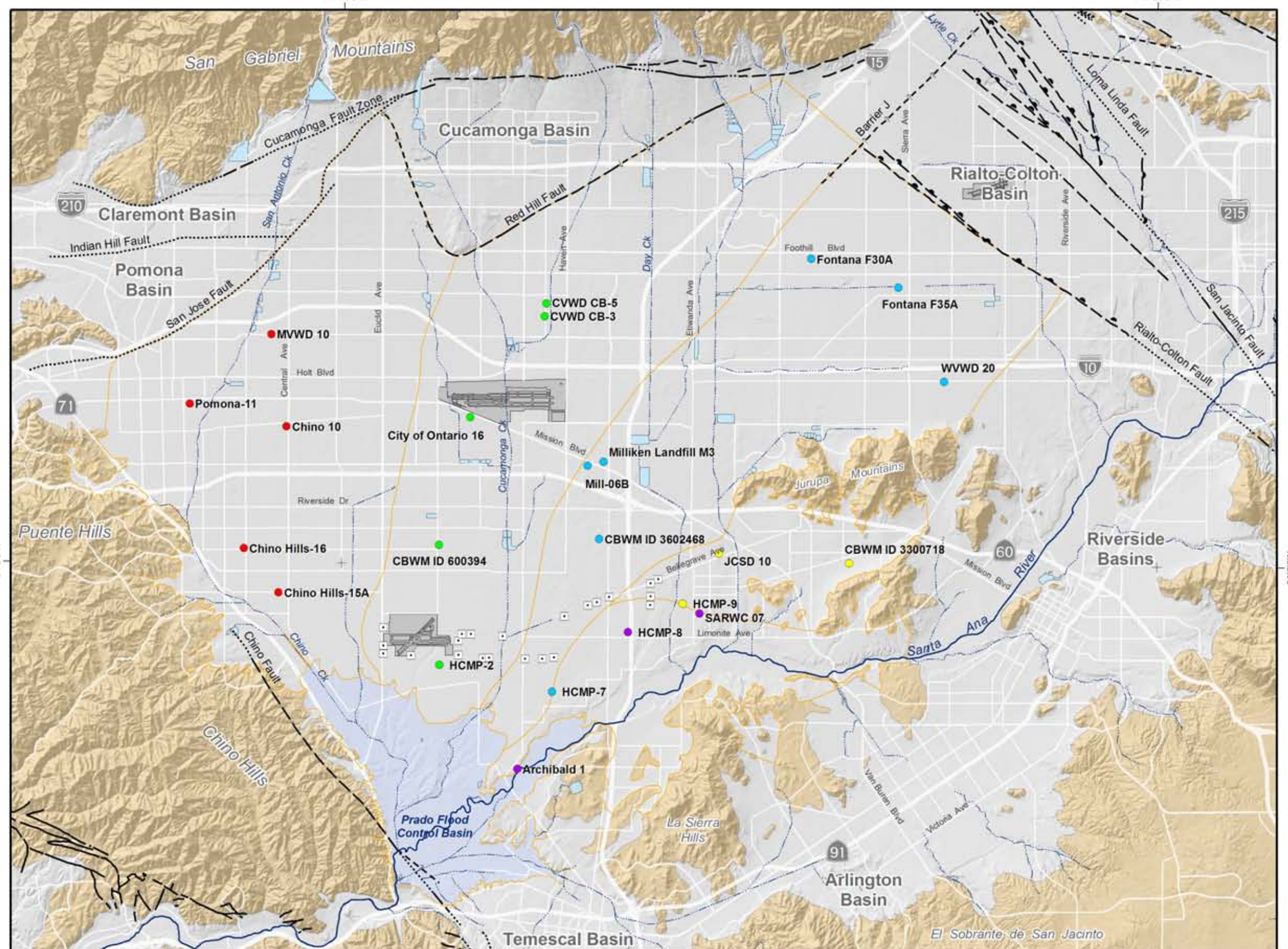
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Pumping

Groundwater Production by Well

Fiscal Year 2007-2008

Figure 3-9



Wells Used in Historical Groundwater Analyses

Management Zone

- MZ-1
- MZ-2
- MZ-3
- MZ-4
- MZ-5

Other Features

Management Zone Boundary

Chino Desalter Well

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

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Faults

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Location Approximate — Location Uncertain

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0 1 2 3 4 5 Miles

0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Levels

Historical Groundwater Level Trends
Well Location Map

Wells Used in Historical Groundwater Level Analyses

Figure 3-10

Figure 3-11 - Time History of Production, Recharge, and Groundwater Levels in MZ1

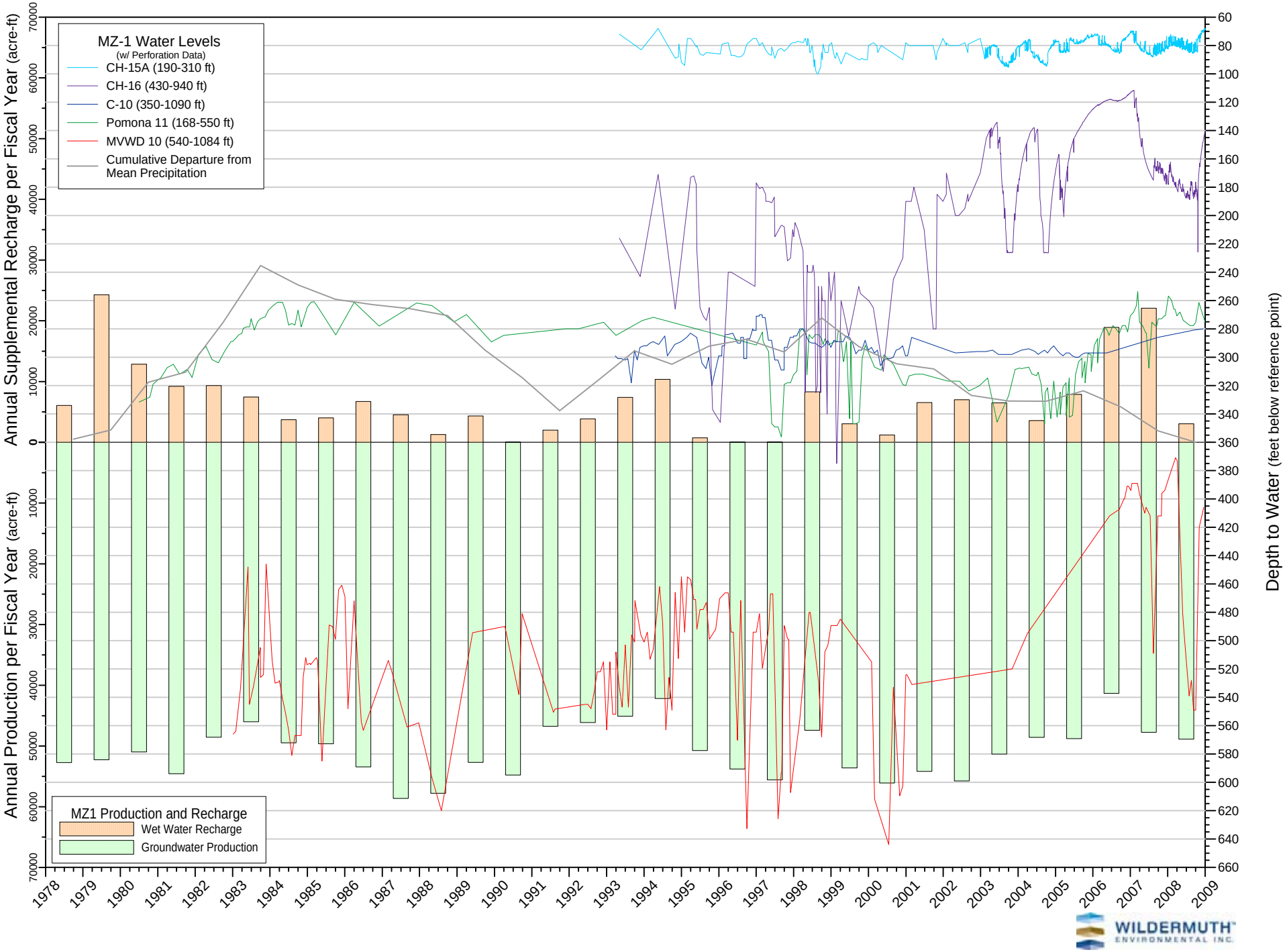

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Figure 3-12 - Time History of Production, Recharge, and Groundwater Levels in MZ2

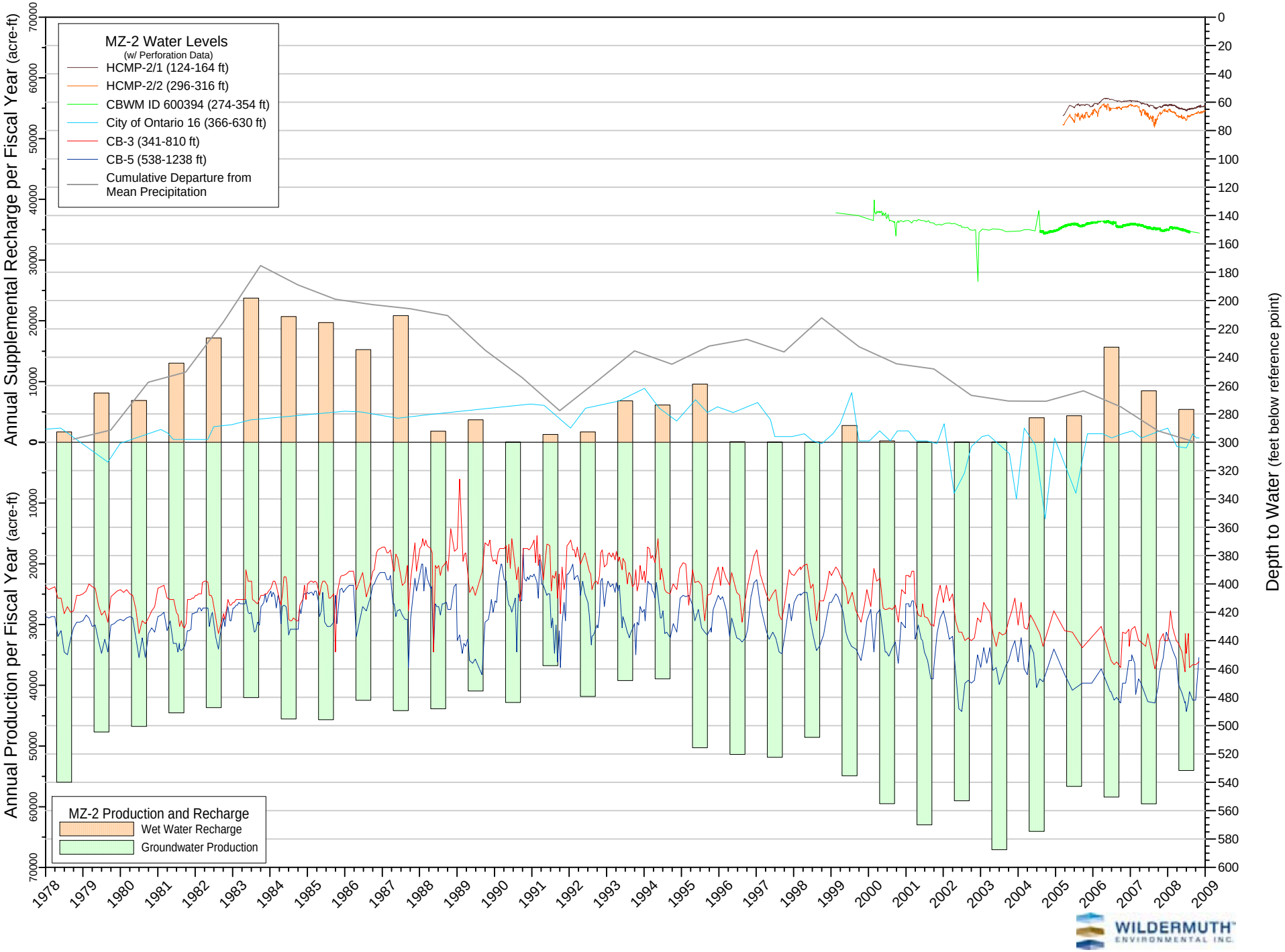

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Figure 3-13 - Time History of Production, Recharge, and Groundwater Levels in MZ3

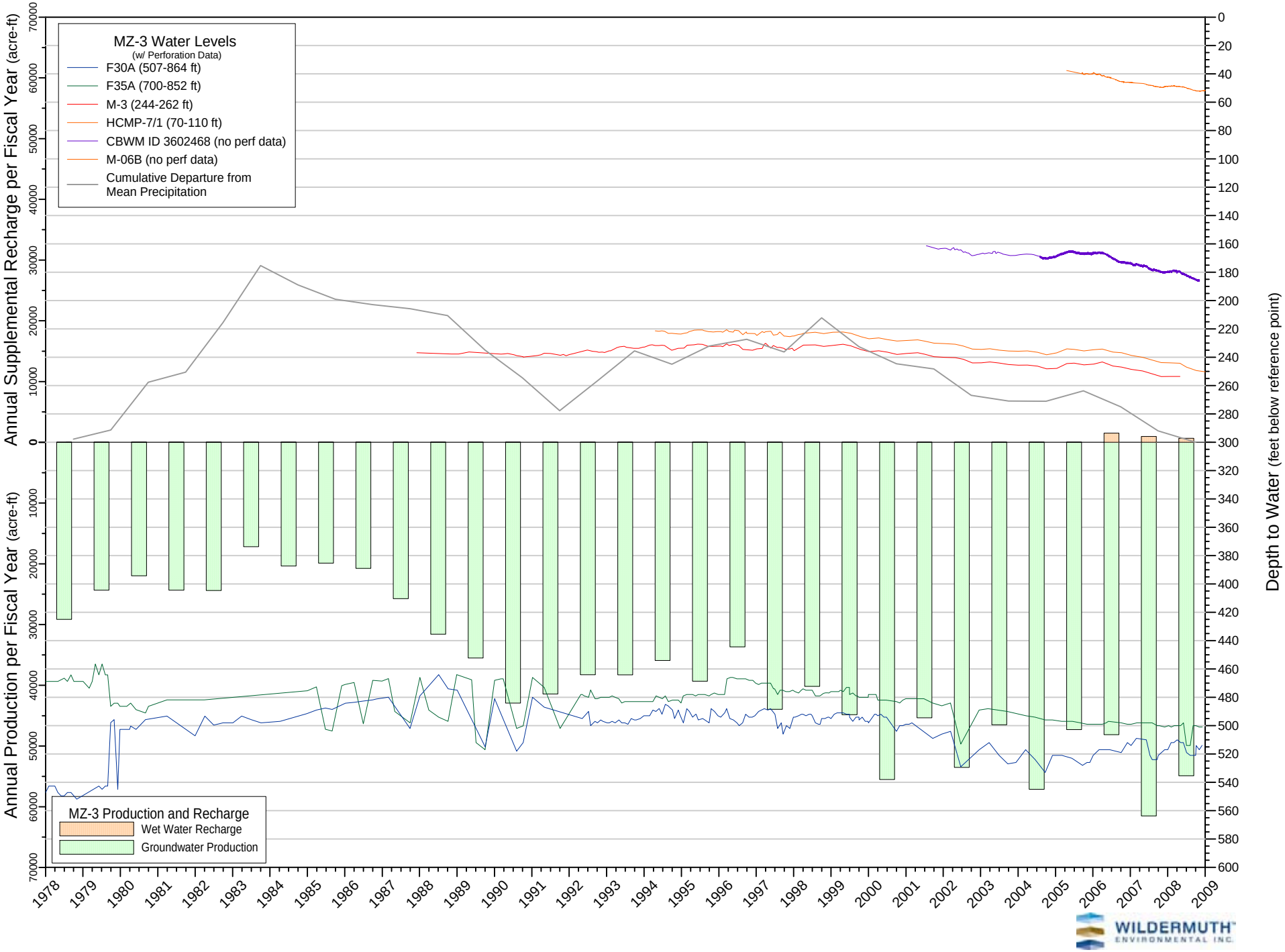

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Figure 3-14 - Time History of Production, Recharge, and Groundwater Levels in Chino-East MZ

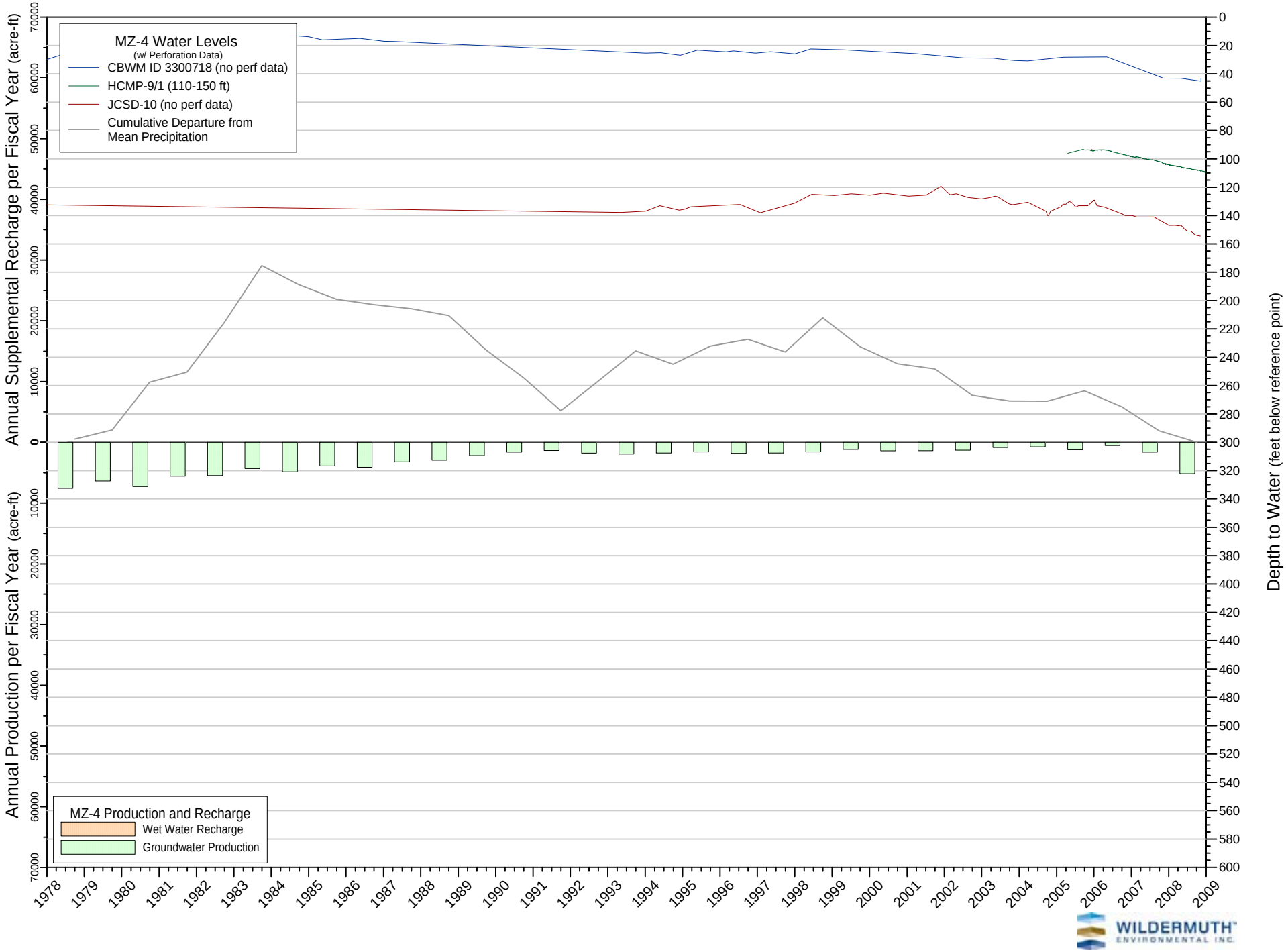

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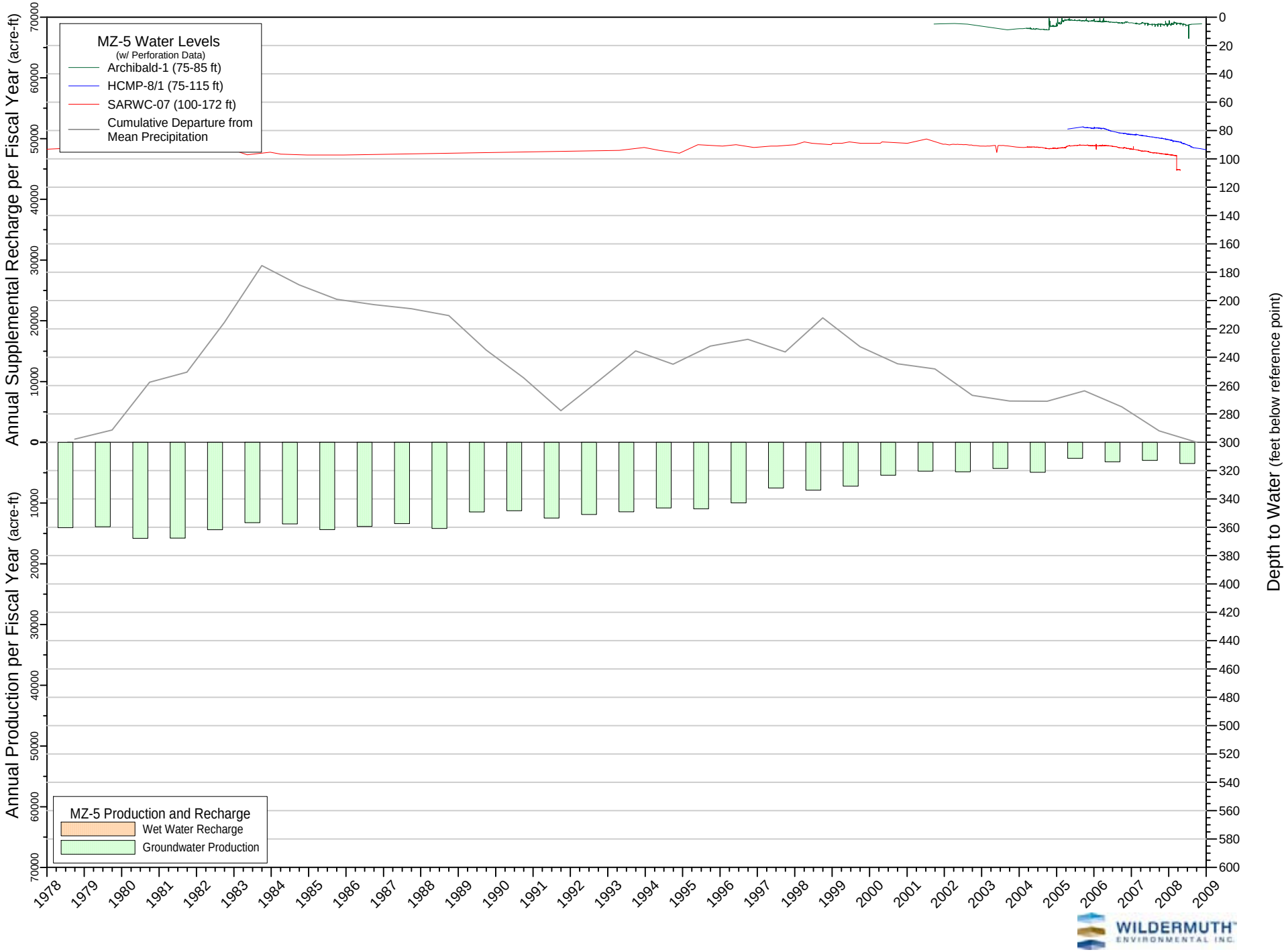
Figure 3-15 - Time History of Production, Recharge, and Groundwater Levels in Chino-South MZ



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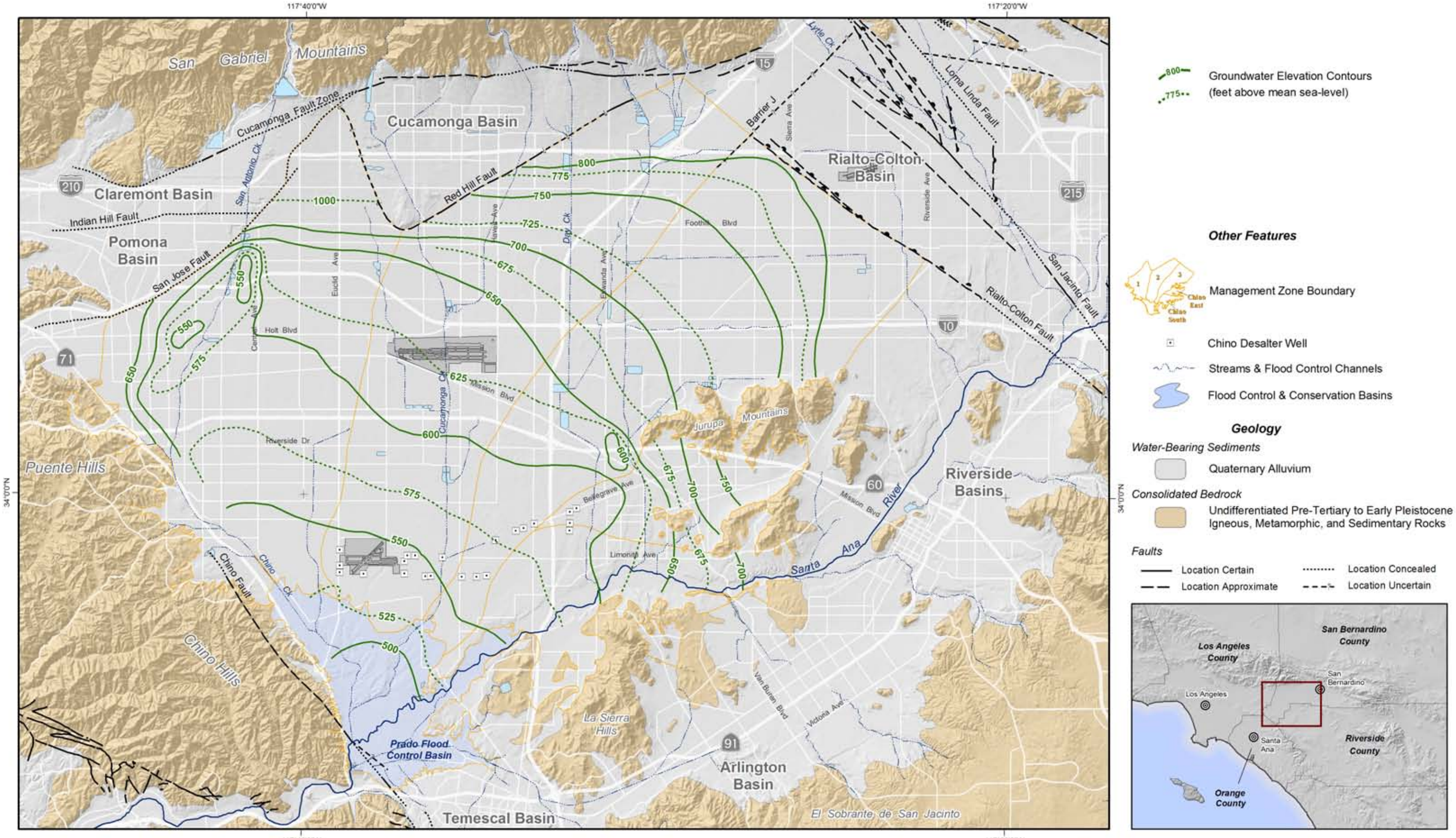

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0 1 2 3 4 5 Miles
0 2 4 6 8 KM

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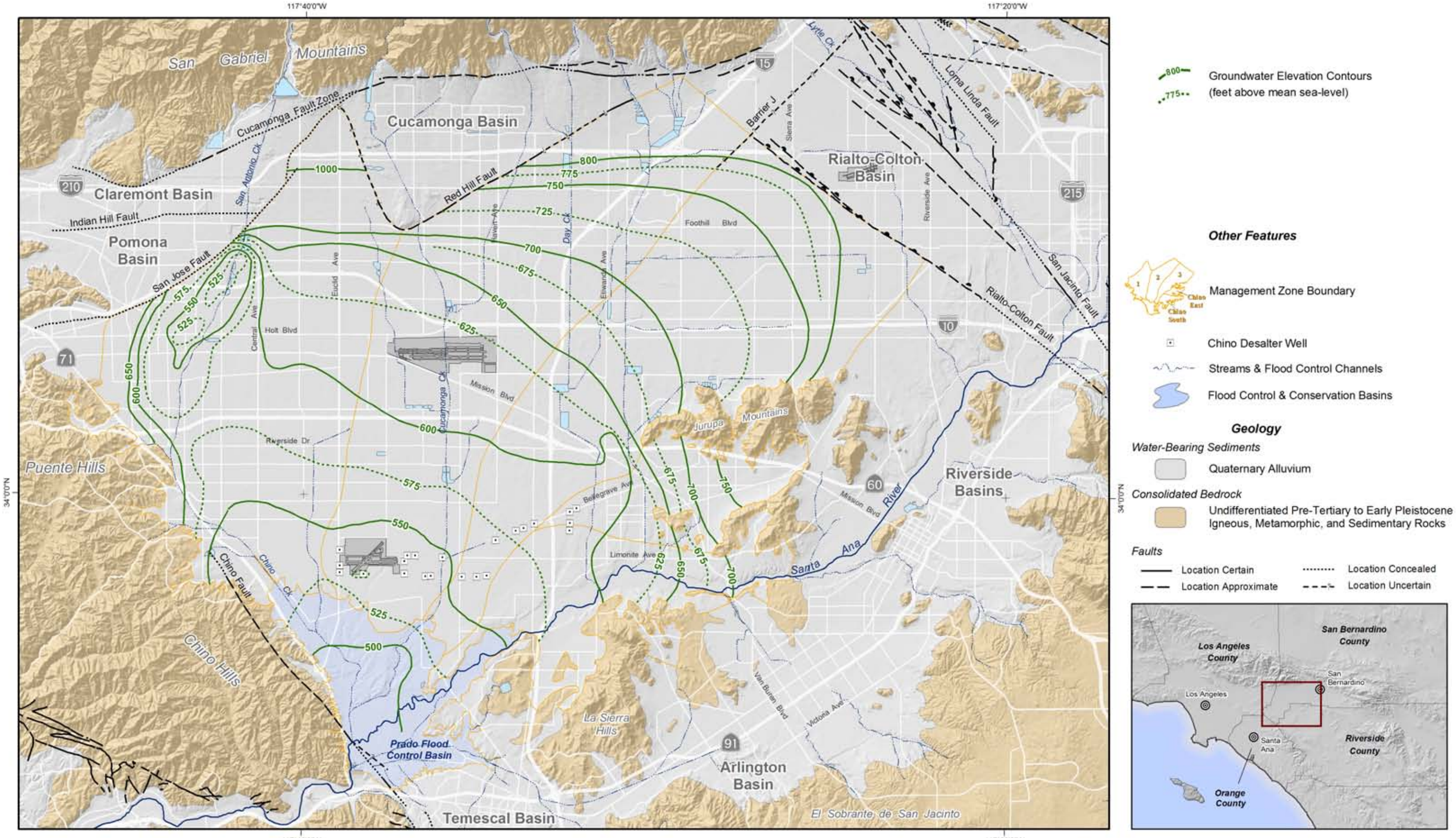
Groundwater Levels

Groundwater Elevation Contours

Fall 2000 -- Chino Basin

Figure 3-16



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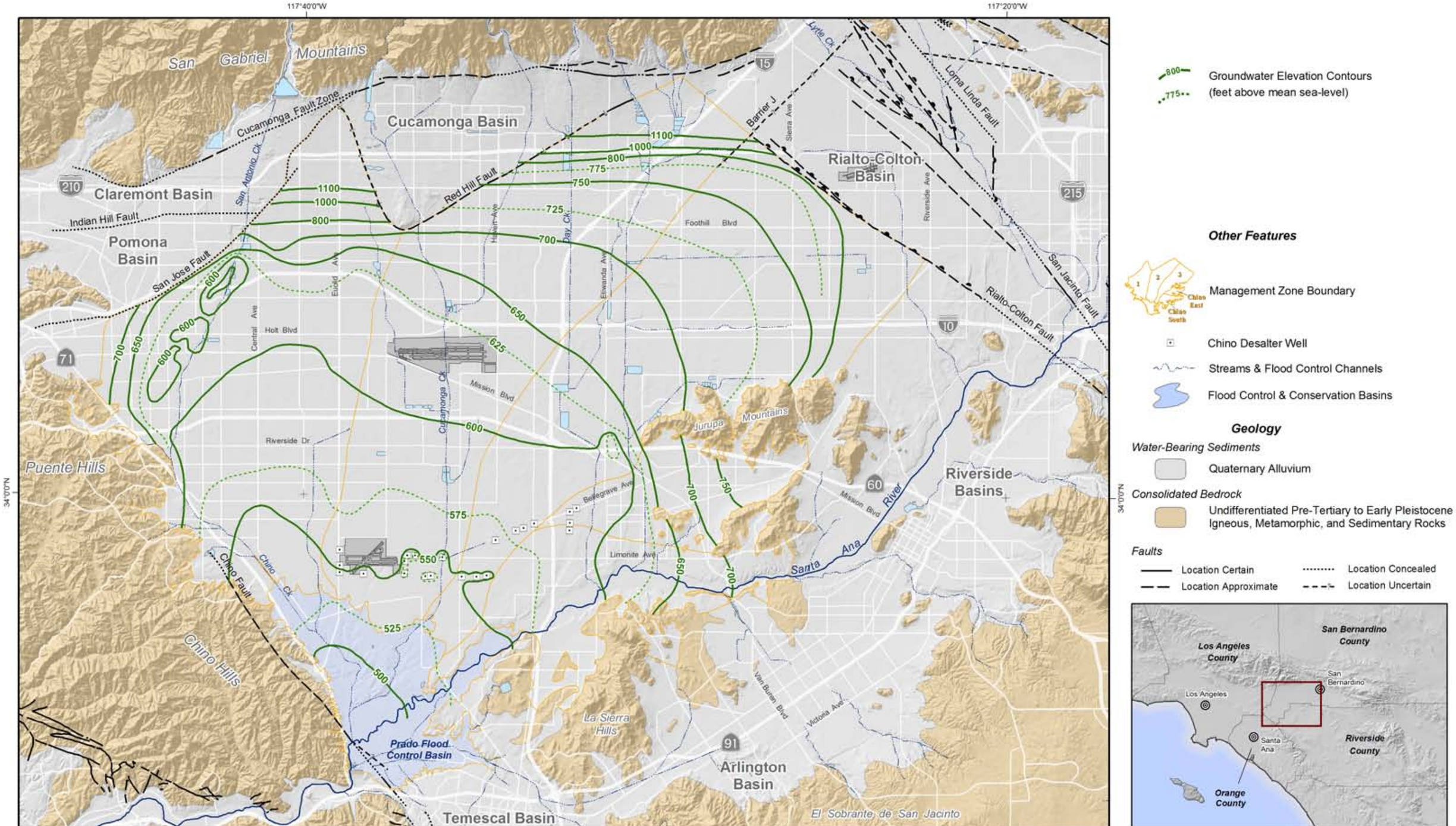
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Levels

Groundwater Elevation Contours

Fall 2003 -- Chino Basin

Figure 3-17



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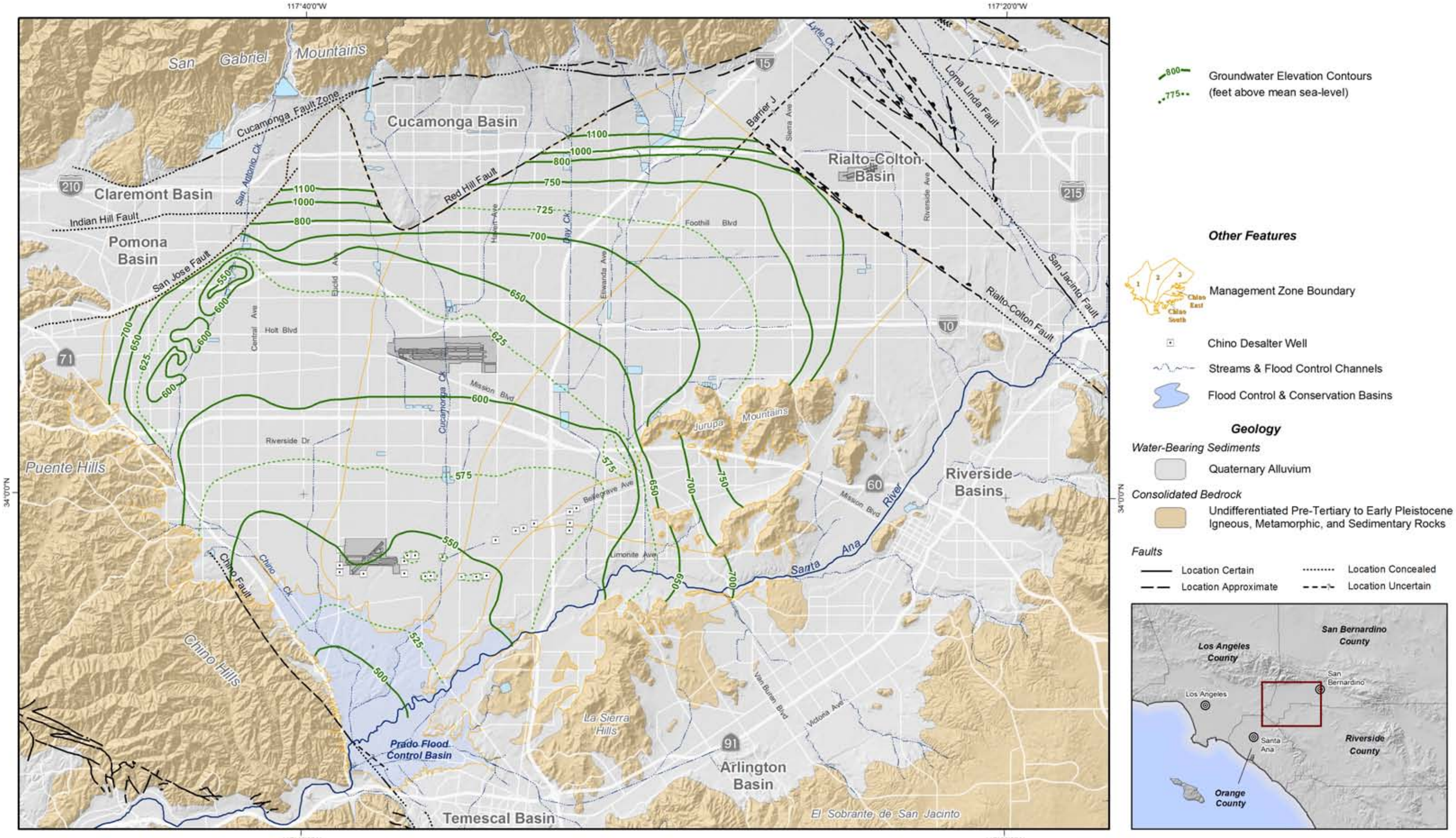
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Levels

Groundwater Elevation Contours

Fall 2006 -- Chino Basin

Figure 3-18



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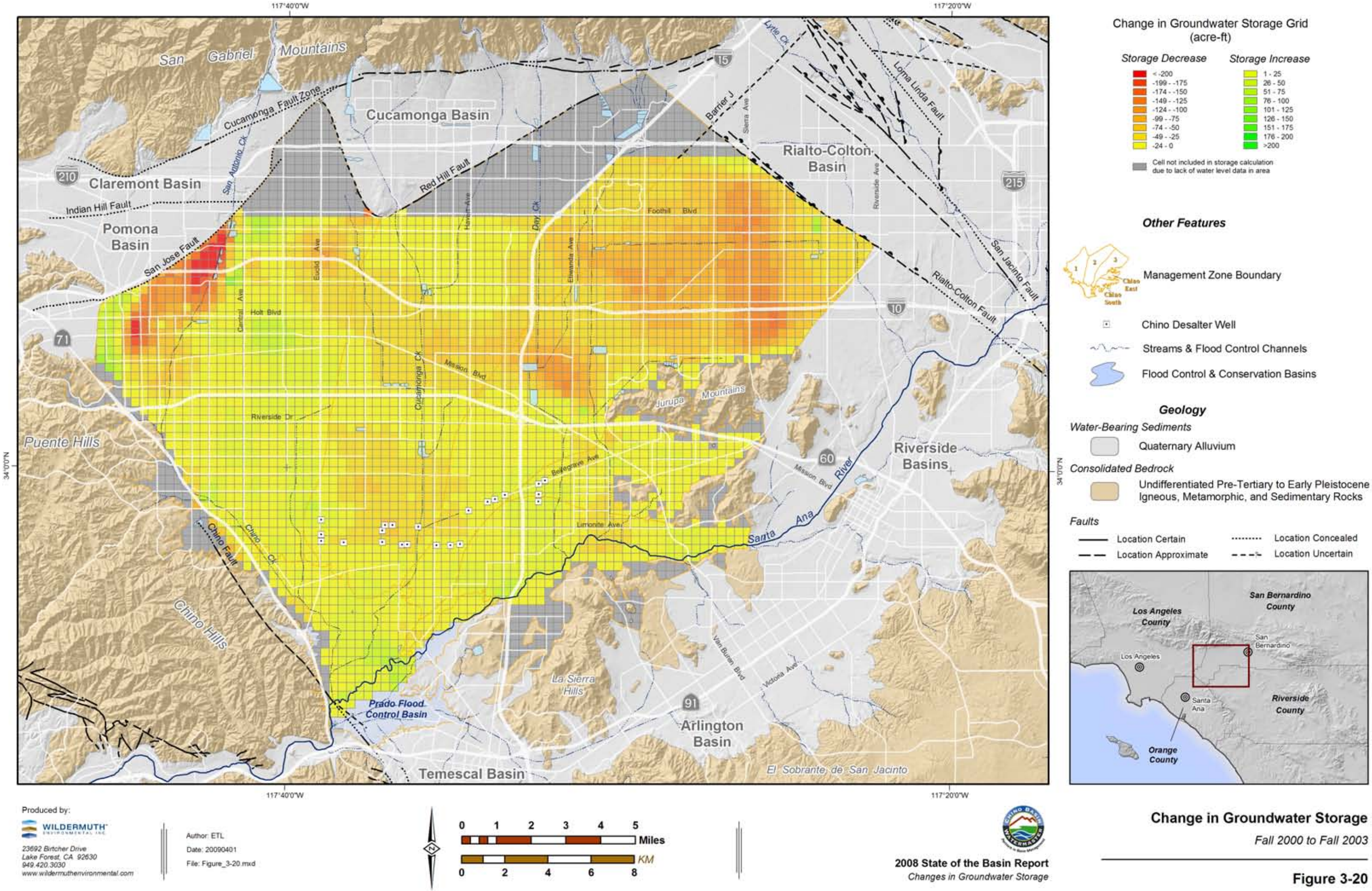
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Levels

Groundwater Elevation Contours

Fall 2008 -- Chino Basin

Figure 3-19



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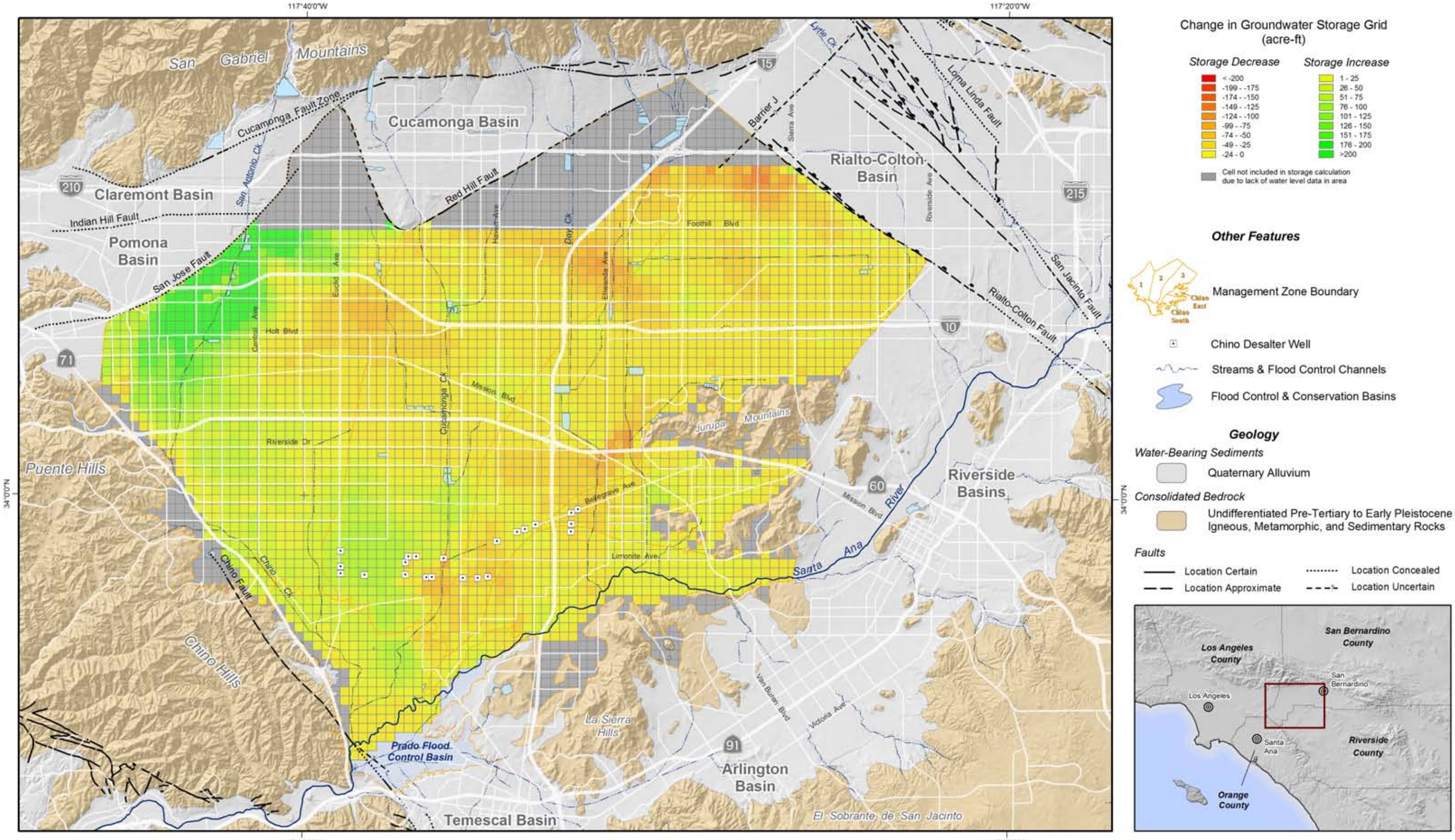
2008 State of the Basin Report
Changes in Groundwater Storage

Change in Groundwater Storage

Fall 2000 to Fall 2003

Figure 3-20



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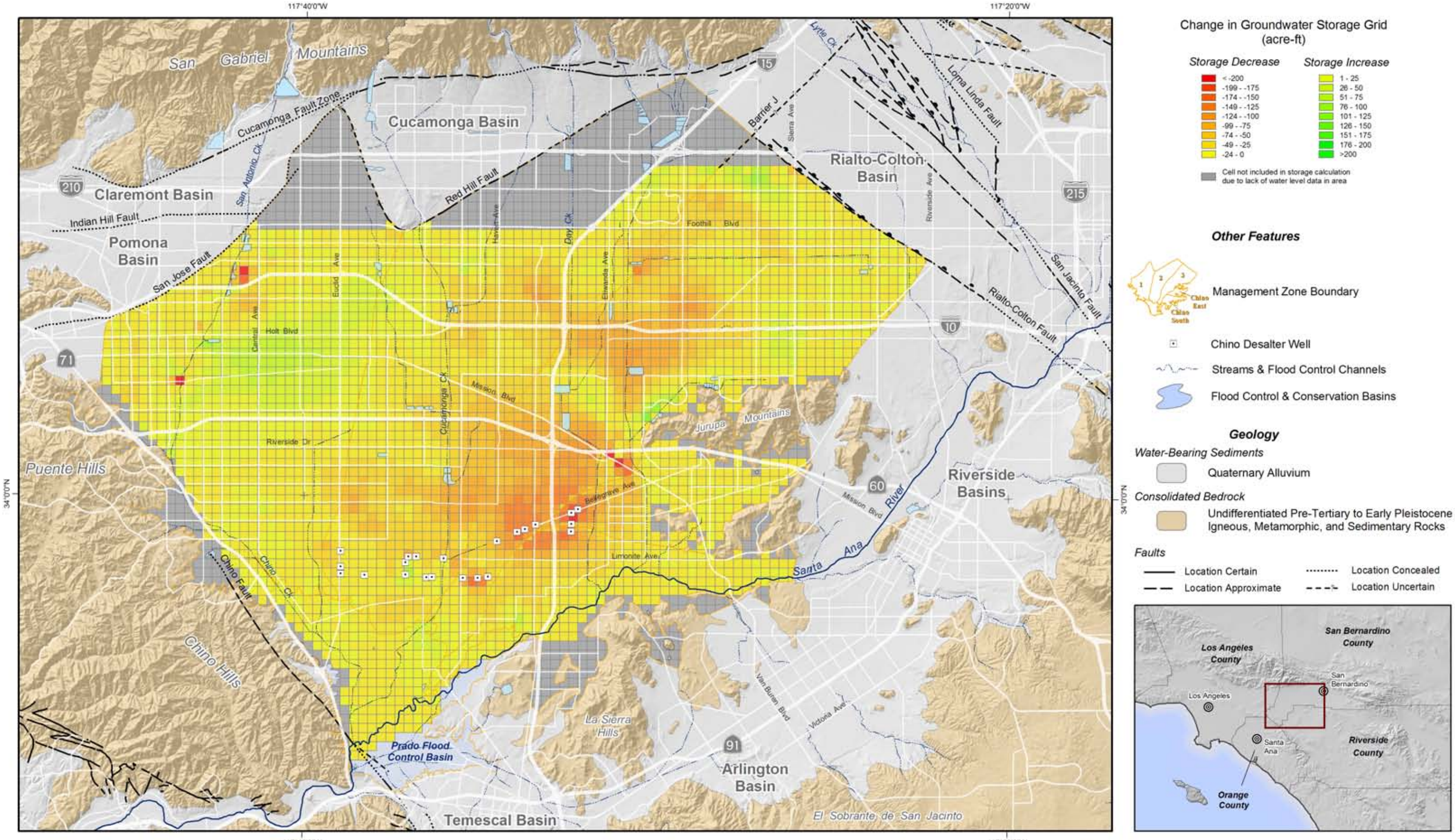
2008 State of the Basin Report
Changes in Groundwater Storage

Change in Groundwater Storage

Fall 2003 to Fall 2006

Figure 3-21



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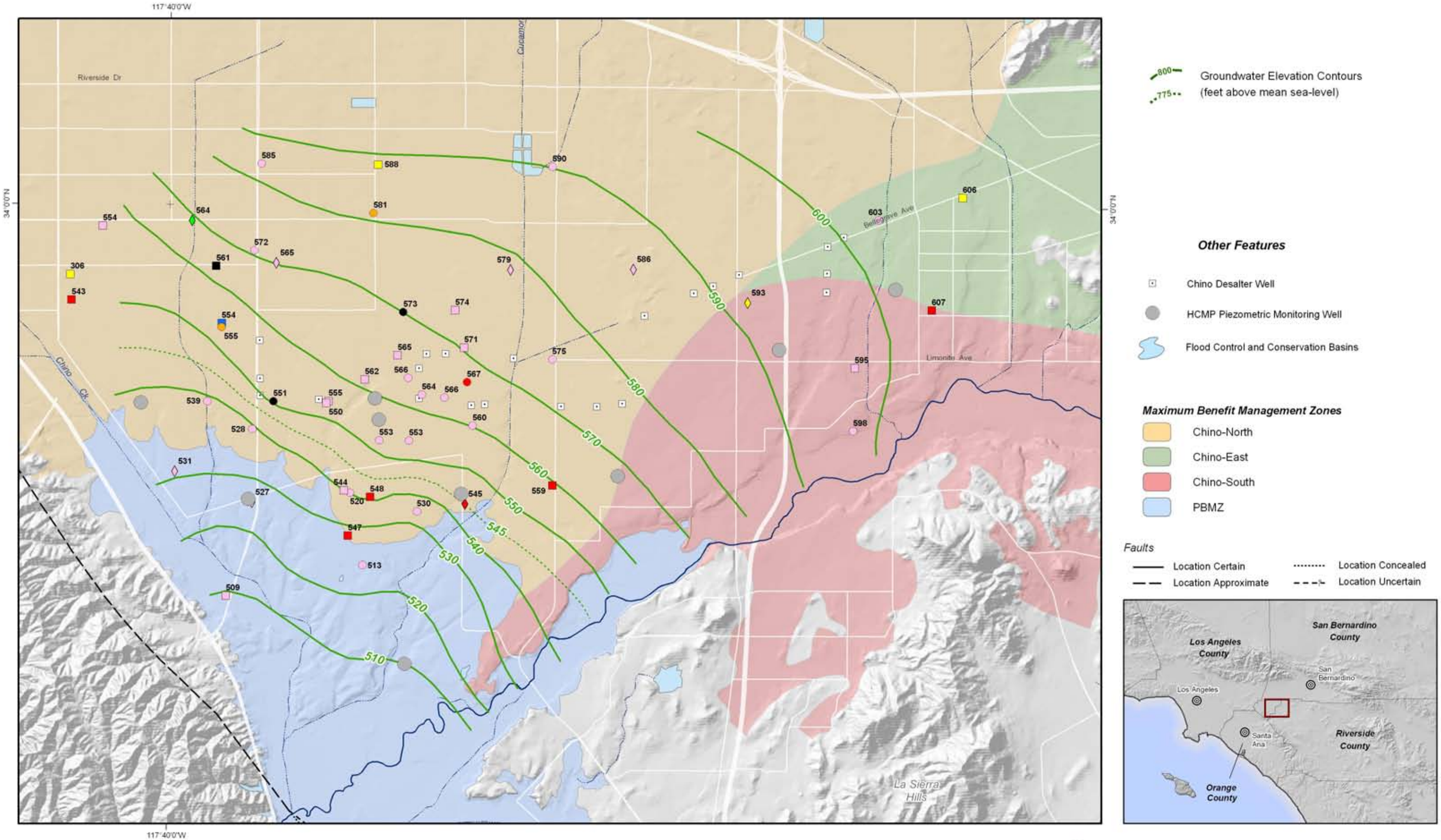
2008 State of the Basin Report
Changes in Groundwater Storage

Change in Groundwater Storage

Fall 2006 to Fall 2008

Figure 3-22



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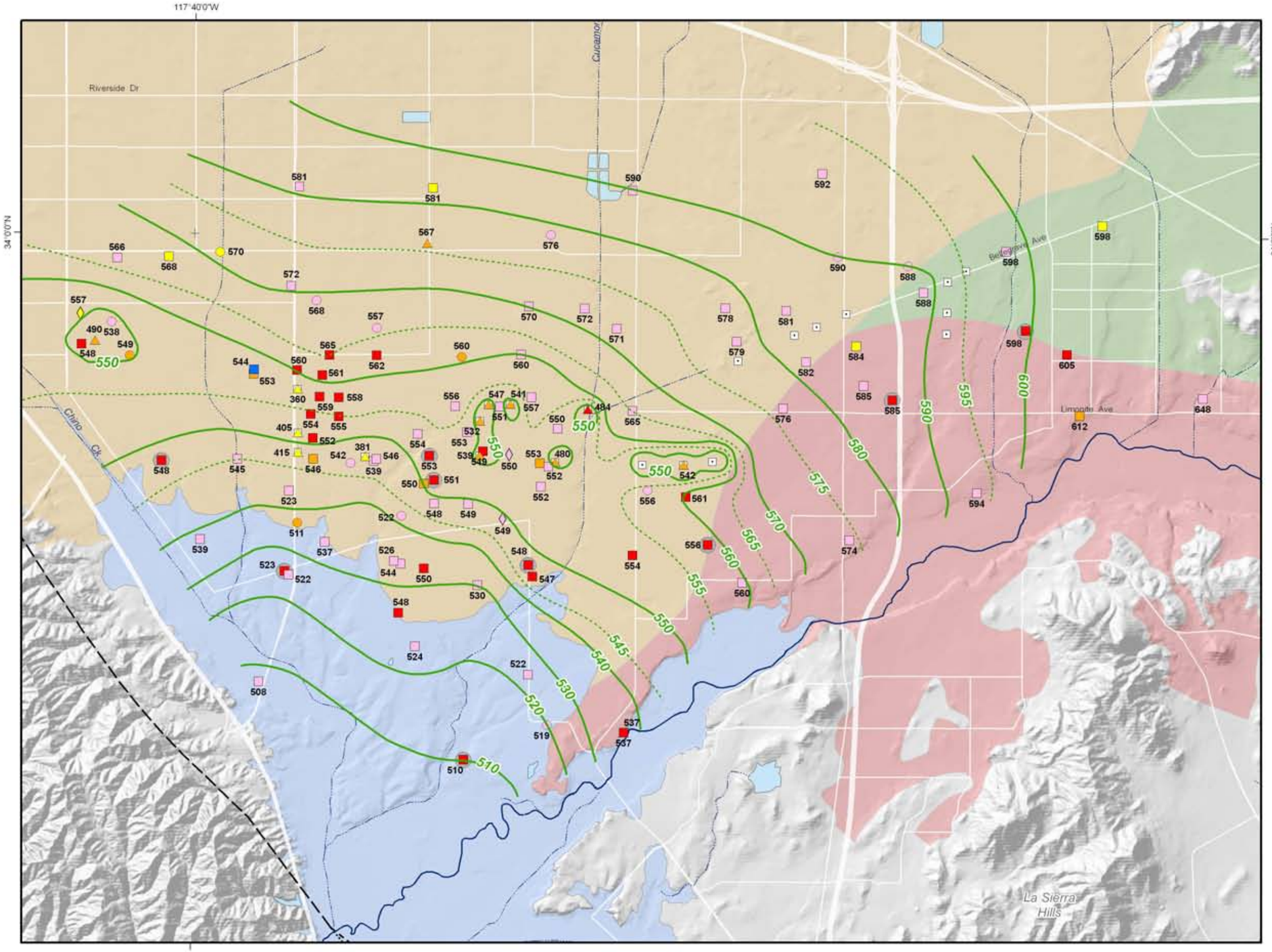
0 1 2 Miles
0 1 2 3 KM

2008 State of the Basin Report
Assessment of Hydraulic Control

State of Hydraulic Control -- Spring 2000

Groundwater Contours -- South Chino Basin Shallow Aquifer System

Figure 3-23



Groundwater Elevation Contours (feet above mean sea-level)

Other Features

- Chino Desalter Well
- HCMP Piezometric Monitoring Well
- Flood Control and Conservation Basins

Maximum Benefit Management Zones

- Chino-North
- Chino-East
- Chino-South
- PBMZ

Faults

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

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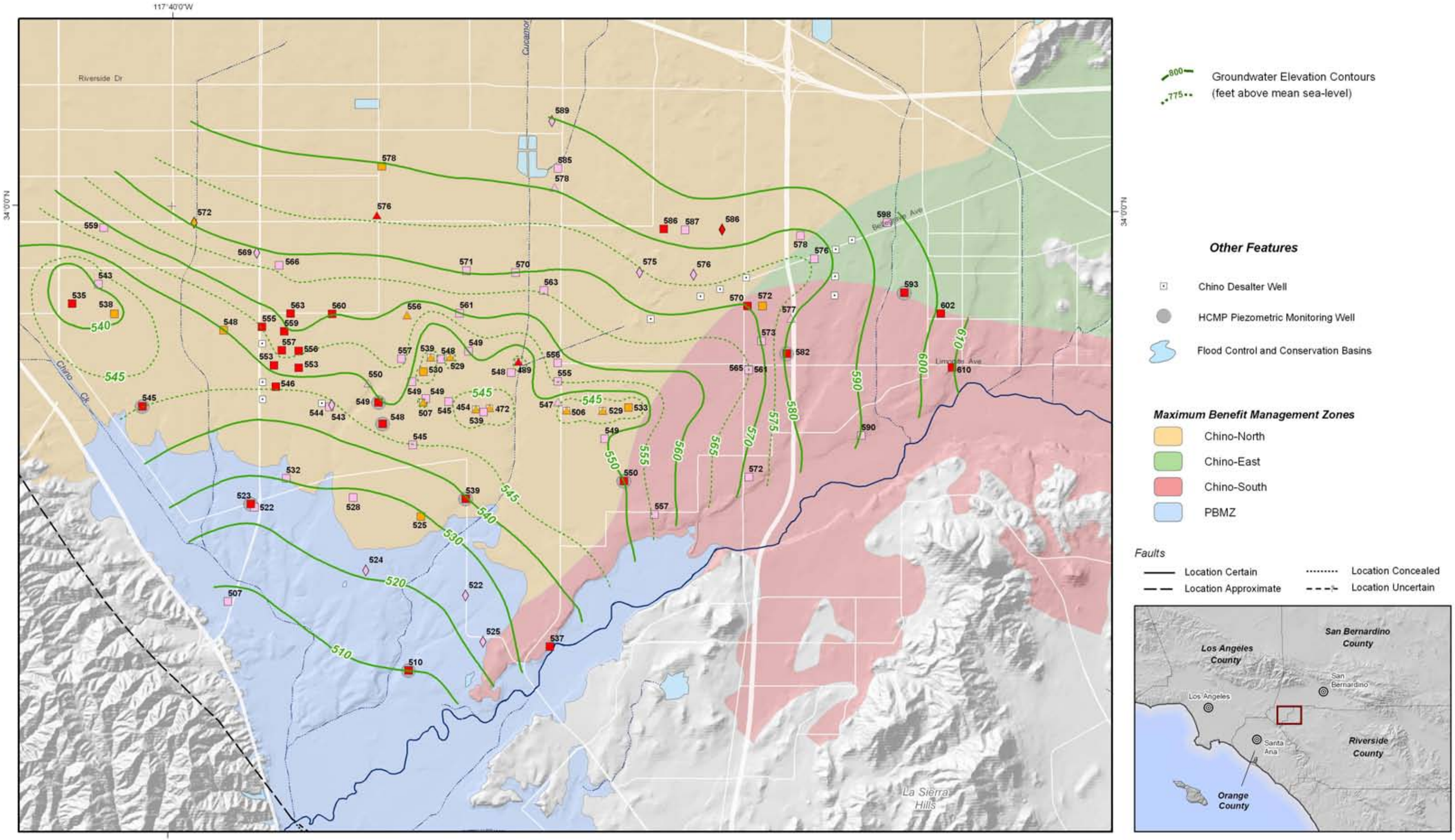
0 1 2 Miles
0 1 2 3 KM

2008 State of the Basin Report
Assessment of Hydraulic Control

State of Hydraulic Control -- Spring 2006

Groundwater Contours -- South Chino Basin Shallow Aquifer System

Figure 3-24



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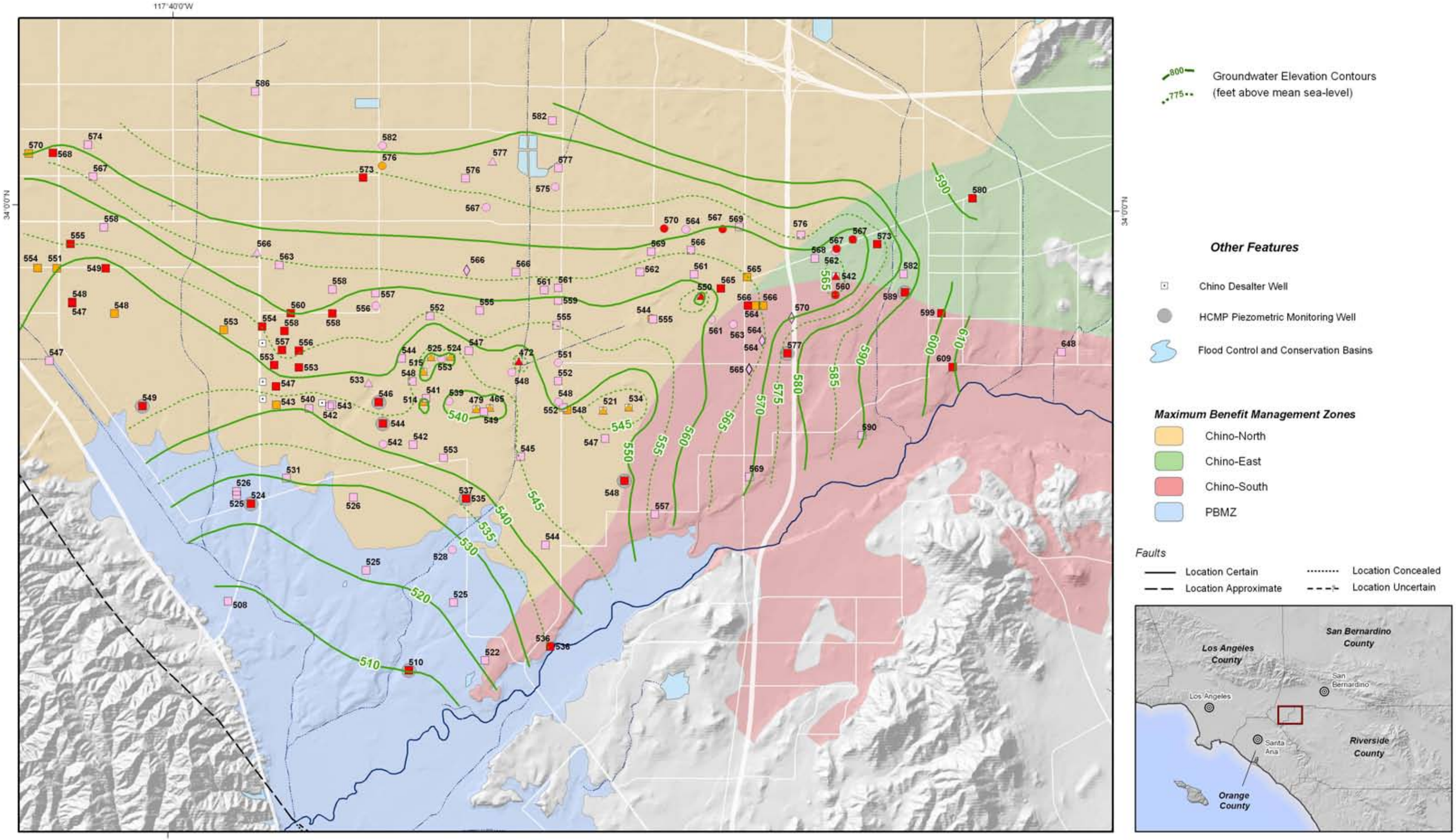
0 1 2 Miles
0 1 2 3 KM

2008 State of the Basin Report
Assessment of Hydraulic Control

State of Hydraulic Control -- Spring 2007

Groundwater Contours -- South Chino Basin Shallow Aquifer System

Figure 3-25



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Date: 20090401
File: Figure_3-26.mxd

0 1 2 Miles
0 1 2 3 KM

2008 State of the Basin Report
Assessment of Hydraulic Control

State of Hydraulic Control -- Spring 2008

Groundwater Contours -- South Chino Basin Shallow Aquifer System

Figure 3-26

4.1 Background

Chino Basin groundwater is not only a critical resource to overlying water producers; it is a critical resource to the entire Santa Ana Watershed. From a regulatory perspective, the use of Chino Basin groundwater to serve potable demands is limited by drinking water standards, groundwater basin water quality objectives, and Santa Ana River water quality objectives. In August 1999, Phase 1 of the OBMP established that groundwater monitoring must be conducted in order to obtain current water quality and water level data in Chino Basin (WEI, 1999). These data are necessary for defining and evaluating specific strategies and locations for the mitigation of nitrate, TDS, and other Constituents of Potential Concern (COPCs); new recharge sites; and pumping patterns that result from the implementation of the OBMP.

In the past, various entities have collected groundwater quality data. Municipal and agricultural water supply entities have collected groundwater quality data to comply with the Department of Health Services' requirements in the California Code of Regulations, Title 22, or for programs that range from irregular study-oriented measurements to long-term periodic measurements. Groundwater quality observations have been made by the DWR, by participants in the 1969 Judgment on the Santa Ana River (Orange County Water District vs. City of Chino et al.), by dischargers under orders from the RWQCB, and by the County of San Bernardino. The DWR and the San Bernardino County Flood Control District were very active in collecting groundwater quality data in the Chino Basin prior to the adjudication of the Chino Basin. After the Judgment was entered in 1978, monitoring south of State Route 60 stopped almost completely with the exception of that conducted by the Cities of Chino, Chino Hills, and Norco; the Jurupa Community Services District (JCSD); and the Santa Ana River Water Company. Most of the pre-1978 measurements were digitized by the DWR. In 1986, the MWDSC conducted the first comprehensive survey of groundwater quality, covering all constituents regulated under Title 22.

Watermaster initiated a regular monitoring program for Chino Basin in 1989. Groundwater quality data has been obtained periodically since 1990.

4.2 Water Quality Monitoring Programs

Watermaster began conducting a more robust monitoring program as part of the initial OBMP implementation. Watermaster's program relies on municipal producers, government agencies, and private consultants to supply their groundwater quality data on a cooperative basis. Watermaster supplements these data with data obtained through its own sampling and analysis program of private wells in the area generally south of State Route 60. Water quality data are also obtained from special studies and monitoring programs that take place under the orders of the RWQCB, the California Department of Toxic Substances Control (DTSC), and others. Watermaster has combined previously digitized groundwater quality data from all known sources into a comprehensive database.

4.2.1 Water Quality Monitoring Programs for Wells Owned by Municipal Water Suppliers

Water quality samples are collected from Appropriative Pool wells and some overlying Non-Agricultural Pool wells as part of formalized monitoring programs. Constituents include (i) those regulated for drinking water purposes in the California Code of Regulations, Title 22; (ii) those regulated in the 1995 Water Quality Control Plan for the Santa Ana River Basin (Basin Plan); or (iii) those that are of special interest to the pumper.

4.2.2 Water Quality Monitoring Programs for Private Water Supply Wells

Historically, private wells were sampled less methodically and less frequently than wells owned by members of the Appropriative Pool. As a result, there is little historical (pre-1999) groundwater quality information for most of the 600 private wells in the southern part of the Chino Basin. As mentioned above, the MWDSC conducted an assessment of water quality and water levels in the private wells south of State Route 60 in 1986. This assessment was a component of the Chino Basin groundwater storage program Environmental Impact Report (MWDSC et al., 1988). Nevertheless, the historical quality of groundwater produced at the majority of the wells in the southern Chino Basin is unknown.

In 1999, the Comprehensive Monitoring Program initiated the systematic sampling of private wells south of State Route 60 in the Chino Basin. Over a three-year period, Watermaster sampled all available wells at least twice to develop a robust baseline data set. This program has since been reduced to approximately 110 private key wells, and about half of these wells are sampled every other year. Groundwater quality samples are analyzed for general minerals, physical properties, and for regional COPCs (e.g. perchlorate, and volatile organic chemicals [VOCs] in the vicinity of known VOC plumes). This key well monitoring program provides a good representation of the areal groundwater quality in this portion of the basin.

4.2.3 Water Quality Monitoring Programs Conducted Pursuant to Regulatory Orders

Groundwater monitoring is conducted by private and public entities as part of regulatory orders and voluntary cleanups. These programs consist of networks of monitoring wells designed specifically to delineate and characterize the extent of the responsible party's contamination. These monitoring programs may include monthly, quarterly, and/or annual sampling frequencies. The following is a summary of all the regulatory and voluntary contamination monitoring in Chino Basin:

- **Plume:** Alumax Aluminum Recycling Facility
  Constituent of Concern: TDS, sulfate, nitrate, chloride
  Order: RWQCB Cleanup and Abatement Order 99-38
- **Plume:** Chino Airport
  Constituent of Concern: VOCs
  Order: RWQCB Cleanup and Abatement Order 90-134

- **Plume:** California Institute for Men
  Constituent of Concern: VOCs
  Order: Voluntary Cleanup Monitoring
- **Plume:** Crown Coach International Facility
  Constituent of Concern: VOCs and Solvents
  Order: Voluntary Cleanup Monitoring
- **Plume:** General Electric Flatiron Facility
  Constituent of Concern: VOCs
  Order: Voluntary Cleanup Monitoring
- **Plume:** General Electric Test Cell Facility
  Constituent of Concern: VOCs
  Order: Voluntary Cleanup Monitoring
- **Plume:** Kaiser Steel Fontana Site
  Constituent of Concern: TDS/total organic carbon (TOC)
  Order: See discussion in Section 4.36.7.
- **Plume:** Milliken Sanitary Landfill
  Constituent of Concern: VOCs
  Order: RWQCB Order No. 81-003
- **Plume:** Upland Sanitary Landfill
  Constituent of Concern: VOCs
  Order RWQCB Order No 98-99-07
- **Plume:** Ontario International Airport (VOC Plume – South of Ontario Airport)
  Constituent of Concern: VOC
  Order: This plume is currently being voluntarily investigated by a group of potentially responsible parties.
- **Plume:** Stringfellow National Priorities List (NPL) Site
  Constituent of Concern: VOCs, perchlorate, N-nitrosodimethylamine (NDMA), heavy metals
  Order: The Stringfellow Site is the subject of US Environmental Protection Agency (EPA) Records of Decision (RODs): EPA/ROD/R09-84/007, EPA/ROD/R09-83/005, EPA/ROD/R09-87/016, and EPA/ROD/R09-90/048.

4.2.4 Other Water Quality Monitoring Programs

In a letter dated July 13, 2000, the RWQCB expressed their concern to the IEUA that the historical recharge of recycled water at IEUA Regional Plant No. 3 (RP3) may have caused groundwater contamination at down-gradient wells. Other sources of groundwater contamination in the area include the Kaiser Steel Mill, Alumax, other industries, and historical agricultural activities, including citrus groves and hog feed lots. Several municipal wells have been shut down in MZ3 due to perchlorate and nitrate in groundwater. MZ3 includes areas that underlie all or part of the Fontana Water Company, the Marygold Mutual Water Company, the CVWD, and the City of Ontario. MZ3 groundwater is tributary to wells owned by the JCSD.

To characterize groundwater levels and quality in MZ3, Watermaster and the IEUA

performed an investigation. The objectives of this investigation were to develop a groundwater sampling program, install two sentry wells at the distal end of the Kaiser plume, and perform further characterization of groundwater quality. Sampling was conducted at twenty-two selected key wells from late 2005 to 2007. Where possible, four quarterly samples and one annual sample were collected. In 2007, two triple-nested wells (MZ3-1 and MZ3-2) were installed down gradient of the Kaiser plume. These wells were sampled quarterly for one year. The sampling results provided data to further characterize the water quality patterns for contaminants of concern in the study area, including TDS, nitrate, sulfate, chloride, and perchlorate. And, the results from well MZ3-1/3 redefined the extent of the Kaiser plume.

4.2.5 Information Management

As with groundwater level and production data, Watermaster manages groundwater quality data in order to perform the requisite scientific and engineering analyses required to ensure that the goals of the OBMP are being met. Watermaster's relational database contains well location, construction, lithology, specific capacity, groundwater level, and water quality data. Historical water quality data for the period prior to the mid-1980s were obtained from the DWR and supplemented with data from producers in the Appropriative and Overlying Non-Agricultural Pools and others. For the period from the mid-1980s forward, Watermaster has QA/QC'd and uploaded water quality data from its own sampling programs, the State of California Department of Public Health (CDPH, formerly the Department of Health Services) database, and other cooperating parties to its relational database. Occasionally, problems have been found with CDPH data, usually occurring in the form of incorrect constituent identification. In 2003, Watermaster launched the Chino Basin Relational Database effort to collect water quality data directly from each member agency and thereby circumvent past data problems. Cooperating parties provide all data (including geologic, geophysical, water levels, water quality, production, and recharge) to Watermaster on a routine basis. These data are delivered in electronic format directly from the laboratory or from the cooperating party.

4.3 Groundwater Quality in Chino Basin

Figure 4-1 shows all wells with groundwater quality monitoring results for the 5-year period of July 2003 to June 2008.

Inorganic and organic constituents detected in groundwater samples from wells in the Chino Basin through June 2008 were analyzed synoptically. This analysis included all available data from production and monitoring wells. Hence, the data do not represent a programmatic investigation of potential sources nor do they represent a randomized study that was designed to ascertain the water quality status of the Chino Basin. These data do, however, represent the most comprehensive information available to date.

Monitoring wells targeted at potential sources tend to have greater concentrations than municipal or agricultural production wells. Wells with constituent concentrations greater than one-half of the MCL represent areas that warrant concern and inclusion in a long-term monitoring program. In addition, groundwater in the vicinity of wells with samples greater than the MCL may be impaired from a beneficial use standpoint.

Numerous water quality standards have been put in place by federal and state agencies. Primary MCLs are enforceable criteria that are set due to health effects. Secondary standards are related to the aesthetic qualities of the water, such as taste and odor. For some chemicals, there are "Notification Level" criteria that are set by the CDPH. When notification levels are exceeded, the CDPH recommends that the utility inform its customers and consumers about the presence of the contaminant and any health concerns associated with exposure. The level at which the CDPH recommends the drinking water system remove the affected drinking water source from service is the "Response Level." These levels range from 10 to 100 times the notification level, depending on the chemical. The following constituents exceeded at least one water quality criteria in more than 10 wells within the Chino Basin for the period of July 2003 through June 2008:

Analyte Group/Constituent		Wells with Exceedance
Inorganic Constituents		
	Total Dissolved Solids	221
	Nitrate-Nitrogen	395
	Aluminum	153
	Arsenic	24
	Chloride	25
	Chromium	30
	Iron	185
	Manganese	58
	Perchlorate	188
	Sulfate	41
	Vanadium	25
General Physical		
	Color	21
	Odor	28
	pH	14
	Specific Conductance	121
	Turbidity	78
Chlorinated VOCs		
	1,1-Dichloroethane	11
	1,1-Dichloroethene	31
	1,2,3-Trichloropropane	23
	1,2-Dichloroethane	17
	cis-1,2-Dichloroethene	10
	Tetrachloroethene (PCE)	37
	Trichloroethene (TCE)	115

For all figures (Section 4 and Appendix B) that depict water quality distributions in the Chino Basin, the following convention is typically followed in setting class intervals in the legend (where WQS is the applicable water quality standard [see table below]). Variations of this convention may be employed to highlight certain aspects of the data.

Symbol	Class Interval
○	Not Detected
●	<0.5x WQS, but detected
●	0.5x WQS to WQS
●	WQS to 2x WQS
●	2x WQS to 4x WQS
●	> 4x WQS

4.3.1 Total Dissolved Solids

In Title 22, TDS is regulated as a secondary contaminant. The California secondary drinking water MCL for TDS is 500 mg/L. Figure 4-2 shows the distribution of the maximum TDS concentrations in Chino Basin from July 2003 through June 2008. During this period, maximum TDS concentrations ranged from 48 mg/L to 4,790 mg/L with average and median concentrations of approximately 550 mg/L and 380 mg/L, respectively. The highest concentrations are located south of State Route 60 where the impacts from agriculture are greatest, which is consistent with the data reported in the 2006 State of the Basin Report.

The impacts of agriculture on TDS in groundwater are primarily caused by dairy waste disposal, consumptive use, and fertilizer use on crops. As irrigation efficiency increases, the impact of consumptive use on TDS in groundwater also increases. For example, if source water has a TDS concentration of 250 mg/L and the irrigation efficiency is about fifty percent (flood irrigation), the resulting TDS concentration in returns to groundwater would be 500 mg/L, which is exclusive of the mineral increments from fertilizer. If irrigation efficiency is increased to seventy-five percent, the resulting TDS concentration in the returns to groundwater would be 1,000 mg/L, which is also exclusive of the mineral increments from fertilizer. For modern irrigated agriculture, the TDS impacts of consumptive use are more significant than mineral increments from fertilizers.

Wells with low TDS concentrations in close proximity to wells with higher TDS concentrations suggests a vertical stratification of water quality. However, there is a paucity of information concerning well construction/perforation intervals; Thus, the vertical differences in water quality are currently unverifiable.

4.3.2 Nitrate-Nitrogen

In Title 22, the primary MCL for nitrate as nitrogen (NO3-N) in drinking water is 10 mg/L. By convention, all nitrate values are expressed in this report as NO3-N. Figure 4-3 displays the distribution of maximum NO3-N concentrations in the Chino Basin from July 2003 through June 2008.

Areas with significant irrigated land use or dairy waste disposal histories overlie groundwater with elevated nitrate concentrations. The primary areas of nitrate degradation were formerly or are currently overlain by:

- Citrus (the northern parts of the Chino-North MZ)
- Dairy and irrigated agriculture (the southern parts of the Chino-North MZ, the Chino-South MZ, the Chino-East MZ, and the Prado Basin MZ [PBMZ])

Nitrate concentrations in groundwater have increased slightly or remained relatively constant in the northern parts of the Chino-North MZ from 1960 to present. These areas were formerly occupied by citrus groves and vineyards. The nitrate concentrations underlying these areas rarely exceed 10 mg/L (as nitrogen). Over the same period, nitrate concentrations increased significantly in the southern parts of the Chino-North MZ, the Chino-South MZ, the Chino-East MZ, and the PBMZ. In these areas, land use was progressively converted from irrigated/non-irrigated agricultural land to dairies, and nitrate concentrations typically exceed the 10 mg/L MCL and frequently exceed 40 mg/L.

4.3.3 Other Constituents of Potential Concern

Section 4.3.3 discusses the constituents with water quality standards that were exceeded in ten or more wells in Chino Basin with the exception of nitrate and TDS. The details of these exceedances are displayed graphically in Figures 4-4 through 4-17, and in Appendix B.

A query was developed to analyze water quality data in the Chino Basin from July 2003 through June 2008 that is in exceedance of any water quality standard. The results of this query are provided in a summary table in Appendix C, including:

- Chemical Constituents (listed alphabetically)
- Reporting Units
- Water Quality Standards (detailed explanations are provided in the table's footnote):
  - EPA Primary MCL
  - EPA Secondary MCL
  - California Primary MCL
  - California Secondary MCL
  - California Notification Level
- Minimum – the minimum concentration of the given constituent for the given time period. Non-detect values were assigned a value of zero.
- Lower or First Quartile – the first value that divides the items of a frequency distribution or ordered data set into four classes with each containing one fourth of the total population.
- Median or Second Quartile – the second value that divides the items of a frequency distribution or ordered data set into four classes with each containing one fourth of the total population.
- Upper or Third Quartile – the third value that divides the items of a frequency distribution or ordered data set into four classes with each containing one fourth of the total population.

- Maximum – the maximum concentration of the given constituent for the given time period. Non-detect values were assigned a value of zero.
- Average – the average concentration of the given constituent for the given time period. Non-detect values were assigned a value of zero.
- Number of Samples – the total number of samples for the given constituent for the given time period.
- Number of Wells Sampled – the number of wells sampled in the given time period, not the number of samples collected.
- Number of Wells with Detects – the number of wells in the period wherein the constituent was detected at any concentration.
- Number of Wells with Exceedances – the number of wells in the given time period with any value that exceeded any of the five water quality standards.

4.3.3.1 VOCs

The following seven VOCs were detected at or above their MCL in more than 10 wells in the Chino Basin:

- 1,1-dichloroethane (1,1-DCA)
- 1,1-dichloroethene (1,1-DCE)
- 1,2,3-trichloropropane (1,2,3-TCP)
- 1,2-dichloroethane (1,2-DCA)
- *cis*-1,2-dichloroethene (cis-1,2-DCE)
- tetrachloroethene (PCE)
- trichloroethene (TCE)

4.3.3.1.1 Trichloroethene and Tetrachloroethene

Trichloroethene (TCE) and tetrachloroethene (PCE) were/are widely used industrial solvents. Both PCE and TCE are used as metal degreasers in the automotive and other metal working industries. PCE is commonly used in the dry-cleaning industry. TCE was commonly used as a food extractant. The areal distributions of TCE and PCE are shown in Figures 4-4 and 4-5, respectively. In general, PCE is below the detection limit for wells in the Chino Basin. Wells with detectable levels tend to occur in clusters, such as those around the Milliken Landfill, south and west of the Ontario Airport, and along the margins of the Chino Hills. The spatial distribution of TCE resembles that of PCE. TCE was not detectable in most of the wells in the basin, and similar clusters of wells occur around the Milliken Landfill, south and west of Ontario International Airport (OIA), south of Chino Airport, and in the Stringfellow plume.

Figure 4-19 shows the ratio of TCE, PCE, and their breakdown products in monitoring wells associated with the VOC plumes in the southern Chino Basin. The unique characteristics of these plumes can be seen by comparing TCE and PCE concentrations and dispersion. For example, the Milliken Landfill plume and the GE plumes near Ontario Airport have significant concentrations of both TCE and PCE while the Chino Airport and Stingfellow

plumes have significant concentrations of TCE and only minor detections of PCE, and the OIA plume is characterized solely by TCE. These unique characteristics allow for differentiation between the plumes and determining the intermingling of plumes.

4.3.3.1.2 1,1-Dichloroethene, 1,2-Dichloroethane, and cis-1,2-Dichloroethene

1,1-Dichloroethene (1,1-DCE), 1,2-Dichloroethane (1,2-DCA), and cis-1,2-Dichloroethene (cis-1,2-DCE) are degradation by-products of PCE and TCE (Dragun, 1988) that are formed by reductive dehalogenation. The areal distributions of 1,1-DCE, 1,2-DCA, and cis-1,2-DCE are shown in Figures 4-6 through 4-8, respectively. 1,1-DCE, 1,2-DCA, and cis-1,2-DCE have not been detected in the majority of wells in the Chino Basin. 1,1-DCE is found near the Milliken Landfill, south and west of OIA, at the former Crown Coach Facility, and at the head of the Stringfellow plume. 1,2-DCA and cis-1,2-DCE are found in the same general locations.

4.3.3.1.3 1,1-Dichloroethane

1,1,-Dichloroethane (1,1-DCA) is a colorless oily liquid that is used as a solvent for plastics, as a degreaser, as a halon in fire extinguishers, and in the cementing of rubber, and is a degradation by-product of 1,1,1-TCA. Figure 4-9 shows the areal distribution of 1,1-DCA in the Chino Basin. Eleven wells were in exceedance of the primary CA MCL of 5 μg/L for 1,1-DCA for the period of July 2003 through June 2008. The majority of these wells are monitoring wells at the former Crown Coach Facility.

4.3.3.1.4 1,2,3-Trichloropropane

1,2,3-TCP is a colorless liquid that is used primarily as a chemical intermediate in the production of polysulfone liquid polymers and dichloropropene, and in the synthesis of hexafluoropropylene and as a cross linking agent in the synthesis of polysulfides. It has been used as a solvent, an extractive agent, a paint and varnish remover, and a cleaning and degreasing agent, and it has been formulated with dichloropropene in the manufacturing of soil fumigants, such as D-D.

The current California State Notification Level for 1,2,3-TCP is 0.005 μg/L. The adoption of the Unregulated Chemicals Monitoring Requirements regulations occurred before a method capable of achieving the required detection limit for reporting (DLR) was available. According to the CDPH, some utilities moved ahead with monitoring, and samples were analyzed using higher DLRs. Unfortunately, findings of non-detect with a DLR higher than 0.005 μg/L do not provide the CDPH with the information needed for setting a standard. New methodologies with a DLR of 0.005 μg/L have since been developed, and the CDPH has requested that any utility with 1,2,3-TCP findings of non-detect with reporting levels of 0.01 μg/L or higher do follow-up sampling using a DLR of 0.005 μg/L. Because 1,2,3-TCP may be a basin-wide water quality issue, private and public wells are continuing to be retested at the lower detection limit (0.005 μg/L).

Figure 4-10 shows the distribution of 1,2,3-TCP in Chino Basin, based on the data limitations discussed above. High 1,2,3-TCP values are associated with the Chino Airport Plume. Of particular note, there is a cluster of wells with 1,2,3-TCP concentrations greater than the Notification Level in the Jurupa region and a scattering of wells that exceed the Notification

Level on the western margins of the basin. Watermaster will continue to monitor and investigate this constituent.

4.3.3.2 Iron, Arsenic, and Vanadium

Iron, arsenic, and vanadium concentrations depend on mineral solubility, ion exchange reactions, surface complexations, and soluble ligands. These speciation and mineralization reactions, in turn, depend on pH, oxidation-reduction potential, and temperature.

4.3.3.2.1 Iron

In general, iron is not detected across the Chino Basin, but there are some scattered detectable concentrations that are above regulatory limits (see Appendix B). Iron concentrations are elevated in the vicinity of the Stringfellow Plume. Outside of the Stringfellow Plume, there were 85 wells with iron concentrations that exceed the MCL. Nevertheless, these exceedances may be an artifact of sampling methodology; relatively high concentrations of iron and trace metals are often the result of the dissolution of aluminosilicate particulate matter and colloids, which is caused by the acid preservative in unfiltered samples.

4.3.3.2.2 Arsenic

The US EPA implemented a new primary MCL for arsenic in 2006, decreasing the MCL from 50 μg/L to 10 μg/L. In November 2008, the Primary CA MCL was also changed from 50 μg/L to 10 μg/L. Figure 4-11 shows the distribution of arsenic in the Chino Basin. Eleven wells in the basin had arsenic concentrations that exceeded the MCL. Of these wells, three are associated with the Stringfellow Plume, and three are associated with Chino Airport Plume. Higher concentrations of arsenic are found in the Chino/Chino Hills area in the lower aquifer at depths greater than about 350 ft-bgs.

4.3.3.2.3 Vanadium

In the Chino Basin, vanadium has been detected above regulatory limits in some scattered wells. In groundwater, vanadium can result from mining and industrial activities or be of natural occurrence. While elemental vanadium does not occur in nature, vanadium compounds are found in fossil fuels and exist in over 60 different mineral ores. The primary industrial use of vanadium is in the steel industry where it is used to strengthen steel. Figure 4-12 shows the areal distribution of vanadium in the Chino Basin. The majority of the 25 wells in exceedance of the California Notification Level (0.05 mg/L) are associated with the Stringfellow Plume. Other exceedances are found near the Milliken Landfill, in deep wells in the Chino/Chino Hills area, and in one well near the Jurupa Mountains.

4.3.3.3 Perchlorate

Perchlorate has recently been detected in several wells in the Chino Basin (Figure 4-13), in other basins in California, and in other states in the west. The most probable reason why perchlorate was not detected in groundwater until recently is that analytical methodologies that could attain a low enough detection limit did not previously exist. Prior to 1996, the

method detection limit for perchlorate was 400 μg/L. In March 1997, an ion chromatographic method was developed with a detection limit of 1 μg/L and a reporting limit of 4 μg/L.

As an environmental contaminant, perchlorate (ClO4-) originates from the solid salts of ammonium perchlorate (NH4ClO4), potassium perchlorate (KClO4), or sodium perchlorate (NaClO4). Perchlorate salts are quite soluble in water. The perchlorate anion (ClO4-) is exceedingly mobile in soil and groundwater environments. Because of its resistance to react with other available constituents, it can persist for many decades under typical groundwater and surface water conditions. Perchlorate is a kinetically stable ion, which means that reduction of the chlorine atom from a +7 oxidation state in perchlorate to a -1 oxidation state as a chloride ion requires activation energy or the presence of a catalyst to facilitate the reaction. Since perchlorate is chemically stable in the environment, natural chemical reduction is not expected to be significant.

Possible sources of perchlorate contamination are synthetic (ammonium perchlorate used in the manufacturing of solid propellant used for rockets, missiles, and fireworks) and natural (perchlorate derived from Chilean caliche that was used for fertilizer).

Fertilizers derived from Chilean caliche are currently used in small quantities on specialized crops, including tobacco, cotton, fruits, and vegetables (Renner, 1999). However, evidence suggests that usage may have been widespread for citrus crops in Southern California from the late 1800s through the 1930s.

The current CDPH Notification Level for perchlorate is 6 μg/L, which was established on March 11, 2004.

Perchlorate has been detected in 188 wells in the Chino Basin at levels greater than 6 μg/L. Perchlorate Notification Level exceedances occur in the following areas of the Chino Basin (Figure 4-13):

- Rialto-Colton Basin (There is a significant perchlorate plume in the Rialto-Colton Basin. The RWQCB is investigating the source of this plume, which appears to be near the Mid-Valley Sanitary Landfill. According to the RWQCB, several companies—including B.F. Goodrich, Kwikset Locks, American Promotional Events, and Denova Environmental—operated nearby and used or produced perchlorate. These companies were located on a 160-acre parcel at T1N R5W S21 SW1/4. Denova Environmental also operated on a 10-acre lot at T1N R5W S20 S1/2 (along the boundary between Sections 20 and 29). Perchlorate in the Fontana area of Chino Basin may be the result of (i) the Rialto-Colton perchlorate plume migrating across the Rialto-Colton fault, (ii) other point sources in Chino Basin, and/or (iii) the non-point application of Chilean nitrate fertilizer in citrus groves.)
- Downgradient of the Stringfellow Superfund Site (Concentrations have exceeded 600,000 μg/L at onsite observation wells. The plume has likely reached the Pedley Hills and may extend as far as Limonite Avenue.)
- City of Pomona well field (source[s] unknown)
- Wells in the City of Ontario water service area, south of OIA (source[s] unknown)
- Scattered wells in the Monte Vista water service area (source[s] unknown)

- Scattered wells in the City of Chino water service area (source[s] unknown)

A forensic isotope study was conducted to determine the source of perchlorate in Chino Basin groundwater. This forensic technique was developed using comprehensive stable isotope analyses (37Cl/35Cl and 18O/17O/16O) of perchlorate to determine the origin of the perchlorate (synthetic vs. naturally occurring). Stable isotope analyses of perchlorate from known man-made (e.g. samples derived from electrochemically synthesized ammonium- and potassium-perchlorate salts) and natural (e.g. samples from the nitrate salt deposits of the Atacama Desert in Chile) sources reveal systematic differences in isotopic characteristics that are related to the formation mechanisms (Bao & Gu, 2004; Böhlke et al., 2005; Sturchio et al., 2006). There is considerable anecdotal evidence that large quantities of Chilean nitrate fertilizer were imported into the Chino Basin in the early 1900s for the citrus industry, which covered the north, west and central portions of the basin.

The perchlorate isotope study consisted of 10 groundwater samples that were collected throughout the Chino Basin. The sampling points included private wells and municipal production wells. Samples were collected using a flow-through column with a highly perchlorate-selective anion-exchange resin. The exchange resin concentrates low levels of perchlorate in groundwater such that a sufficient amount can be acquired and for isotopic analysis. Results confirmed that most of the perchlorate in the west and central portions of the Chino Basin was derived from Chilean nitrate fertilizer. One sample collected south of the OIA is a potential mixture of natural and synthetic sources.

4.3.3.4 Total Chromium and Hexavalent Chromium

Figure 4-14 shows the areal distribution of total chromium in the Chino Basin. Thirty wells were found to be in exceedance of the CA MCL of 50 µg/L. The majority of these wells are associated with the Milliken Sanitary Landfill, the Stringfellow Plume, and the GE Test Cell Plume. The remaining wells include isolated wells near the Jurupa Mountains and in the southern Chino Basin and City of Pomona wells. Chromium in groundwater results from natural and anthropogenic sources.

Hexavalent chromium is currently regulated under the MCL for total chromium. In 1999, the CDPH identified that hexavalent chromium needed an individual MCL, and concerns over its carcinogenicity grew. Subsequently, the CDPH included it on the list of unregulated chemicals that require monitoring. California Health and Safety Codes (§116365.5 and §1163659a) compelled the adoption of a hexavalent chromium MCL by January 1, 2004, and required it to be close to the public health goals (PHG) established by the Cal/EPA Office of Environmental Health Hazard Assessment (OEHHA). At present, the PHG has not been established, and the CDPH cannot proceed with the MCL process. Figure 4-15 shows the areal distribution of hexavalent chromium in the Chino Basin. Only three wells in the Chino Basin were in exceedence of the CA MCL for total chromium. In the near future hexavalent chromium may become a more significant contaminant of concern in the Chino Basin when a lower MCL is determined by CDPH, and more wells are sampled for hexavalent chromium.

4.3.3.5 Chloride and Sulfate

Chloride and sulfate both exceeded secondary MCLs. As discussed previously, secondary MCLs apply to chemicals in drinking water that adversely affect its aesthetic qualities and are not based on the direct health effects associated with the chemical. Chloride and sulfate are major anions associated with TDS. All wells in the basin had detectable levels of sulfate (Figure 4-16), but most had concentrations that were less then 125 mg/L (one-half the water quality standard). A total of 41 wells had concentrations at or above the sulfate secondary MCL. In general, these wells are distributed in the southern portion of the basin, in the Stringfellow plume, and along the margins of the Chino Hills. All wells had detectable levels of chloride (Figure 4-17), but most had concentrations that were less 125 mg/L (one-half the MCL). The secondary MCL for chloride was exceeded in 25 wells; almost all of which are located in the southern portion of the basin.

4.3.3.6 Color, Odor, and Turbidity

In the last 5 years, color, odor, and turbidity have been detected above their secondary MCLs in more than 10 wells within the Chino Basin (see Appendix B). These parameters are monitored purely for aesthetic reasons and should not substantially impair water quality in the Chino Basin.

4.3.4 Point Sources of Concern

The water quality discussion above described water quality conditions across the entire basin. The discussion below describes the water quality plumes associated with known point source discharges to groundwater. Figure 4-18 shows the locations of various point sources and associated areas of water quality degradation. Figure 4-19 shows the VOC plumes and features pie charts that display the relative percent of TCE, PCE, and other VOCs detected at groundwater wells within plume impacted areas. The pie charts demonstrate the chemical differentiation between the VOC plumes in the southern portion of Chino Basin.

4.3.4.1 Alumax Aluminum Recycling Facility

Between 1957 and 1982, an 18-acre aluminum recovery facility was operated in the City of Fontana. The byproducts of aluminum recycling are aluminum oxide wastes and brine water. During this 25-year period, solid wastes were stockpiled onsite. Process water containing sodium and potassium chloride salts was discharged onsite and allowed to percolate into native soil and groundwater. Discharge ceased in 1982, and the solid wastes were removed in 1992. Onsite groundwater monitoring was initiated in 1993 by then owner Alumax, Inc. The site was subsequently capped to prevent the future mobilization of salts offsite. Alcoa Davenport Works (Alcoa) purchased Alumax in 1998.

Currently, there are two onsite monitoring wells: MW-1 is located in the northeast corner of the property, and MW-2 is located in the southwest corner. These wells have steel casings and have experienced chloride corrosion and extensive accumulation of iron hydroxide scale. Rehabilitation efforts in 2001 failed to adequately clear the well screens. Both wells subsequently experienced partial casing constrictions or screen collapses. In 2007, it was discovered that over ten feet of iron oxide scale and sediment had accumulated in the bottom

of MW-1. MW-2 was abandoned and replaced in 2008 as it could no longer be sampled.

Offsite monitoring began with the construction of four monitoring wells (AOS-1, AOS-2, AOS-3, and AOS-4) between 1999 and 2000. These wells are all located downgradient of the site and were constructed of PVC in an effort to avoid the scale and corrosion experienced at the onsite wells. In April 2008, the RWQCB stated that Alcoa would no longer be required to monitor offsite monitoring wells AOS-1, AOS-2, and AOS-3 unless elevated levels of salts were detected at upgradient well AOS-4 (RWQCB, 2008). Alcoa is currently evaluating the ownership transfer of wells AOS-1, AOS-2, and AOS-3 to Watermaster to allow for continued monitoring.

The plume emanating from the Alumax site is characterized by elevated concentrations of sulfate, nitrate, chloride, potassium, and sodium. Consequently, the TDS concentrations at the onsite wells are high, ranging from about 500 mg/L to over 2,000 mg/L. Offsite monitoring has yielded observed TDS concentrations that range from about 100 mg/L to 700 mg/L. Note that these TDS values are higher than those observed at up-gradient wells, which typically range from 200 to 300 mg/L.

4.3.4.2 Chino Airport

The Chino Airport is located approximately four miles east of the City of Chino and six miles south of the OIA and occupies about 895 acres. From the early 1940s until 1948, the airport was owned by the federal government and used for flight training and aircraft storage. The County of San Bernardino acquired the airport in 1948 and has operated and/or leased portions of the facility ever since. Since 1948, businesses and activities at the airport have included: the modification of military aircraft; crop-dusting; aircraft-engine repair; aircraft painting, stripping, and washing; dispensing of fire-retardant chemicals to fight forest fires; and general aircraft maintenance. The use of organic solvents for various manufacturing and industrial purposes has been widespread throughout the airport's history. From 1986 to 1988, a number of groundwater quality investigations were performed in the vicinity of the Chino Airport. Analytical results from groundwater sampling revealed the presence of VOCs above MCLs in six wells downgradient of the Chino Airport. The most common VOC detected above its MCL is TCE, as shown in Figure 4-19. TCE concentrations in the contaminated wells ranged from 6 to 75 µg/L.

In 1990, Cleanup and Abatement Order (CAO) No. 90-134 was issued to address groundwater contamination emanating from the Chino Airport. During 2003, five groundwater monitoring wells were installed onsite; and in 2005, an additional four groundwater monitoring wells were installed onsite for further characterization. During June and July of 2006, Watermaster conducted a focused sampling event of 25 wells within the vicinity of the Chino Airport plume. In 2007, the San Bernardino County Department of Airports began to focus their investigation on offsite characterization of the plume. In 2008, the RWQCB issued a CAO (No. R-8 2008-0064) to the San Bernardino County Department of Airports in order to define the lateral and vertical extent of the VOCs in groundwater and to prepare a remedial action plan. In late 2008, nine offsite monitoring wells were completed in three locations. Initial sampling of these wells was done in August 2009.

Figure 4-18 shows the approximate areal extent of TCE in groundwater at concentrations in

exceedance of the MCL in the vicinity of the Chino Airport as of 2008. The plume is elongate in shape, up to 3,600 feet wide, and extends approximately 12,100 feet from the airport's northern boundary in a south to southwestern direction. From July 2003 to June 2008, the maximum TCE concentration detected at an individual well within the Chino Airport plume was 910 μg/L.

4.3.4.3 California Institute for Men

The California Institution for Men (CIM) is a state correctional facility located in the City of Chino and has been in existence since 1939. The property occupies approximately 1,500 acres, and is bounded by Eucalyptus Avenue to the north, Euclid Avenue to the east, Kimball Avenue to the south, and Central Avenue to the west. Site use includes agricultural operations, inmate housing, and correctional facilities. The Heman G. Stark Youth Correctional Facility occupies the eastern portion of the property (Geomatrix Consultants, 2005).

In 1990, PCE was detected at a concentration of 26 μg/L at CIM drinking water supply Well 1. Analytical results have indicated that the most common VOCs detected in groundwater underlying CIM are PCE and TCE. The maximum PCE concentration in groundwater detected at an individual monitoring well (MW-7) was 1990 μg/L, and the maximum TCE concentration in groundwater detected at an individual monitoring well (MW-6) was 160 μg/L (Geomatrix Consultants, 2007). Other detected VOCs include 1,2-DCE, bromodichloromethane, 1,1,1-TCA, carbon tetrachloride, chloroform, and toluene.

In 1992, construction began on a groundwater monitoring network of approximately 40 wells. These wells were sampled intermittently through 2007. An Interim Remedial Measure (IRM) was implemented to resume production at Well 1, treat extracted water to reduce VOC concentrations, and use that water as part of the CIM potable water distribution system. Since the implementation of the IRM, the concentrations of PCE and TCE in groundwater have decreased considerably. Of the 39 wells sampled in 2007, 6 wells in the shallow aquifer had PCE concentrations in exceedance of the MCL, and TCE was detected at one shallow monitoring well (Geomatrix Consultants, 2007). CIM submitted a Request for No Further Action (NFA) for groundwater PCE remediation to the RWQCB.

Figure 4-18 shows the approximate areal extent of VOCs in groundwater at concentrations exceeding their MCLs as of 2008. The plume is up to 2,900 feet wide and extends about 5,800 feet from north to south. As Figure 4-19 illustrates, the CIM plume is primarily characterized by PCE. From July 2003 to June 2008, the maximum PCE and TCE concentrations in groundwater detected at an individual well within the CIM plume were 57 μg/L and 26 μg/L, respectively.

4.3.4.4 Crown Coach

The former Crown Coach site, located at 13799 Monte Vista Ave in the City of Chino, was used by the General Electric Corporation (GE) for the manufacturing and maintenance of semi-tractors and buses from the early 1970s onward. In 1987, it was discovered that twelve underground storage tanks were leaking lube oils, diesel, antifreeze, waste oil, and waste

solvents. All 12 tanks were removed by 1988, and the release of spent solvents in the underlying soil and groundwater was reported (Rosengarten Smith & Associates, 1992). Since 1988, sampling at 22 monitoring wells has determined the concentration and areal extent of the VOC plume. Contaminated soil and groundwater are contained onsite. The most common VOCs detected are TCE, PCE, and 1,1-DCE, as shown in Figure 4-19.

Concurrent with groundwater monitoring, a series of remediation activities have occurred on the property. Starting in June 1990, extracted groundwater was discharged to an onsite sewer connection, operating under an industrial wastewater discharge permit. A soil-vapor extraction system was brought onsite in 1992 to address vadose zone contamination. Starting in 2005, a Dual Phase Extraction Treatment System (DPETS) was used to remediate groundwater and soil. In May 2008, Duke Reality began redevelopment activities on the property. During construction, DPETS operations ceased, and Edible Oil Solution (EOS) was injected into ten monitoring and extraction wells as a remediation replacement.

Figure 4-18 shows the approximate areal extent of VOCs in groundwater at concentrations exceeding their MCLs near the Crown Coach Facility as of 2008. The plume is approximately 500 feet in length and 250 feet wide. The last monitoring event in 2008 indicated that the lateral boundaries of the plume are decreasing, and PCE, TCE, and 1,1 DCE were not detected in deep aquifer wells (Rosengarten Smith & Associates, 2008). From July 2003 to June 2008, the maximum PCE and TCE concentrations detected at an individual well within the Crown Coach VOC plume were 182 μg/L and 125 μg/L, respectively.

In June 2009, GE submitted a report to the Regional Board evaluating the effectiveness of the EOS injections and the need for additional remedial measures. In this report GE concluded that the hydrogeologic conditions beneath the site are sufficient to protect the beneficial uses of groundwater in the regional aquifer and that no further monitoring and remediation activity is warranted at this site. A response from the Regional Board on this report is pending.

4.3.4.5 General Electric Flatiron Facility

The General Electric Flatiron Facility (Flatiron Facility) occupied the site at 234 East Main Street, Ontario, California from the early 1900s to 1982. Its operations primarily consisted of manufacturing clothes irons. Currently, the site is occupied by an industrial park. The RWQCB issued an investigative order to GE in 1987 after an inactive well in the City of Ontario was found to contain TCE and chromium above drinking water standards. Analytical results from groundwater sampling have indicated that VOCs and total chromium are the major groundwater contaminants. The most common VOC detected at levels significantly above its MCL is TCE, as shown in Figure 4-19. TCE has reached a measured maximum concentration of 5,620 μg/L. Other VOCs—including PCE, toluene, and total xylenes—are periodically detected but commonly below their MCLs (Geomatrix Consultants, 1997).

The facility's eighteen monitoring wells are part of a quarterly monitoring program that began in 1991. Remediation activities began in 1995 with RWQCB Waster Discharge Requirement Order No. 95-62 for the pump and treat of groundwater at two extraction wells, EW-01 and EW-02. The operation of the extraction wells and remediation system is also referred to as the Final Remediation Measures (FRM). Groundwater from EW-01 is treated for VOCs, and groundwater from EW-02 is treated for VOCs and chromium. The two sources of treated

water join, are pipelined to the West Cucamonga Channel and ultimately to the Ely Basins, where it percolates into the Chino Basin Aquifer. In late 2009 or early 2010, an injection well and pipeline will be completed, and treated groundwater will be injected into the Chino Basin. In addition to the remediation measures discussed above, a Soil Vapor Extraction (SVE) system has been in operation since 2003 to remove VOCs from impacted soil.

Figure 4-18 shows the approximate areal extent of TCE in groundwater at concentrations exceeding the MCL as of 2008. The plume is up to 3,400 feet wide and extends about 9,000 feet south-southwest (hydraulically downgradient) from the southern border of the site. From July 2003 to June 2008, the maximum TCE concentration detected at an individual well within the Flatiron Facility plume was 5,620 μg/L, and the maximum total chromium concentration detected at an individual well was 485 μg/L.

4.3.4.6 General Electric Test Cell Facility

The GE Engine Maintenance Center Test Cell Facility (Test Cell Facility) is located at 1923 East Avion, Ontario, California. From 1956 to present, primary operations at the Test Cell Facility have included the testing and maintenance of commercial and military aircraft engines. Historically, hazardous waste was disposed of in dry wells. In 1987, results of a preliminary investigation indicated the presence of VOCs in soils near the dry wells. In 1991, a soil and groundwater investigation and subsequent quarterly groundwater quality monitoring showed the presence of VOCs in the soil and groundwater beneath the Test Cell Facility and that the VOCs had migrated offsite (Dames & Moore, 1996). Subsequent investigations indicated that the most common and abundant VOC detected in groundwater beneath the site was TCE. The historical maximum TCE concentration measured at an onsite monitoring well (directly beneath the Test Cell Facility) was 1,240 μg/L. The historical maximum TCE concentration measured at an offsite monitoring well (downgradient) was 190 μg/L (BDM International, 1997). Other detected VOCs include PCE, cis-1,2-DCE, 1,2-dicholoropropane, 1,1-DCE, 1,1-DCA, and chloroform, among others.

A Consent Order between General Electric and CDPH was signed September 28, 1988 for groundwater and soil remediation (Docket No. 88/89-009CO). The groundwater investigation and cleanup is under the oversight of the RWQCB. Vapor extraction treatment system operations began in 1996 (Docket No. HAS 97/98-014). Quarterly monitoring and operations status reports have been submitted to the DTSC and the RWQCB since remediation commenced. Recently a study was conducted to evaluate the effectiveness of the soil remediation program. The results of this study were submitted to the DTSC in October 2008 (Geosyntec Consultants, 2008). In some regions of the facility, shallow soils have reached acceptable closure levels; however, remediation activities will continue until sufficient data can be evaluated.

Figure 4-18 shows the approximate areal extent of VOCs in groundwater at concentrations exceeding federal MCLs as of 2008. The plume is elongate in shape, up to 2,400 feet wide, and extends approximately 10,300 feet from the Test Cell Facility in a southwesterly direction. As Figure 4-19 illustrates, the GE Test Cell Facility plume is characterized primarily by TCE, PCE, cis-1,2-DCE, and 1,1-DCE. From July 2003 to June 2008, the maximum TCE and PCE concentrations in groundwater detected at an individual well within the Test Cell Facility

plume were 900 µg/L and 16 µg/L, respectively.

4.3.4.7 Kaiser Steel Fontana Steel Site

Between 1943 and 1983, the Kaiser Steel Corporation (Kaiser) operated an integrated steel manufacturing facility in Fontana. During the first 30 years of operations (1945-1974), a portion of the Kaiser brine wastewater was discharged to surface impoundments and allowed to percolate into the soil. In the early 1970s, the surface impoundments were lined to eliminate percolation to groundwater (Wildermuth, 1991). In July of 1983, Kaiser initiated a groundwater investigation that revealed the presence of a plume of degraded groundwater beneath the facility. In August 1987, the RWQCB issued CAO Number 87-121, requiring additional groundwater investigations and remediation activities. The results of those investigations showed that the major constituents of release to groundwater were inorganic dissolved solids and low molecular weight organic compounds. The wells sampled during the groundwater investigations had TDS concentrations ranging from 500 to 1,200 mg/L and TOC concentrations ranging from 1 to 70 mg/L. By November 1991, the plume had migrated almost entirely off the Kaiser site.

In 1993, Kaiser and the RWQCB entered into a settlement agreement; Kaiser was required to mitigate any adverse impacts caused by its plume at existing and otherwise useable municipal wells. Pursuant to the settlement, the RWQCB rescinded its earlier order 91-40, and Kaiser was granted capacity in the Chino II Desalter to intercept and remediate the Kaiser plume within the Chino Basin. In an effort to further characterize the plume, during 2005, a network of 22 public and private supply wells were selected for quarterly groundwater sampling for one year and annual sampling thereafter. In addition, two triple nested monitoring wells, MZ3-1 and MZ3-2, were installed between the distal edge of the plume and municipal supply wells in 2007. Well MZ3-1/3 was found to have elevated concentrations of TDS, sulfate, and TOC. Based on this finding, the Kaiser plume was extended to include this well.

Figure 4-18 shows the approximate areal extent of the TDS/TOC groundwater plume as of 2008. Based on a limited number of wells, including Kaiser monitoring wells MP-2 and KOSF, City of Ontario Wells 27 and 30, and monitoring wells MZ3-1 and MZ3-2, the plume is up to 7,000 feet wide and extends about 18,500 feet from the northeast to the southwest.

4.3.4.8 Milliken Sanitary Landfill

The Milliken Sanitary Landfill (MSL) is an inactive Class III Municipal Solid Waste Management Unit, located near the intersections of Milliken Avenue and Mission Boulevard in the City of Ontario. This facility is owned by the County of San Bernardino and managed by the County's Waste System Division. The facility operated from 1958 to 1999. Groundwater monitoring at the MSL began in 1987 with five monitoring wells as part of a Solid Waste Assessment Test (SWAT) investigation (IT, 1989). The results of this investigation indicated that the MSL had released organic and inorganic compounds to underlying groundwater. Based on this finding, the MSL conducted an Evaluation Monitoring Program (EMP) investigation. At the completion of the EMP, a total of 29 monitoring wells were drilled to evaluate the nature and extent of the groundwater impacts identified in the vicinity of the MSL (GeoLogic Associates, 1998). Analytical results have indicated that VOCs

are the major constituents of release. The most commonly detected VOCs are TCE, PCE, and dichlorodifluoromethane. Other VOCs that have been detected above MCLs include vinyl chloride, benzene, 1,1-dichloroethane, and 1,2-dichloropropane. Historically, the maximum total VOC concentration in an individual monitoring well was 159.6 µg/L (GeoLogic Associates, 1998).

Figure 4-18 shows the approximate areal extent of VOCs in groundwater at concentrations exceeding MCLs as of 2008. The plume is up to 1,800 feet wide and extends about 2,100 feet south of the MSL's southern border. As Figure 4-19 illustrates, the MSL plume is characterized by a mixture of PCE, TCE, and their degradation products. From July 2003 to June 2008, the maximum TCE and PCE concentrations detected at an individual well within the MSL plume were 12 µg/L and 8.4 µg/L, respectively.

4.3.4.9 Municipal Wastewater Disposal Ponds

Historically, treated municipal wastewater was disposed of in ponds located near the current IEUA Regional Plant 1 (RP1), located in south Ontario, and the former Regional Plant 3 (RP3) disposal ponds, located in south Fontana. The ponds located just east of RP1, commonly referred to as the Cucamonga ponds, were used to dispose of untreated effluent collected by the Cucamonga County Water District (now the CVWD) and the IEUA. The RP3 disposal ponds are located on the southwest corner of Beech and Jurupa Avenues in the City of Fontana. The discharge of treated wastewater to the Cucamonga ponds and the RP3 ponds ceased between the early 1970s and the mid-1980s. The contaminant plumes emanating from these ponds have never been characterized.

4.3.4.10 Upland Sanitary Landfill

The Upland Sanitary Landfill (USL) is located on the site of a former gravel quarry at the southeastern corner of 15th Street and Campus Avenue in the City of Upland. The facility operated from 1950 to 1979 as an unlined Class II and Class III municipal solid waste disposal site. In 1982, the entire USL disposal site was covered with a 10-inch thick, low permeability layer of sandy silt (GeoLogic Associates, 1997). Groundwater monitoring began at the USL in 1988, and there are now three onsite monitoring wells: an upgradient well, a cross-gradient well, and a downgradient well (City of Upland, 1998). Monitoring results indicate that the USL has released organic and inorganic compounds to underlying groundwater (GeoLogic Associates, 1997). Groundwater samples from the downgradient monitoring well consistently contain higher concentrations of organic and inorganic compounds than samples from the upgradient and cross-gradient wells. Historical groundwater samples have indicated that VOCs are the major constituents of release, and all three monitoring wells have shown detectable levels of VOCs. The most common VOCs detected above MCLs are dichlorodifluoromethane, PCE, TCE, and vinyl chloride. Other VOCs that have been periodically detected above MCLs include methylene chloride, cis-1,2-DCE, 1,1-DCA, and benzene. For the 1990 to 1995 period, the average total VOC concentration at the downgradient monitoring well was 125 µg/L (GeoLogic Associates, 1997). And, for the July 2003 to June 2008 period, the maximum TCE and PCE concentrations detected at USL monitoring wells were 0.6 µg/L and 3.5 µg/L, respectively.

Figure 4-18 shows the approximate areal extent of VOCs at concentrations exceeding MCLs as of 2008. Please note that this plume is only defined by three onsite monitoring wells. The extent of the plume may be greater than currently depicted in Figure 4-18.

4.3.4.11 VOC Plume – South of the OIA

A VOC plume, containing TCE, exists south of the OIA. This plume extends approximately from State Route 60 on the north and Haven Avenue on the east to Cloverdale Road on the south and South Grove Avenue on the west. It is up to 11,300 feet wide and 20,500 feet long. By the late 1980s, the RWQCB determined TCE was present in numerous private wells in the area south of the OIA, and identified past activities at the airport as a likely source of TCE (RWQCB, 2005b). By 2005, TCE in exceedance of the CA MCL (5µg/L) was detected in 92 of the 167 private wells in the area. In July 2005, Draft CAOs were issued by the RWQCB to six parties identified as former TCE dischargers on the OIA property: Aerojet, the Boeing Company (Boeing), the Department of Defense, the Lockheed Martin Corporation (Lockheed), and the Northrop Grumman Corporation (Northrop). On a voluntary basis, Lockheed, GE, Boeing, and Aerojet are funding current investigative work on the extent and source of the TCE plume. Three triple nested monitoring wells were constructed in 2008 between the OIA and the VOC plume. A fourth well will be completed in 2009.

Final CAOs will likely be issued in the future. Watermaster has been working closely with the RWQCB and the identified parties, providing any available information to assist in the investigation. Remediation of the plume will likely be achieved using the CDA's Chino Basin Desalter I facilities . Watermaster is currently seeking a settlement with the companies to recover treatment costs associated with the VOC plume.

Figure 4-18 shows the approximate areal extent of the plume as of 2008. As Figure 4-19 illustrates, the OIA plume is characterized solely by TCE. During the July 2003 to June 2008 period, the maximum TCE concentration detected at an individual well within this plume was 38 µg/L.

4.3.4.12 Stringfellow NPL Site

One facility in the Chino Basin, the Stringfellow site, is on the current NPL of Superfund Sites. This site is located in Pyrite Canyon north of Highway 60 near the community of Glen Avon in Riverside County (see Figure 4-18). From 1956 until 1972, this 17-acre site was operated as a hazardous waste disposal facility. More than 34-million gallons of industrial waste—primarily from metal finishing, electroplating, and pesticide production—were deposited at the site (US EPA, 2001). A groundwater plume of site-related contaminants exists underneath portions of the Glen Avon area. Groundwater at the site contains various VOCs, perchlorate, NDMA, and trace metals, such as cadmium, nickel, chromium, and manganese. In the original disposal area, soil is contaminated with pesticides, polychlorinated biphenyls (PCBs), sulfates, perchlorate, and trace metals. The original disposal area is covered by a clay cap, fenced, and guarded by security services.

Contamination at the Stringfellow site has been addressed by cleanup remedies described in four EPA RODs. Since 1986, cleanup actions have focused on controlling the source of contamination, installing an onsite pretreatment plant, the cleanup of the lower part of Pyrite Canyon, and the cleanup of the community groundwater area below Highway 60. In 1996, the DTSC assumed responsibility for the maintenance of the Stringfellow Superfund Site through a Cooperative Agreement with the USEPA. In December 2007, the DTSC submitted the Draft Final Supplemental Feasibility Study (SFS), which identified and evaluated the final remedial alternatives for cleanup. The 2007 Draft SFS is a revised version of an earlier 2000 draft; reconsideration was required after perchlorate and other new contaminates were discovered in 2001. Once finalized, the SFS will be used by the US EPA to select a final remedial strategy and prepare a draft ROD. The draft ROD is anticipated in December 2009.

Figure 4-18 shows the approximate areal extent of the Stringfellow VOC plume as of 2008. The VOC plume is elongate in shape, up to 1,500 feet wide, and extends approximately 14,500 feet from the original disposal area in a southwesterly direction. The most common VOC detected at levels above the MCL is TCE. There are approximately 70 extraction wells throughout the length of the plume, which have been effective in stopping plume migration and removing TCE contamination. South of Highway 60, there are only a few isolated areas where TCE exceeds 5 µg/L (DTSC, 2008). During the 2003 to 2008 period, the maximum TCE concentration detected in the Stringfellow plume was 170 µg/L.

High levels of perchlorate associated with the Stringfellow site were detected in community groundwater south of Highway 60 in 2001. Residents connected to the JCSD water service were provided bottled water, and the DTSC contracted to install water mains and hook ups at each residence. Concurrent with the SFS, the DTSC is conducting a Remedial Investigation and Feasibility Study of remedial alternatives for perchlorate in the downgradient community area. As with TCE, the operation of the groundwater treatment system has resulted in a reduction of perchlorate. Since the discovery in 2001, perchlorate concentrations have been reduced by 30% to 50% throughout the monitored area (DTSC, 2008). Figure 4-18 shows the approximate areal extent of perchlorate concentrations exceeding the Notification Level (6 µg/L) as of 2008. The perchlorate plume is elongated in shape, up to 2,000 feet wide, and extends approximately 25,000 feet to the southwest from the original disposal area. During the 2003 to 2008 period, the maximum perchlorate concentration detected in the Stringfellow plume was 870 µg/L.

4.3.5 Water Quality by Management Zone

Figure 4-20 shows the locations of wells with groundwater quality time histories discussed herein and the five Chino Basin management zone boundaries. Wells were selected based on length of record, completeness of record, quality of data, and geographical distribution. Wells are identified by their local name (usually owner abbreviation and well number) or their X Reference ID (X Ref ID) if privately owned. The HCMP wells were selected because they are sampled at multiple depths and have a consistent water quality record for the past four years. Figures 4-21 through 4-28 are TDS and NO3-N time histories for the wells shown in Figure 4-20 from 1970 to 2008. These time histories illustrate water quality variation and trends within each management zone and the current state of water quality compared to

historical trends.

4.3.5.1 Management Zone 1

MZ1 is an elongate region in the westernmost part of the Chino Basin. Figures 4-21 and 4-22 show TDS and NO3-N time histories for three wells representative of the northern portion of MZ1 (City of Upland well 8 [Upland 08], Monte Vista Water District well 5 [MVWD 05], and City of Upland well 20 [Upland 20]), two wells representative of the central region (City of Chino 5 [Chino 05] and City of Pomona well 23 [Pomona 23]), and two wells representative of the southern portion (Chino Institution for Men well 13 [CIM 13] and HCMP 3). In the northern portion of MZ1, NO3-N and TDS values have remained steady or decreased slightly over the time period depicted. Upland 08 exhibits NO3-N concentrations above the MCL (10 mg/L); however, slightly towards the west, near the Upland, Montclair, and College Heights Recharge Basins, NO3-N values drop below the MCL, as demonstrated by MVWD 05. TDS levels also decrease near the recharge basins. In the central region of MZ1, TDS and NO3-N concentrations have increased slightly over the last 30 years, but they are still below the MCLs. In the southern portion, NO3-N and TDS concentrations have increased significantly since 1990 and are above the MCLs, which is the trend seen in the majority of wells south of Highway 60. Quarterly sampling at HCMP 3 shows that TDS and NO3-N concentrations have remained stable over the past four years. HCMP 3 also shows the variation of water quality from the shallow to deeper aquifers. Overall, NO3-N and TDS concentrations in MZ1 escalate from north to south but have not increased over the last five years.

4.3.5.2 Management Zone 2

MZ2 is an elongate region in the center part of the Chino Basin. Figures 4-23 and 4-24 show TDS and NO3-N time histories for two wells representative of the northern portion of MZ2 (CVWD Well 5 [CVWD 05] and City of Ontario well 24 [ONT 24]), one well representative of the central region (City of Ontario well 17 [ONT 17]), and three wells representative of the southern portion (X Ref 29, HCMP 1, and X Ref 5333). Similar to MZ1, NO3-N and TDS values increase from north to south. Over the time period depicted, NO3-N and TDS concentrations have remained stable in the northern portion of MZ2, increased slightly in the central region, and increased considerably in the southern portion. At X Ref 5333 and HCMP 1, in the southern portion of MZ2, TDS concentrations are currently greater than twice the MCL (500 mg/L), and NO3-N concentrations are twice the MCL (10mg/L) or greater. In addition, HCMP 1 exemplifies the variation of high TDS and NO3-N levels in the shallow aquifer and low levels in the deeper aquifer. Overall, NO3-N and TDS concentrations have not increased over the last five years with the exception well X Ref 5333.

4.3.5.3 Management Zone 3

MZ3 is an elongate region that borders the majority of the Chino Basin's eastern boundary. Figures 4-25 and 4-26 show TDS and NO3-N time histories for one well representative of the northern portion (City of Fontana 37A [F37A]), one well representative of the central region (City of Ontario well 31 [ONT 31]), and two wells representative of the southern portion (Jurupa Community Service District well 16 [JCSD 16], and X Ref 5736). Similar to MZ1 and

MZ2, NO3-N and TDS values increase from north to south. In the northern and central areas of MZ3, TDS values have slightly increased since 1980 but still remain below the MCL (500 mg/L). Over the time period depicted, NO3-N concentrations increase in all regions of MZ3. Well F37A, in the northern region, exhibits NO3-N concentrations slightly above the MCL (10 mg/L). In the southern portion of MZ3, current TDS and NO3-N concentrations are near double the MCLs. At JCSD 16, NO3-N and TDS concentrations have increased significantly since 1990. In general, NO3-N and TDS concentrations have not increased over the last five years.

4.3.5.4 Management Zone 4

MZ4 – also known as Chino-East – is a wedge shaped region, bounded by the Jurupa Hills to the northeast, the Pedley Hills to the southeast, Management Zone 5 to the south, and Management Zone 3 to the west. Figures 4-27 and 4-28 show TDS and NO3-N time-histories for one well representative of the western region (HCMP-9), one well representative of the northern region (Jurupa Community Service District Well 24 [JCSD 24]), and one well representative of the eastern region (CDPH Stringfellow monitoring well [CTP-TW1]). In the western portion of MZ4, at HCMP-9, TDS and NO3-N concentrations are above the MCLs in the shallow aquifer but quite low in the deeper aquifer. The TDS and NO3 concentrations at JCSD 24 are slightly lower than those in the western portion, but they are slightly below or equal to the MCLs. In the eastern portion, at CTP-TW1, TDS and NO3-N concentrations are significantly above the MCLs. High TDS and NO3-N concentrations in the eastern portion of MZ4 are predominantly associated with the Stringfellow plume. Pre-1990 water quality data was not available for wells in this region. Since 1990, MZ4 TDS and NO3-N levels have remained relatively stable and decreased slightly over the last few years.

4.3.5.5 Management Zone 5

MZ5 – also known as Chino-South – is a small region towards the southeastern boundary of the Chino Basin. It is bordered by MZ4 to the north and MZ3 to the east. Figures 4-27 and 4-28 show TDS and NO3-N time histories for three wells representative of the northern portion of MZ5 (San Ana River Water Company Well 1A [SARWC 01A], JCSD 01, and HCMP-8). None of the wells in the southern region of MZ5 have sampling records that are complete enough to be considered representative. At JCSD 01 and SARWC 01A, TDS concentrations have historically been above the MCL (500 mg/L) and began to notably increase in 1990. Starting in 1995, NO3-N concentrations at JCSD 01 and SARWC 01A began to increase slightly above the MCL. Water quality sampling at these two wells ceased around 2005; however, HCMP-8 shows that TDS and NO3-N concentrations have decreased significantly since then.

4.3.6 Current State of Groundwater Quality in Chino Basin

The groundwater quality in Chino Basin is generally very good with better groundwater quality found in the north where recharge occurs. In the southern portion of the basin, TDS and NO3-N concentrations increase. Between July 2003 and June 2008, 32 percent of the wells sampled south of Highway 60 had TDS concentrations below the secondary MCL, an

improvement from the 20 percent reported in the 2006 State of the Basin Report (period of July 2001 through June 2006). In some places, wells with low TDS concentrations are proximate to wells with higher TDS concentrations, suggesting a vertical stratification of water quality. Between July 2003 and June 2008, about 69 percent of the wells sampled south of Highway 60 had NO3-N concentrations greater than the MCL, an improvement from the 80 percent reported in the 2006 State of the Basin Report (period of July 2001 through June 2006). However, please note that these statistical improvements may be an artifact of sampling occurrence and frequency.

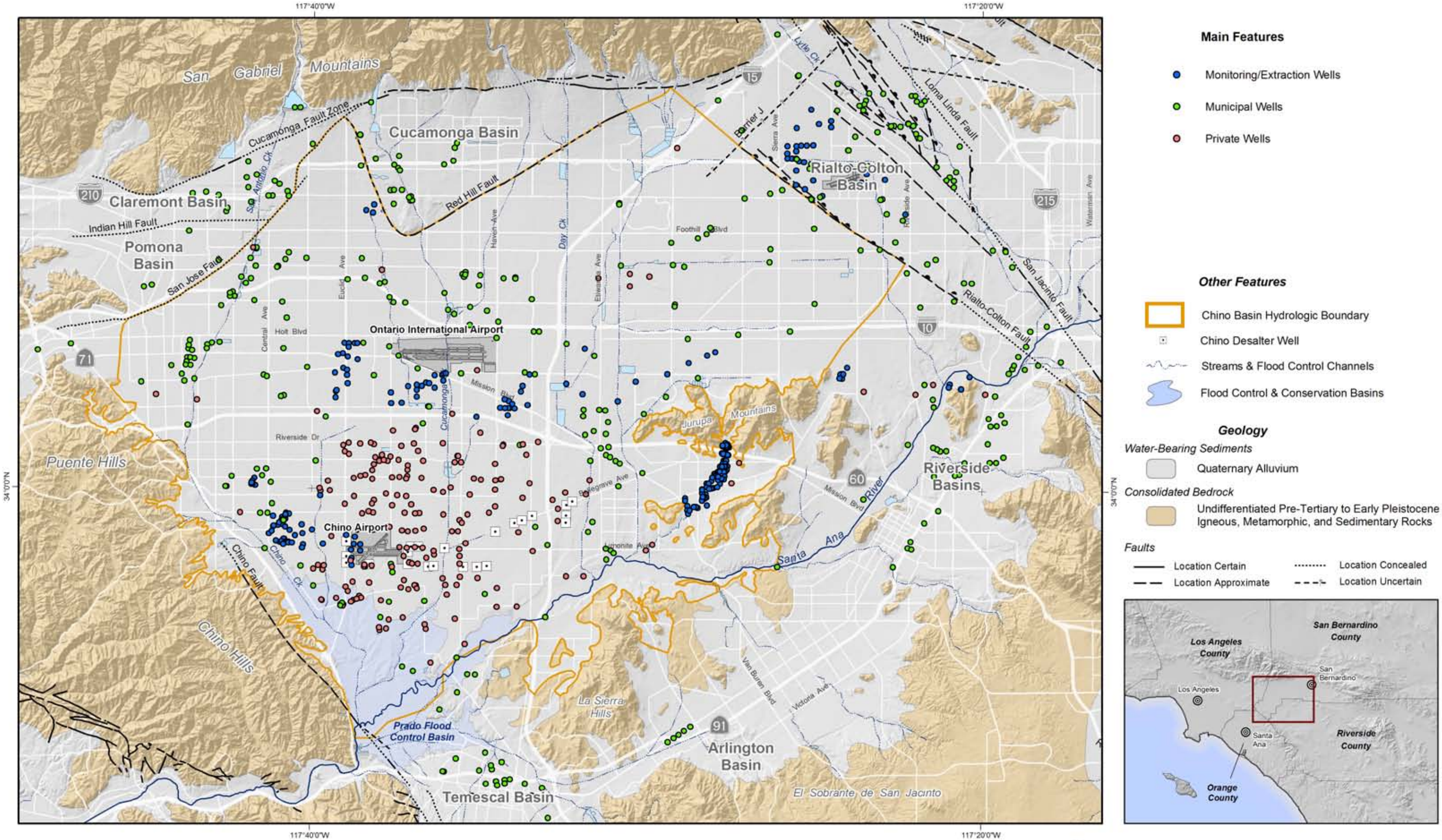
Other constituents that impact groundwater quality from a regulatory or Basin Plan standpoint include certain VOCs, arsenic, and perchlorate. As discussed in Section 4.3.4, there are a number of point source releases of VOCs in the Chino Basin that are in various stages of investigation or cleanup. There are also known point source releases of perchlorate (MVSL area, Stringfellow, etc.), and non-point source related perchlorate contamination appears to have resulted from natural and anthropogenic sources. Arsenic at levels above the WQS appears to be limited to the deeper aquifer zone near the City of Chino Hills. Hexavalent chromium, while not currently a groundwater quality issue in the Chino Basin, may become so, depending on the promulgation of future standards.

4.4 Conclusions and Recommendations

The Initial State of the Basin, and the 2004 and 2006 State of the Basin Reports discussed the need for future, long-term monitoring. Due to commercial and residential development in the Chino Basin area; many of the private agricultural wells that have been used for monitoring activities are destroyed as land is developed.

In response to the loss of historically utilized wells, Watermaster developed a water quality key well program. This program designates a series of wells across a wide areal distribution for long-term monitoring activities. To establish the well network, a grid was overlain the basin, and, where possible, at least one well was chosen per grid cell. Wells that are part of the water level monitoring program and/or on property that is not likely to be developed were preferentially chosen. Details of the Key Well Groundwater Quality Monitoring Program are available in the 2008 Chino Basin Maximum Benefit Annual Report and in Section 4.2.2 of this report. Key well sampling began in fall 2005 and runs in two-year cycles. Sampling results are added to the Watermaster database.

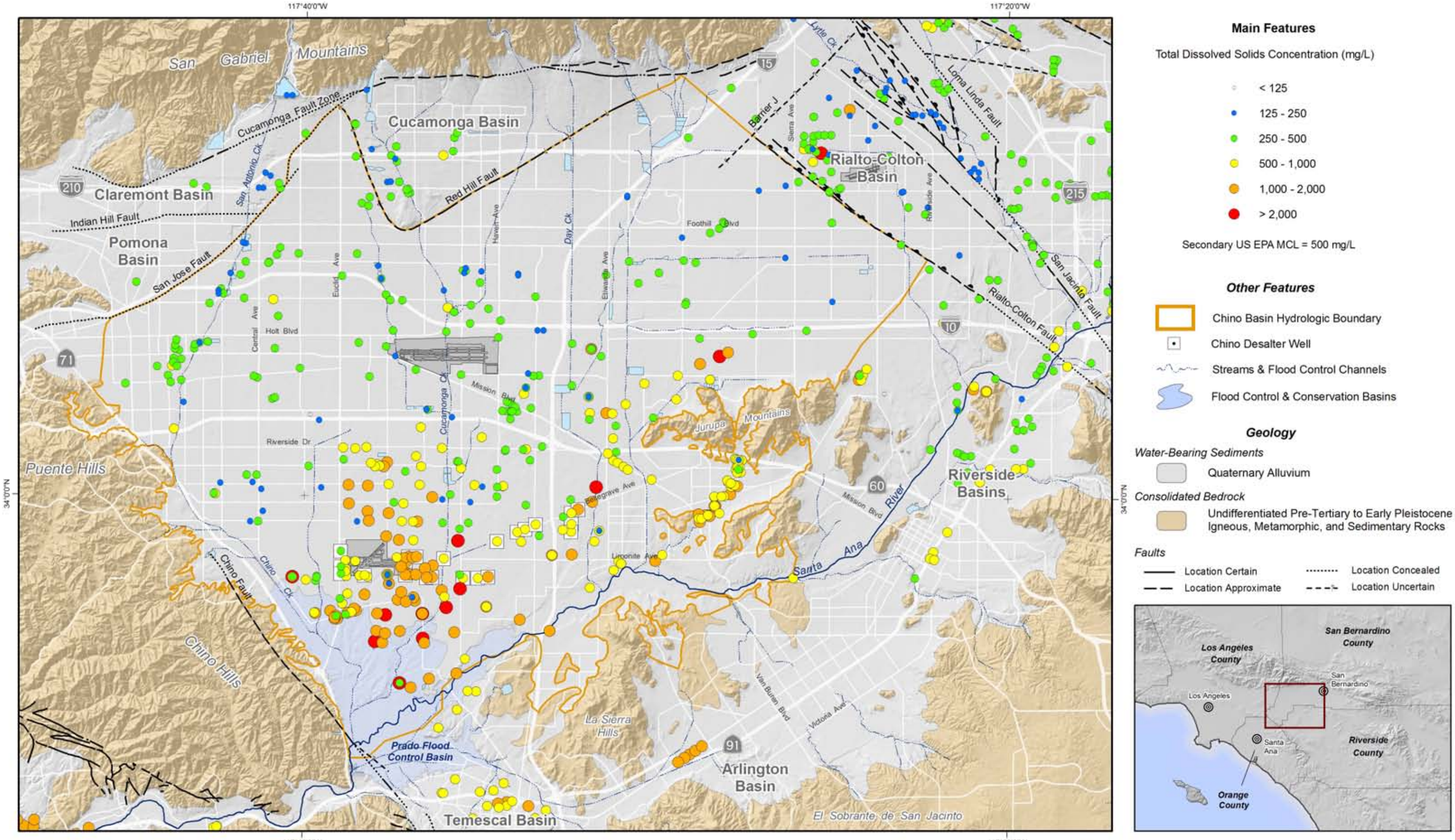
Point sources of concern are critical to the overall quality of Chino Basin groundwater. To ensure that Chino Basin groundwater remains a sustainable resource, it is of the utmost importance that Watermaster closely monitor point sources and emerging contaminates. It is recommended that Watermaster continue to work closely with the RWQCB and potentially responsible parties within the Chino Basin. This will allow for up-to-date understanding of groundwater quality, investigations, remediation activities, and potential mutually beneficial remedial options through Chino Basin desalting facilities.



Groundwater Wells with Water Quality Data

July 2003 - June 2008

Figure 4-1



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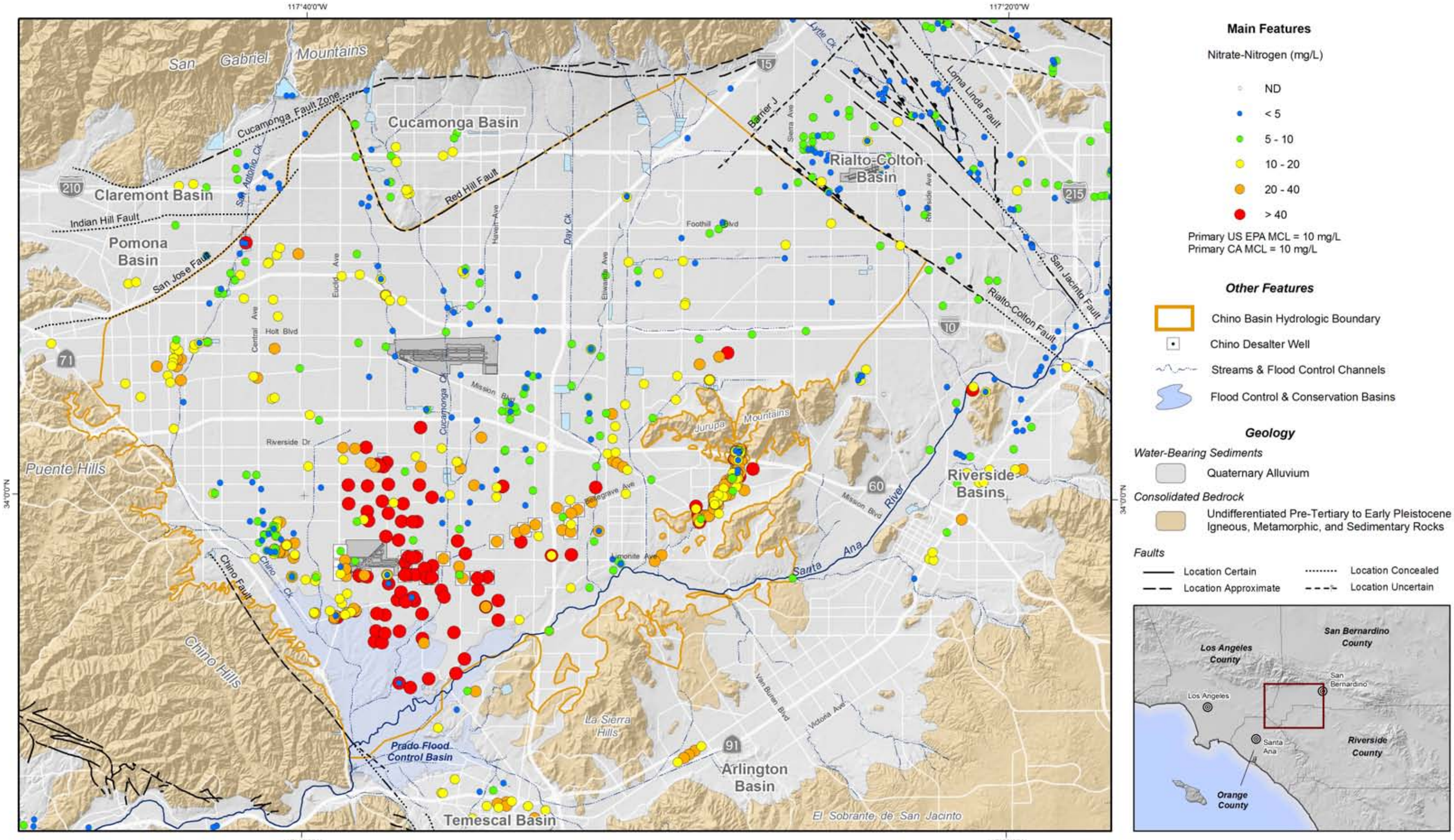
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Total Dissolved Solids in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-2



Main Features

Nitrate-Nitrogen (mg/L)

- ND
- < 5
- 5 - 10
- 10 - 20
- 20 - 40
- > 40

Primary US EPA MCL = 10 mg/L
Primary CA MCL = 10 mg/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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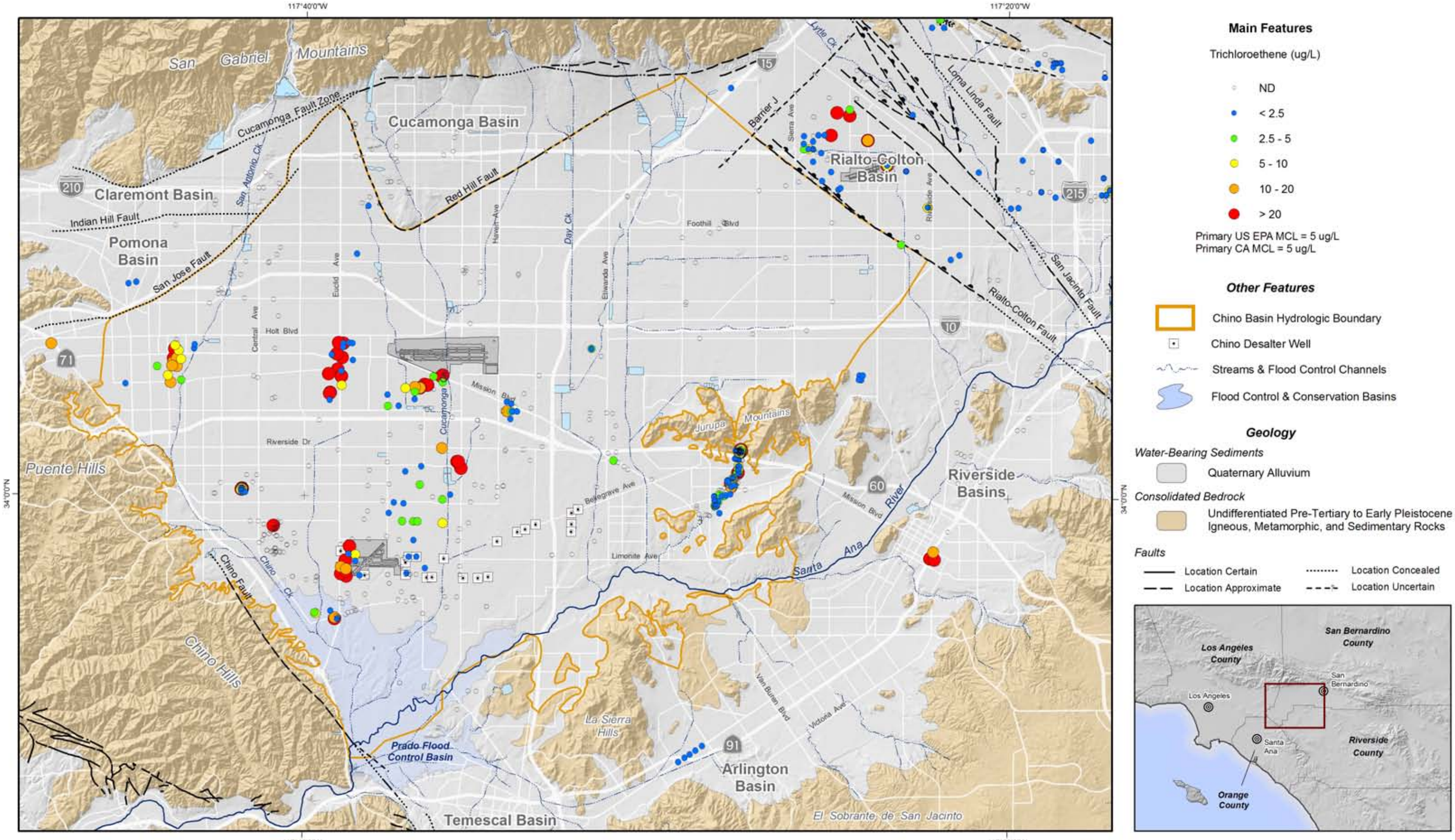
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Nitrate as Nitrogen in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-3



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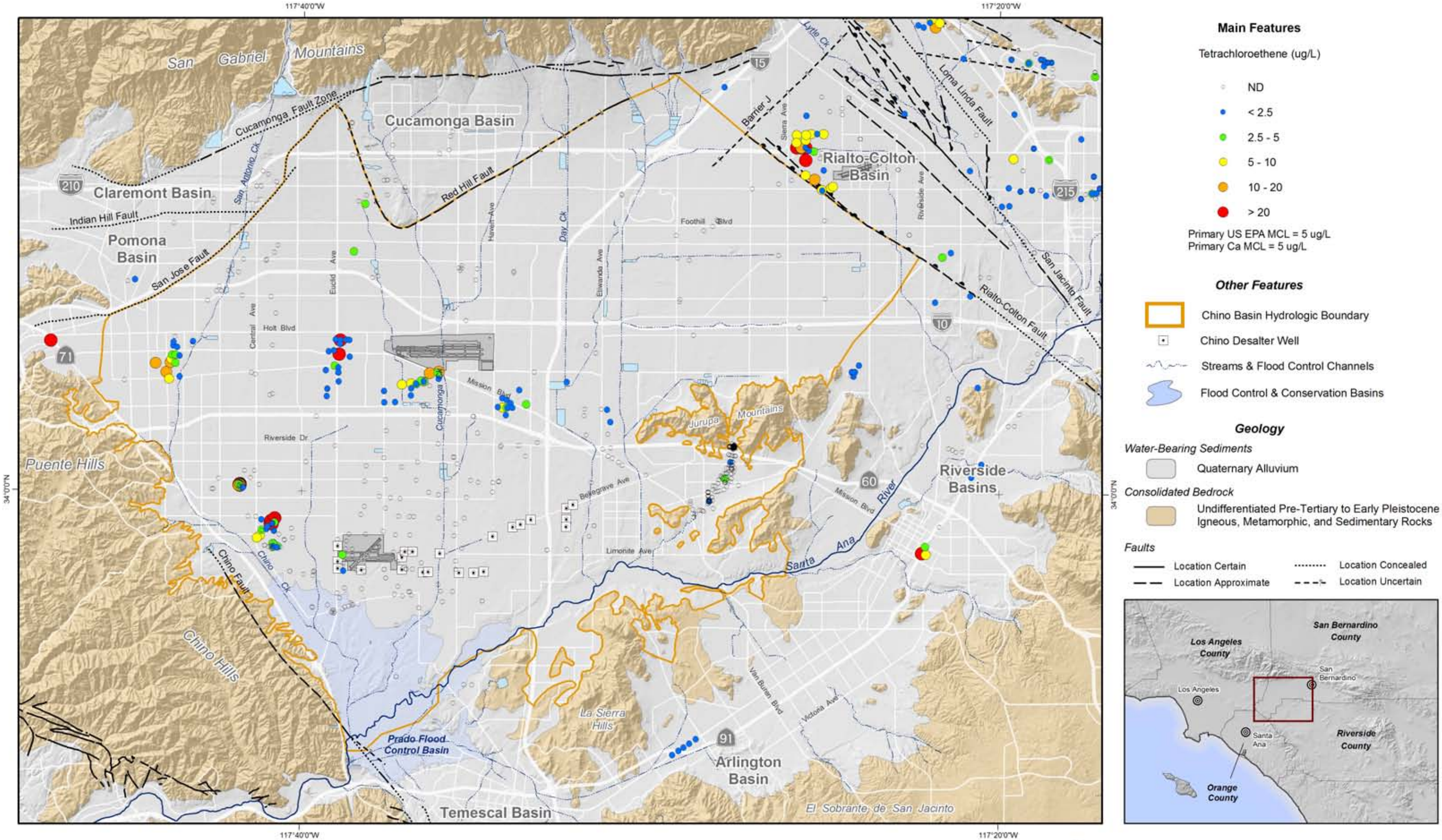
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Trichloroethene in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-4



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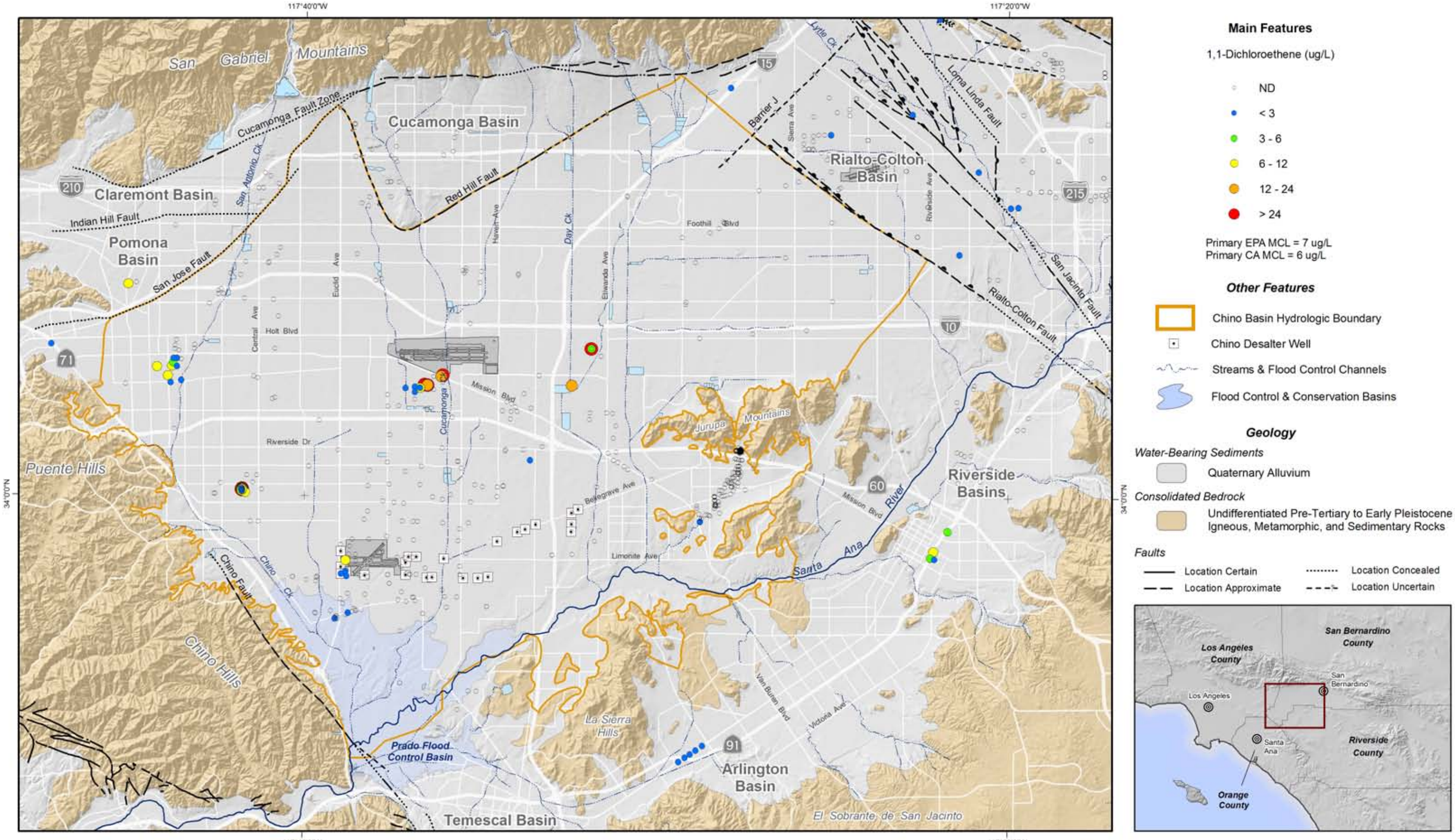
2008 State of the Basin Report
Groundwater Quality

Tetrachloroethene in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-5



Main Features

1,1-Dichloroethene (ug/L)

- ND
- < 3
- 3 - 6
- 6 - 12
- 12 - 24
- > 24

Primary EPA MCL = 7 ug/L
Primary CA MCL = 6 ug/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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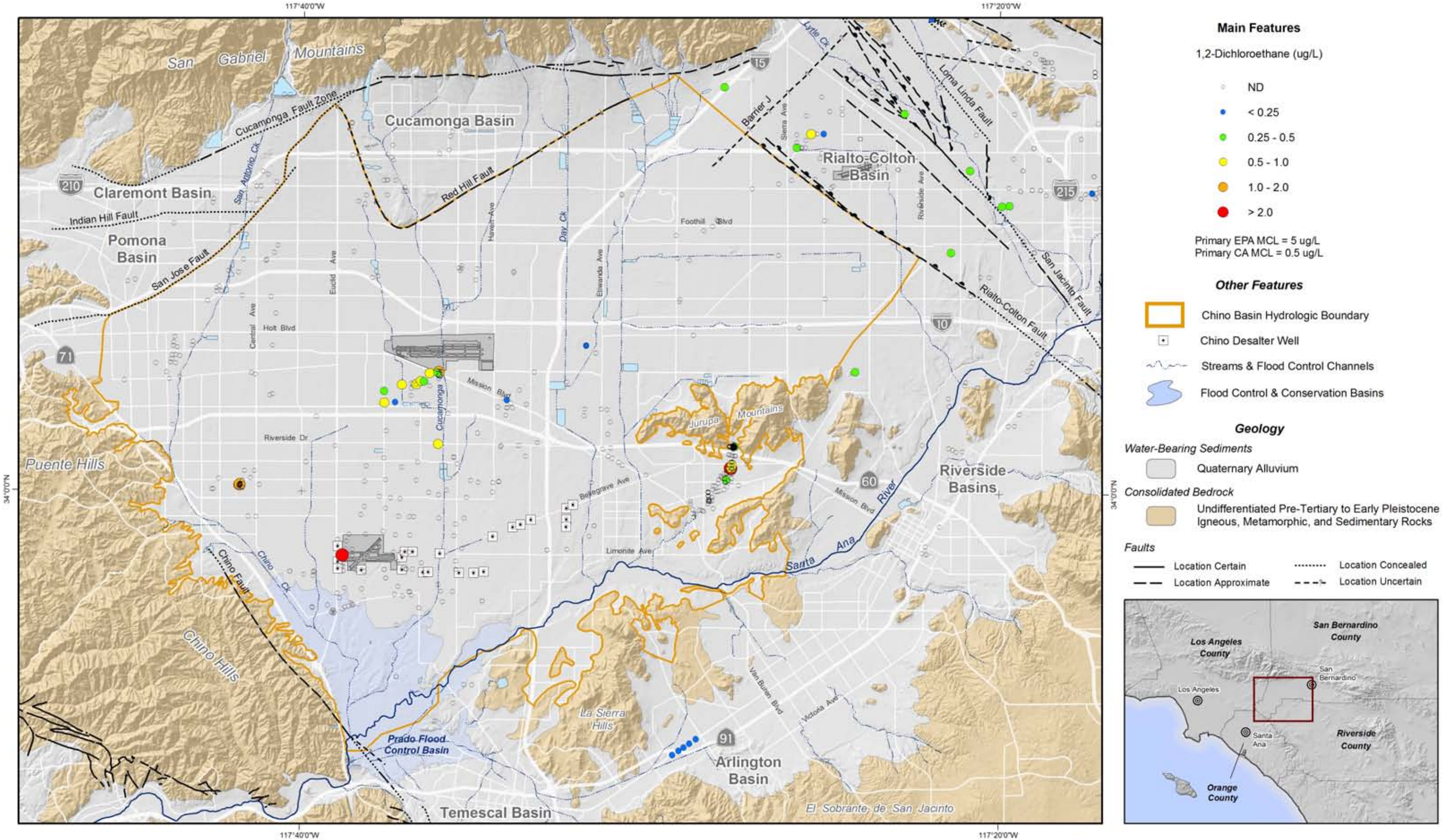
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

1,1-Dichloroethene in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-6



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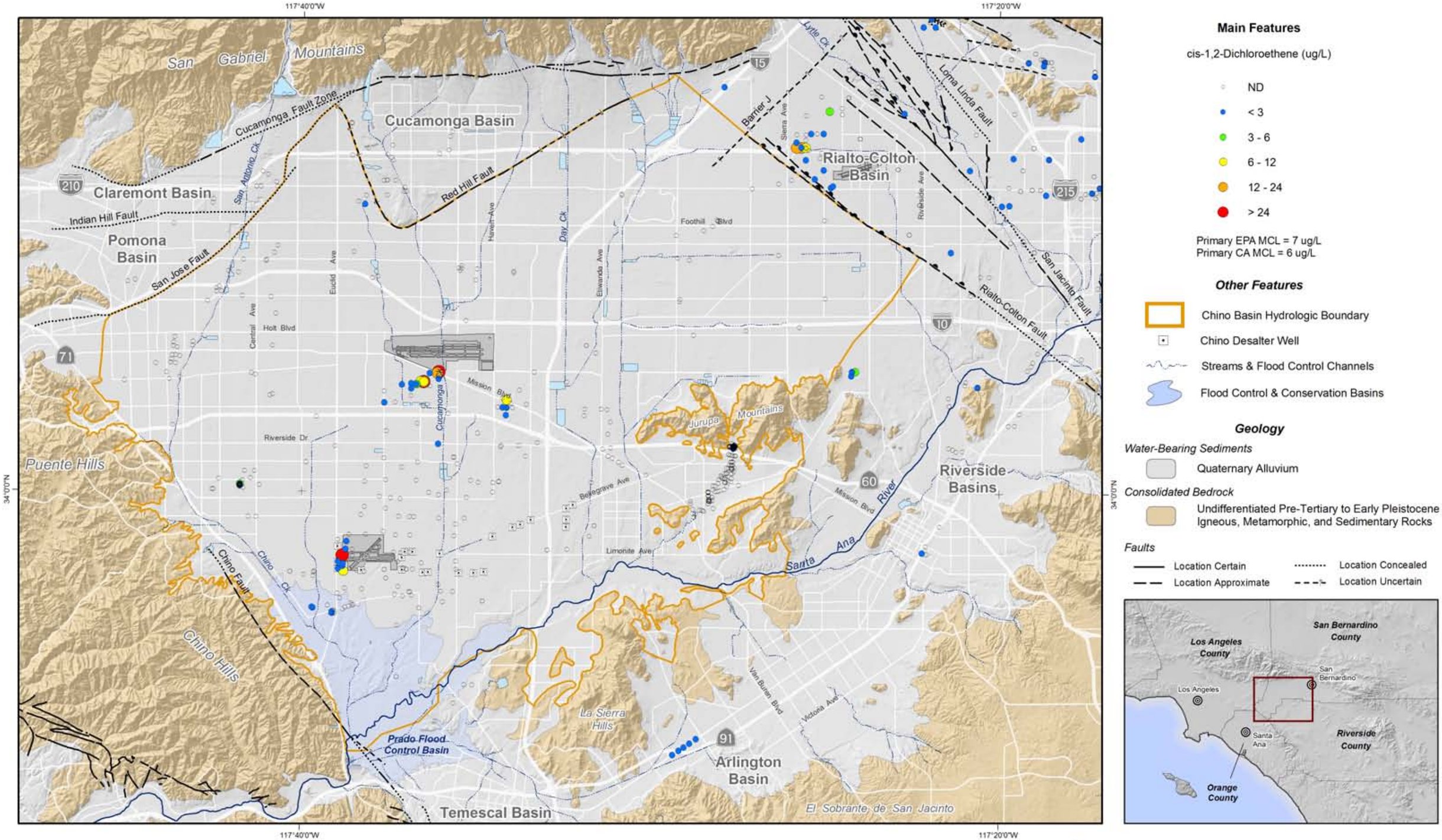
2008 State of the Basin Report
Groundwater Quality

1,2-Dichloroethane in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-7



Main Features

cis-1,2-Dichloroethene (ug/L)

- ND
- < 3
- 3 - 6
- 6 - 12
- 12 - 24
- > 24

Primary EPA MCL = 7 ug/L
Primary CA MCL = 6 ug/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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File: Figure_4-8.mxd

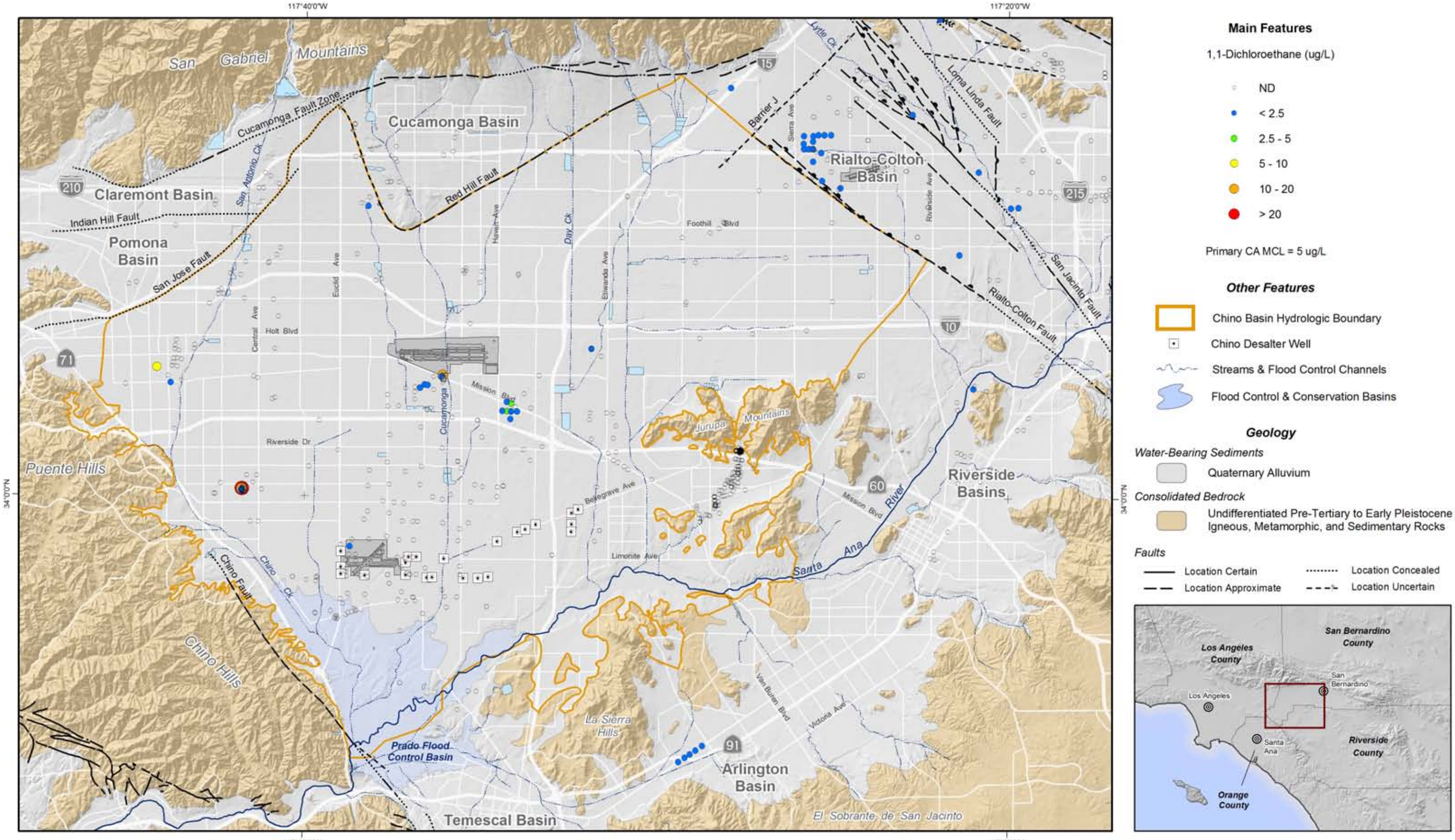
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

cis-1,2-Dichloroethene in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-8



Main Features

1,1-Dichloroethane (ug/L)

- ND
- < 2.5
- 2.5 - 5
- 5 - 10
- 10 - 20
- > 20

Primary CA MCL = 5 ug/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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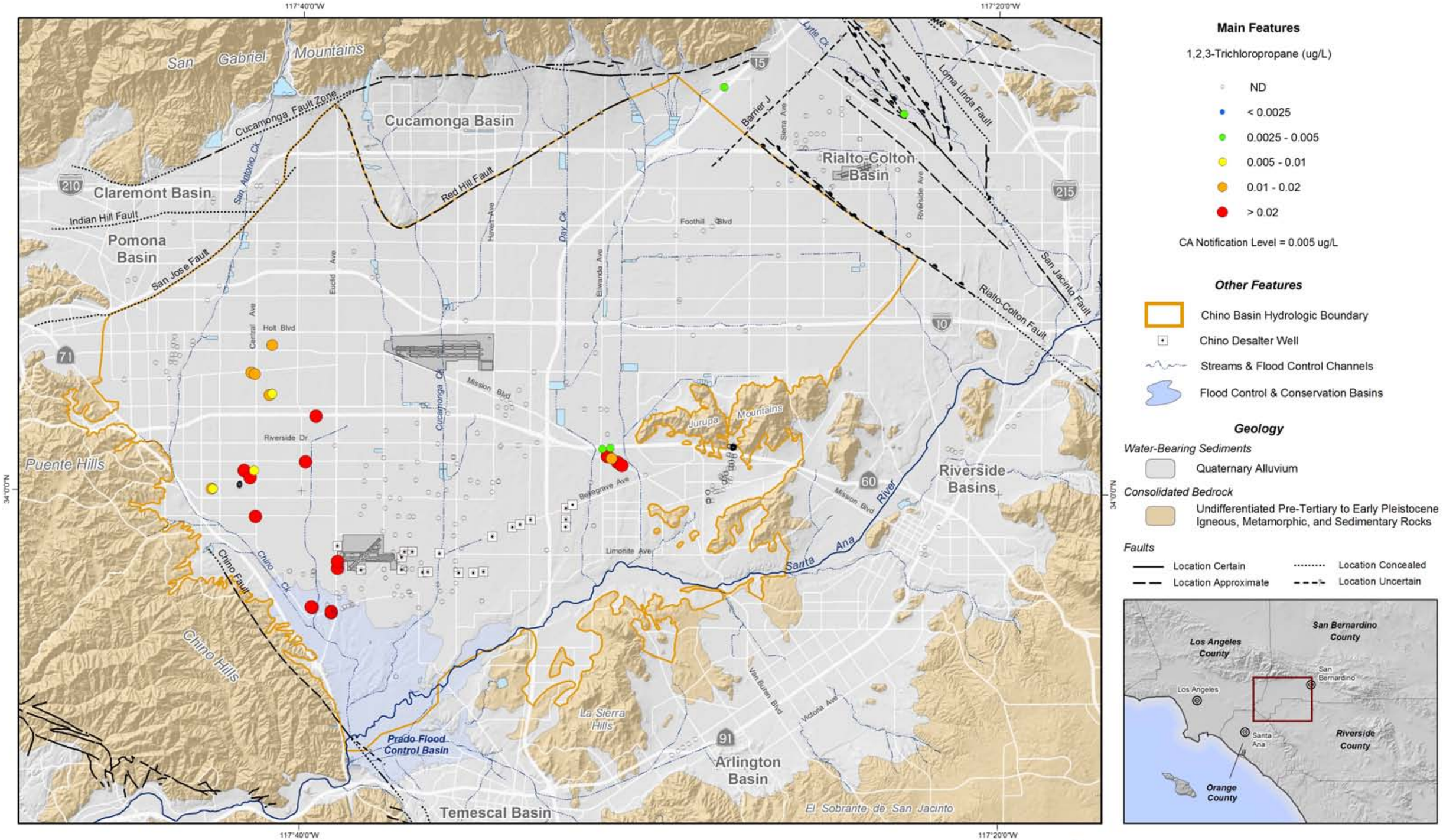
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

1,1-Dichloroethane in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-9



Main Features

1,2,3-Trichloropropane (ug/L)

- ND
- < 0.0025
- 0.0025 - 0.005
- 0.005 - 0.01
- 0.01 - 0.02
- > 0.02

CA Notification Level = 0.005 ug/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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File: Figure_4-10.mxd

0 1 2 3 4 5 Miles

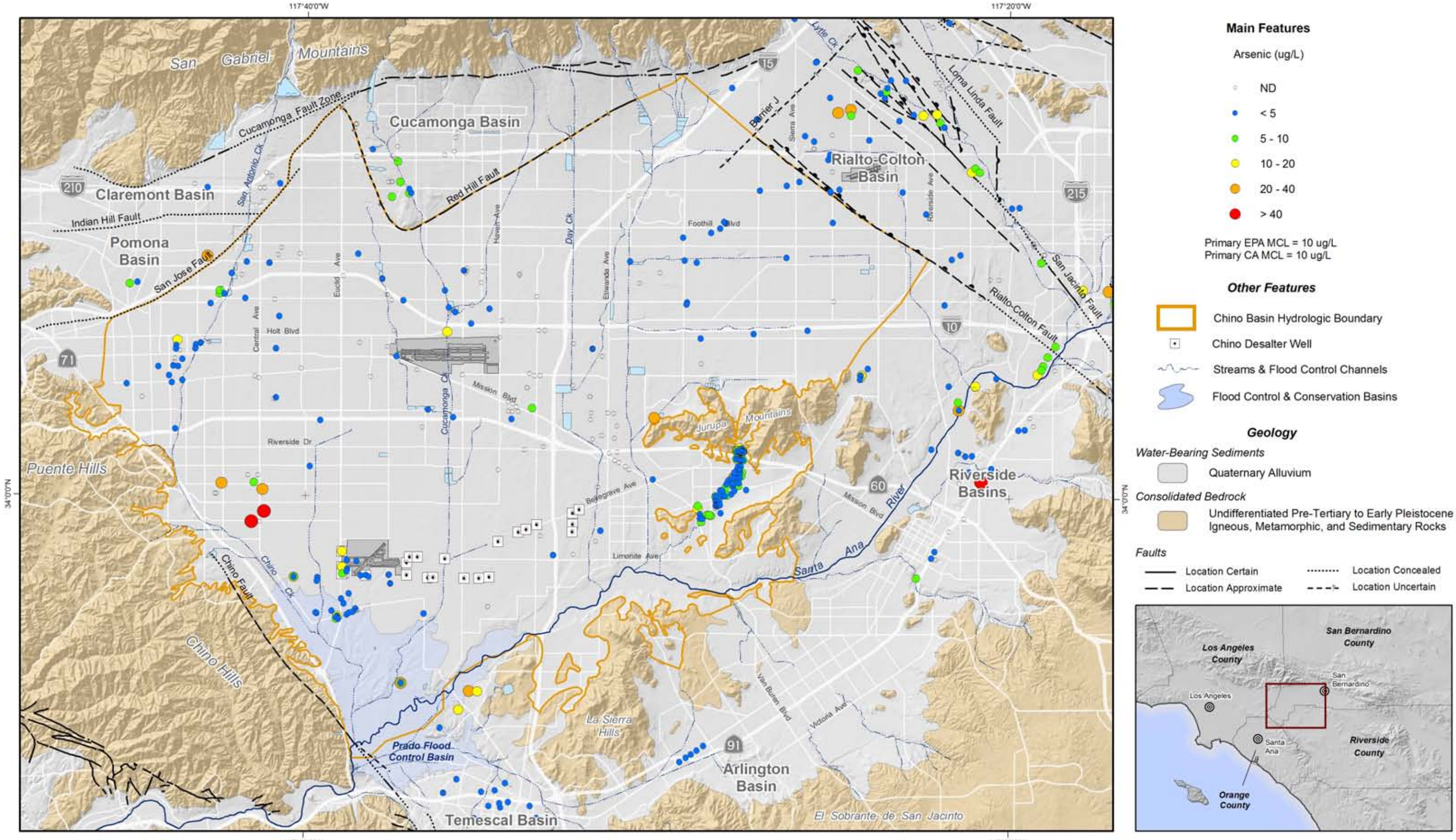
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

1,2,3-Trichloropropane in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-10



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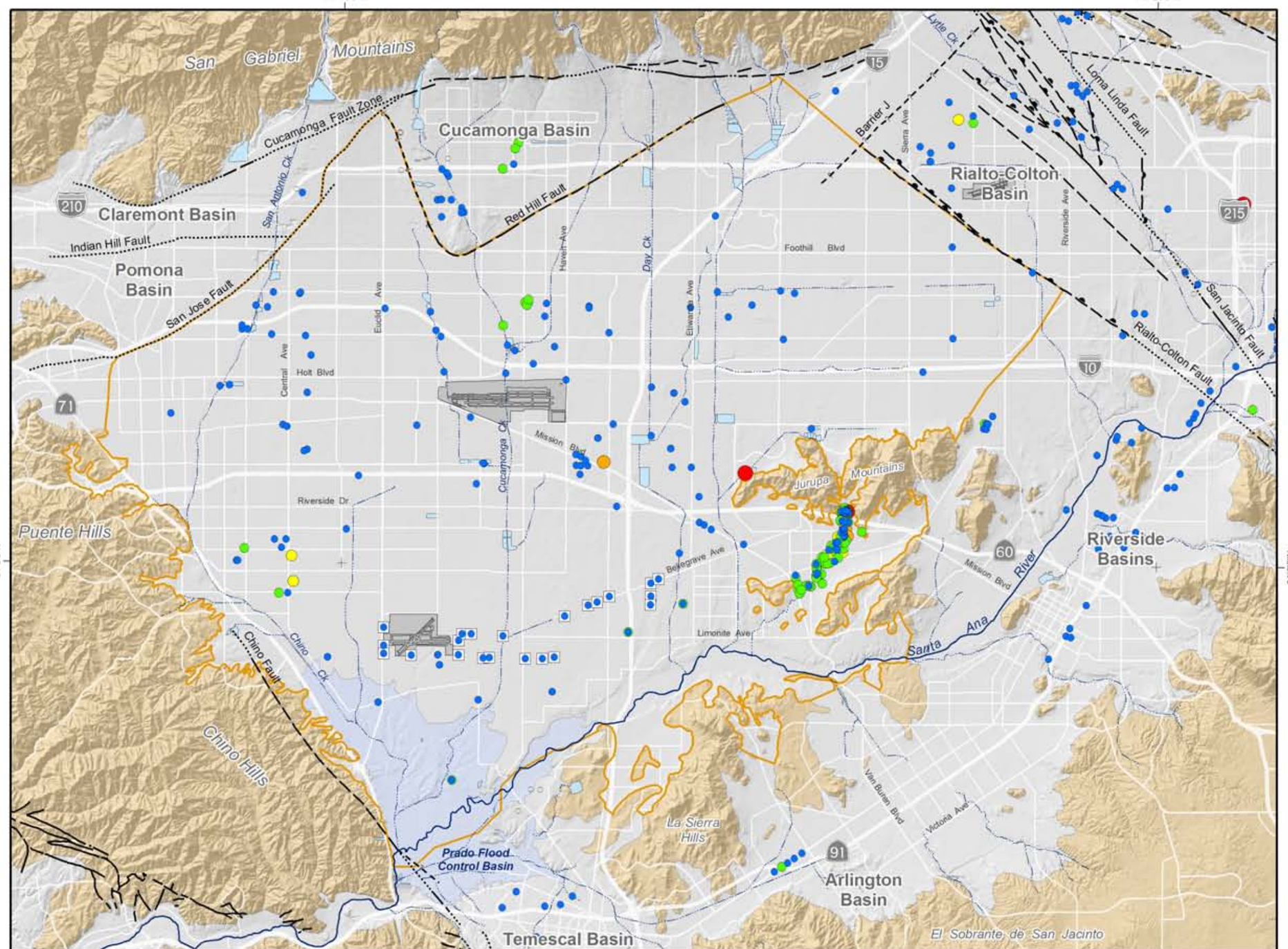
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Arsenic in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-11



Main Features

Vandium (mg/L)

- ND
- < 0.025
- 0.025 - 0.050
- 0.05 - 0.1
- 0.1 - 0.2
- > 0.2

CA Notification Level = 0.05 mg/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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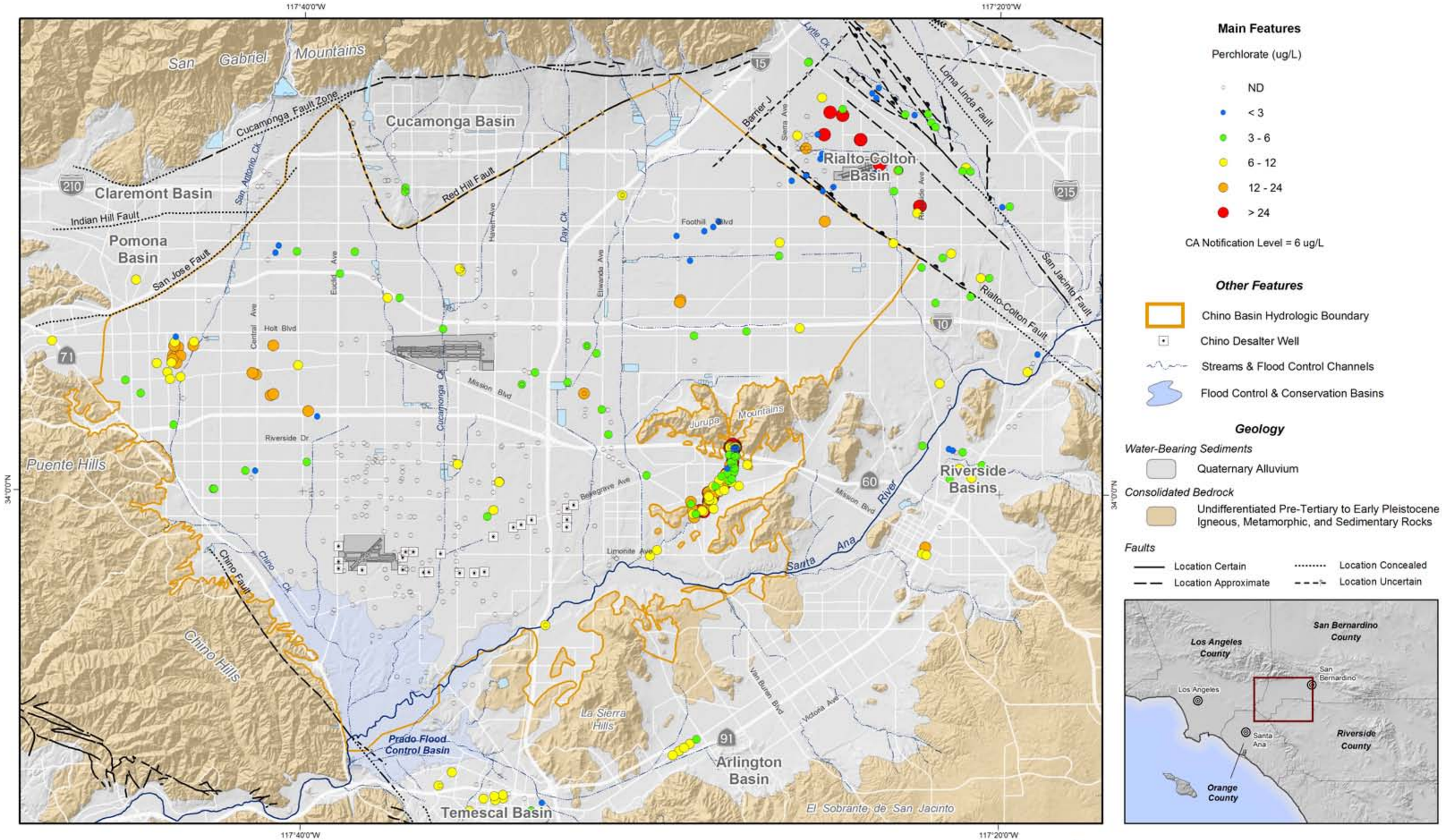
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Vanadium in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-12



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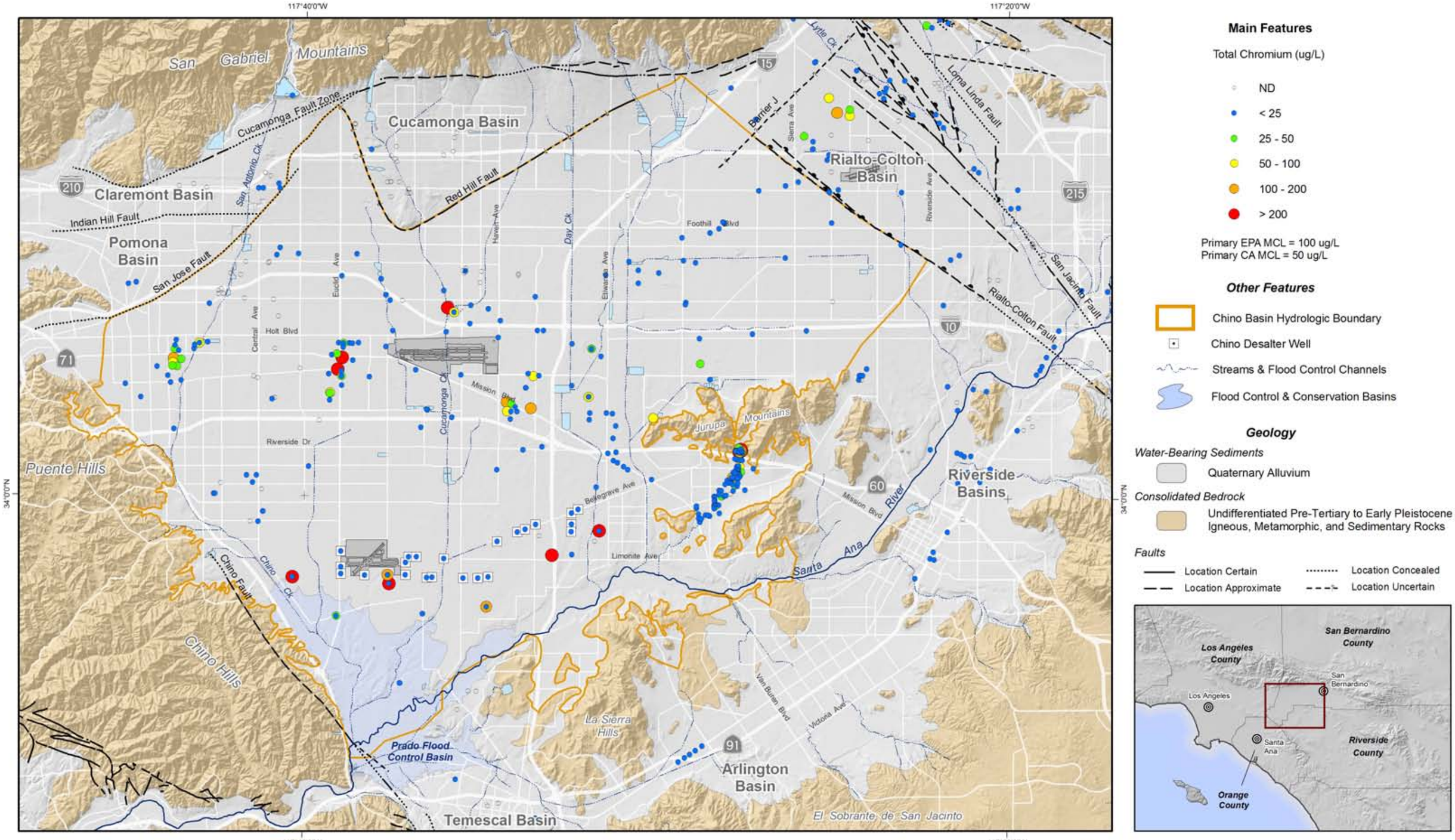
2008 State of the Basin Report
Groundwater Quality

Perchlorate in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-13



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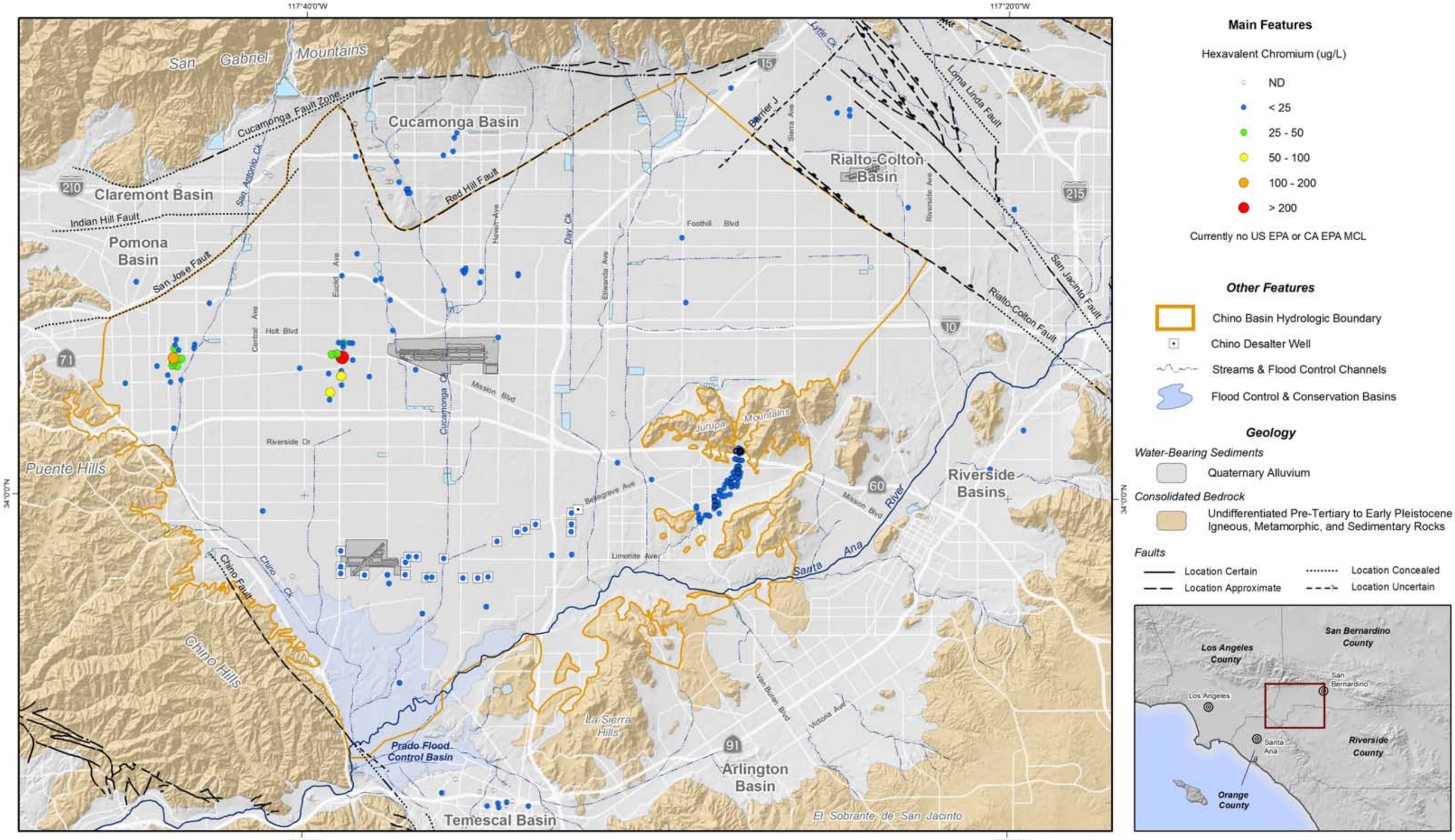
2008 State of the Basin Report
Groundwater Quality

Total Chromium in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-14



Main Features

Hexavalent Chromium (ug/L)

- ND
- < 25
- 25 - 50
- 50 - 100
- 100 - 200
- > 200

Currently no US EPA or CA EPA MCL

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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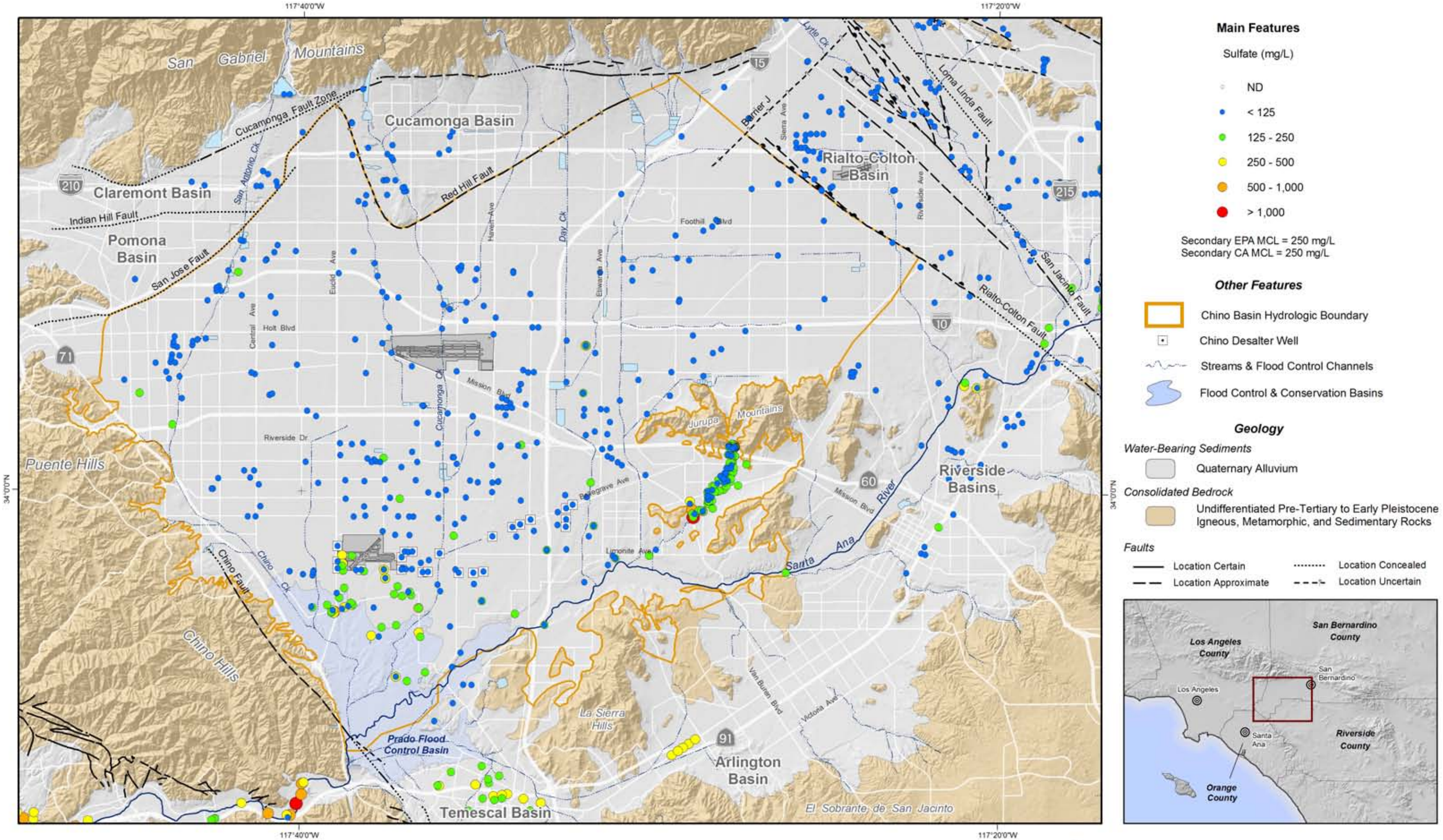
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Hexavalent Chromium in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-15



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0 1 2 3 4 5 Miles
0 2 4 6 8 KM

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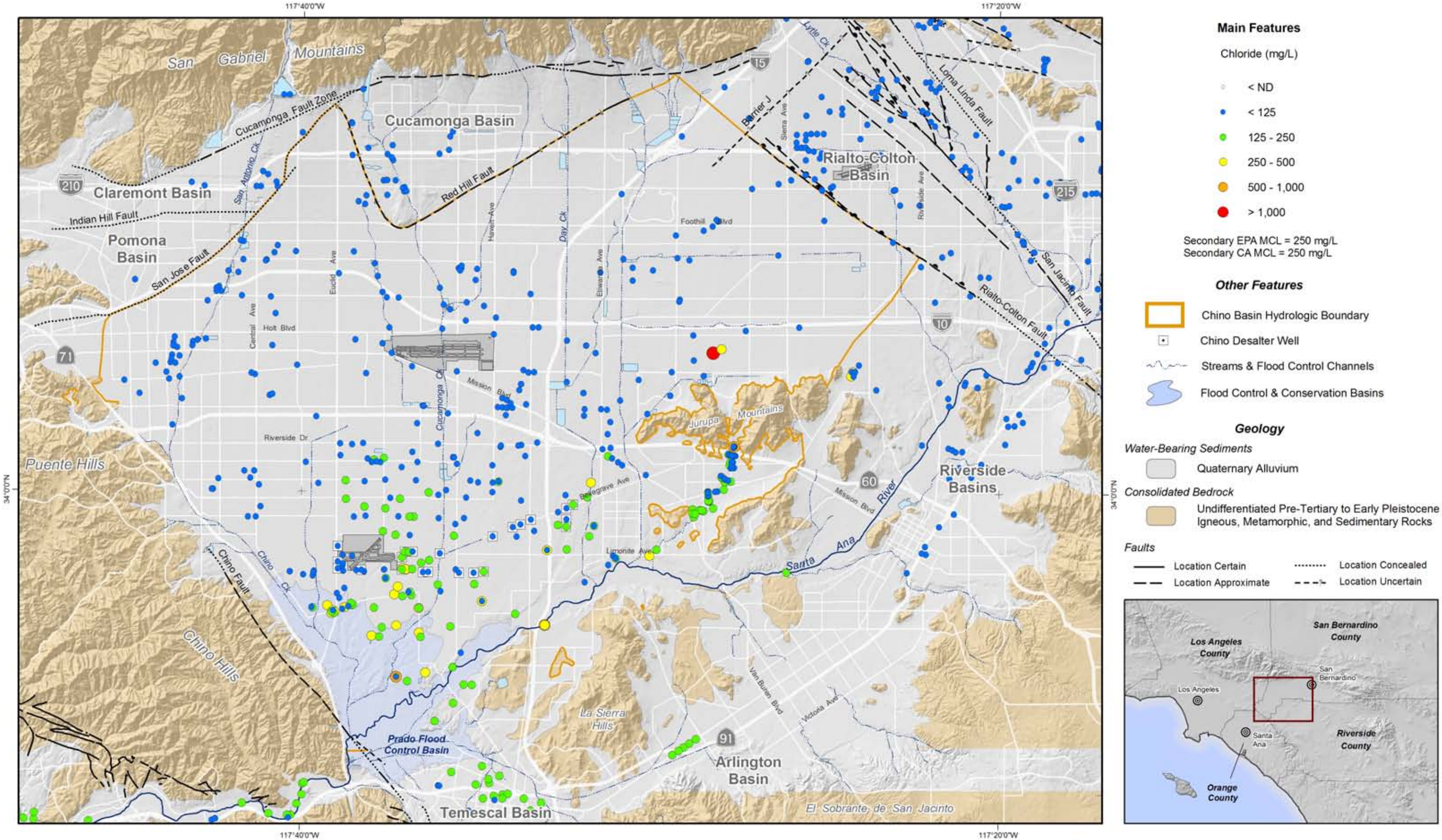
Sulfate in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-16



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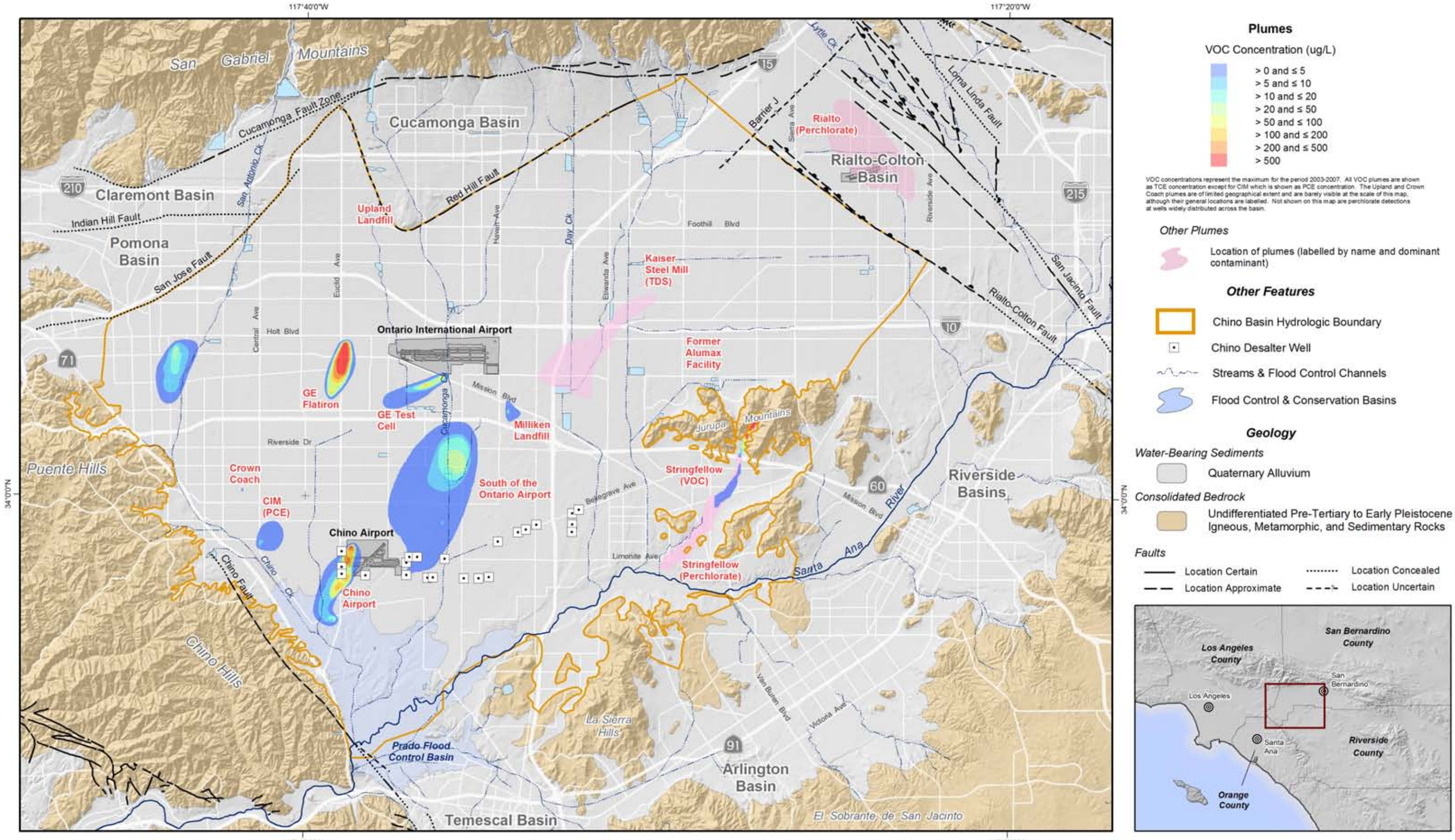
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Chloride in Groundwater

Maximum Concentration (July 2003 - June 2008)

Figure 4-17



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0 1 2 3 4 5 Miles
0 2 4 6 8 KM

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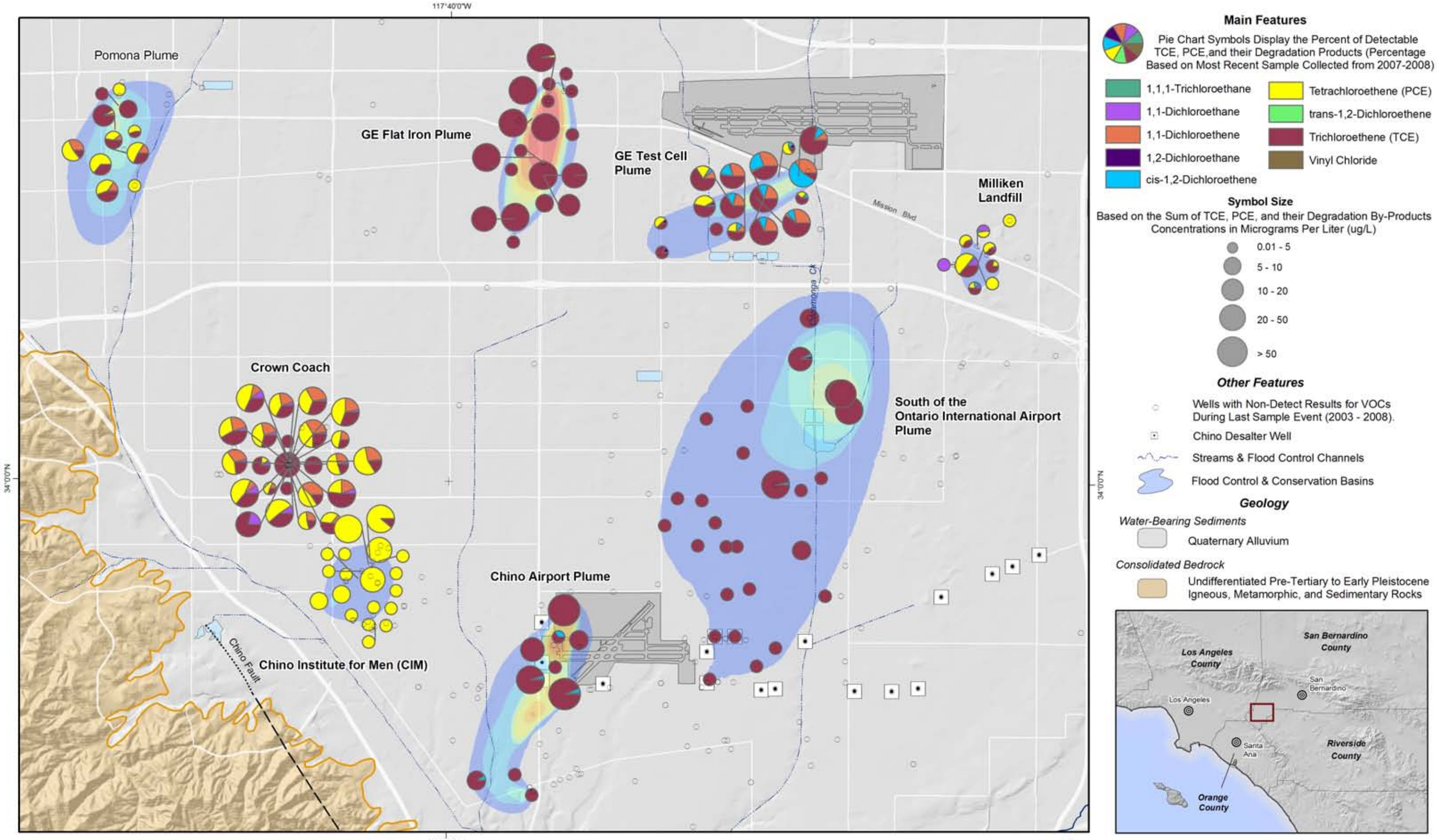
Groundwater Contamination Plumes

Chino Basin Area (Updated June 2008)

Figure 4-18



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0 0.9 1.8 2.7 Miles

0 0.9 1.8 2.7 3.6 Kilometers

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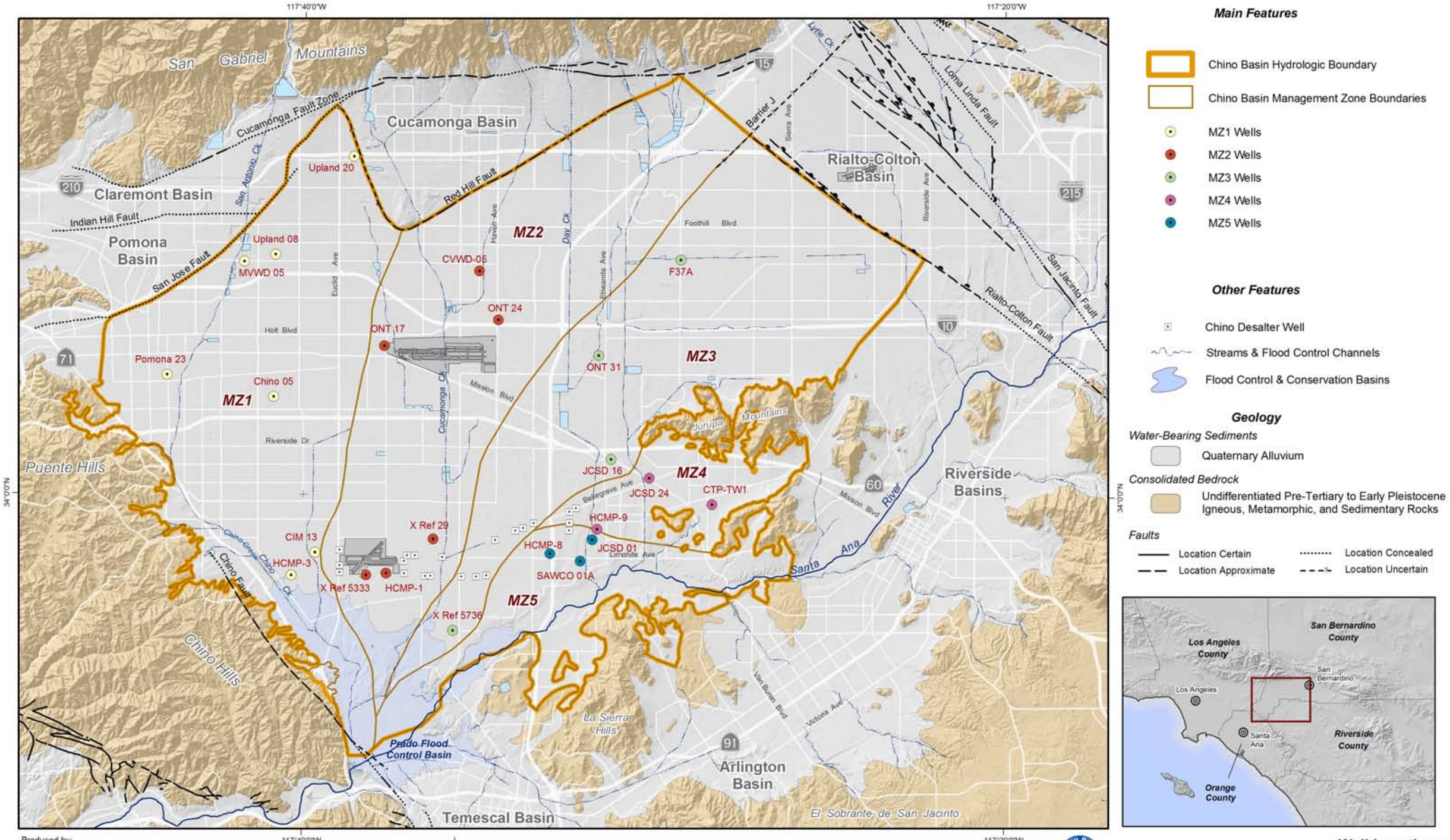
Groundwater Quality

VOC Pie Chart Comparisons

Wells Within and Adjacent to Groundwater Contamination Plumes

Figure 4-19



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0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
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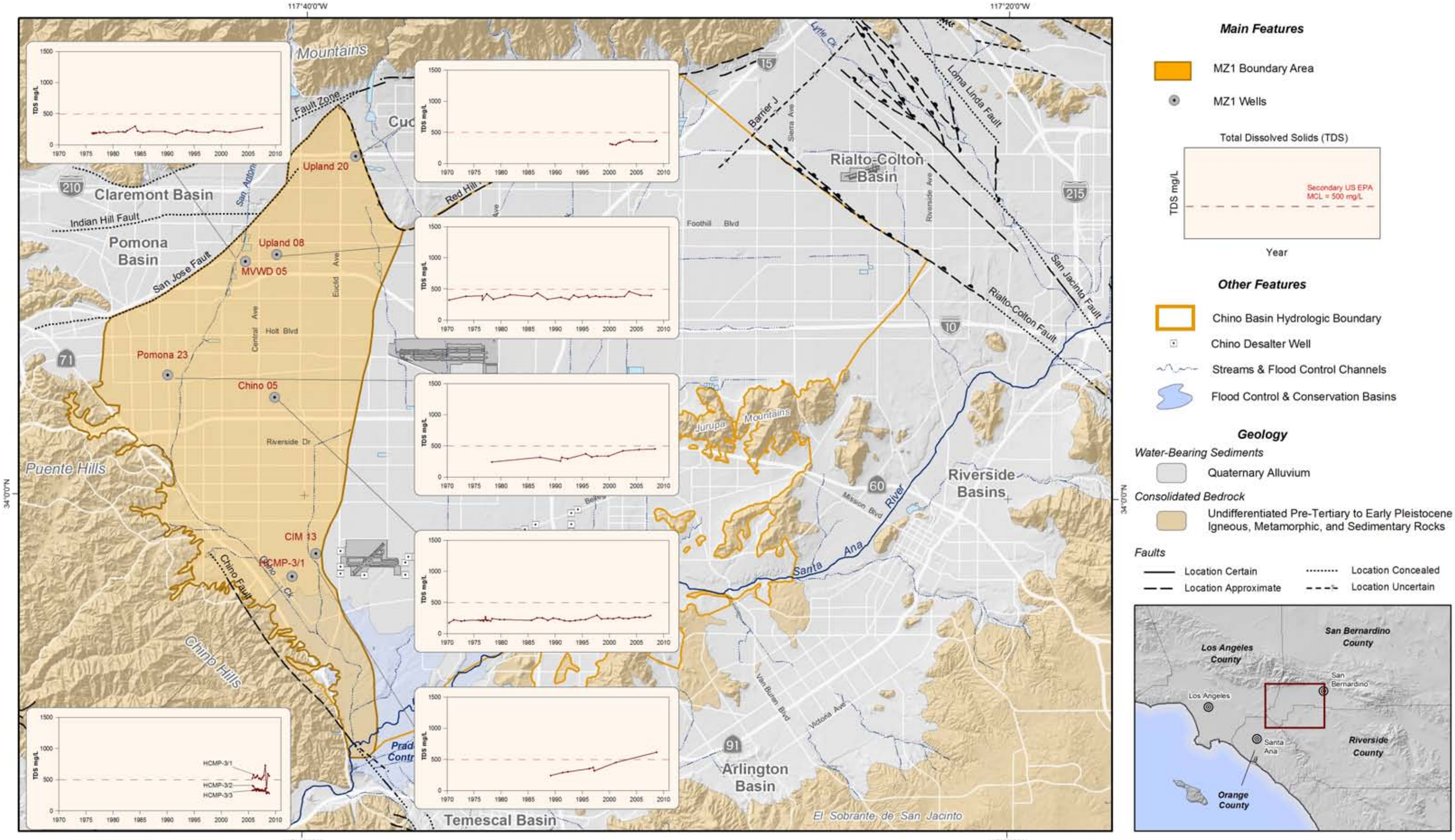
Well Locations

Wells Used in Management Zone Water Quality Analyses

Figure 4-20



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0 1 2 3 4 5 Miles
0 2 4 6 8 KM

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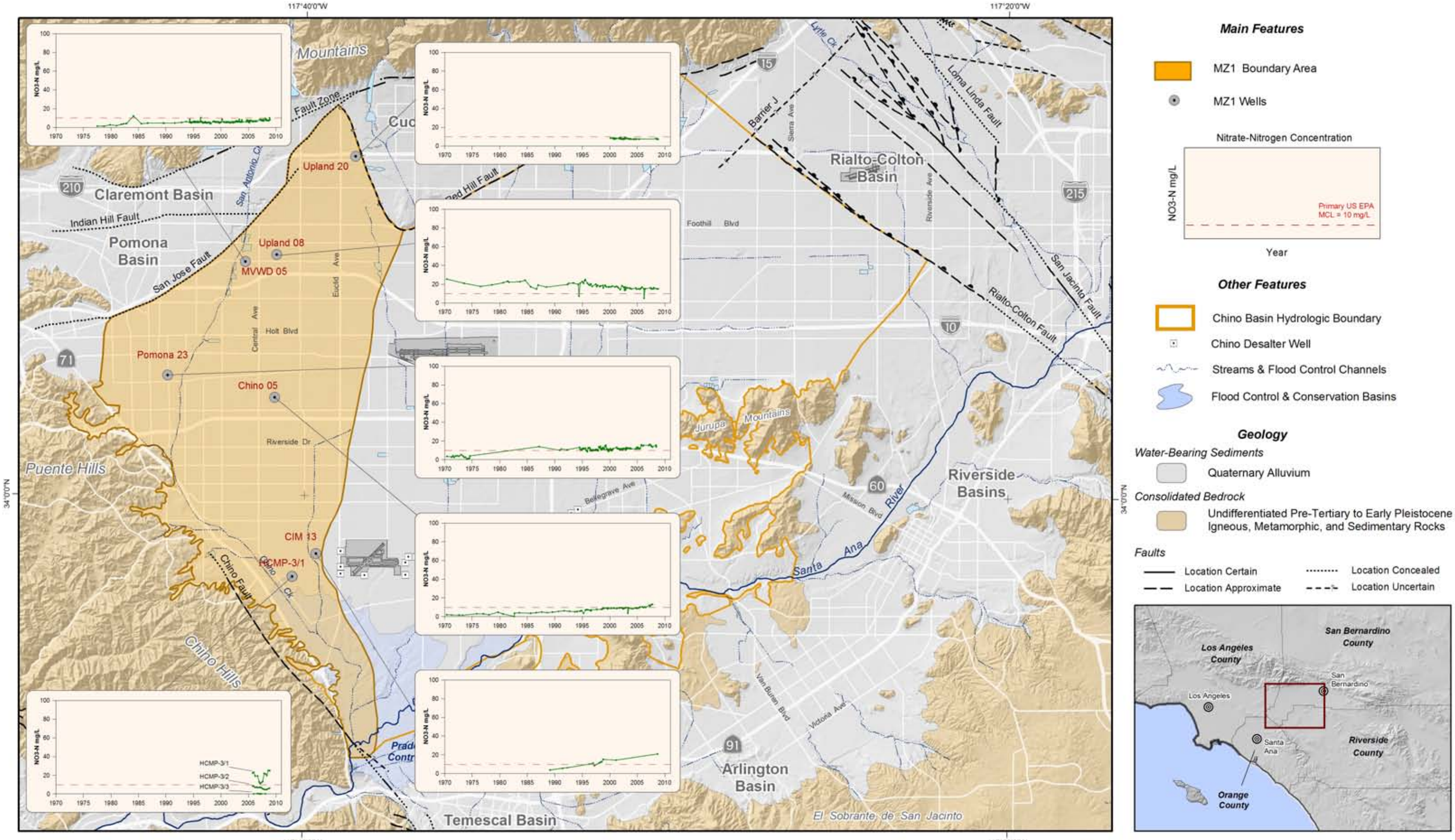
Groundwater Quality

Chino Basin Management Zone 1
Historical and Current Total Dissolved Solids Concentration

Figure 4-21



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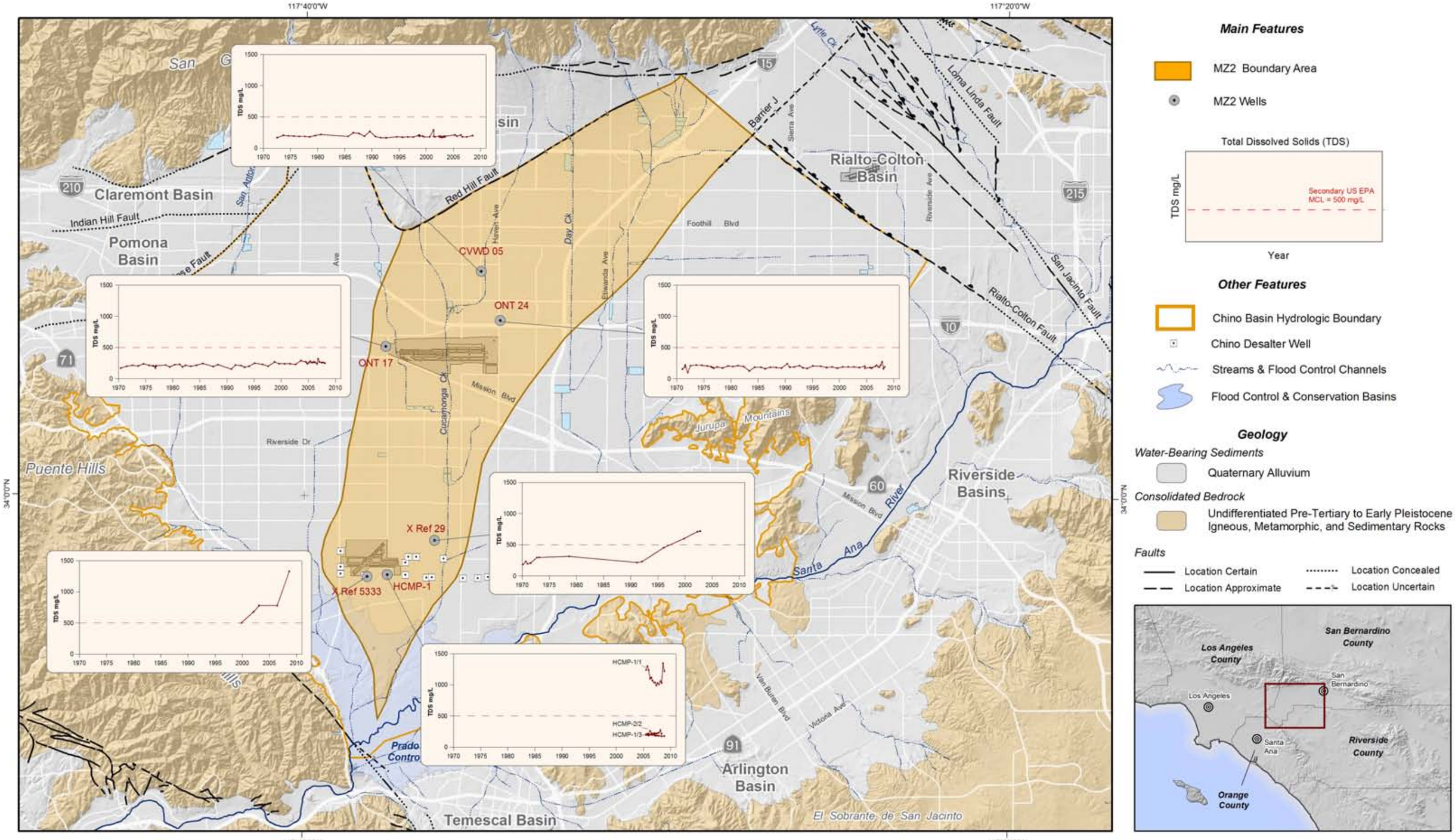
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Chino Basin Management Zone 1

Historical and Current Nitrate-Nitrogen Concentrations

Figure 4-22



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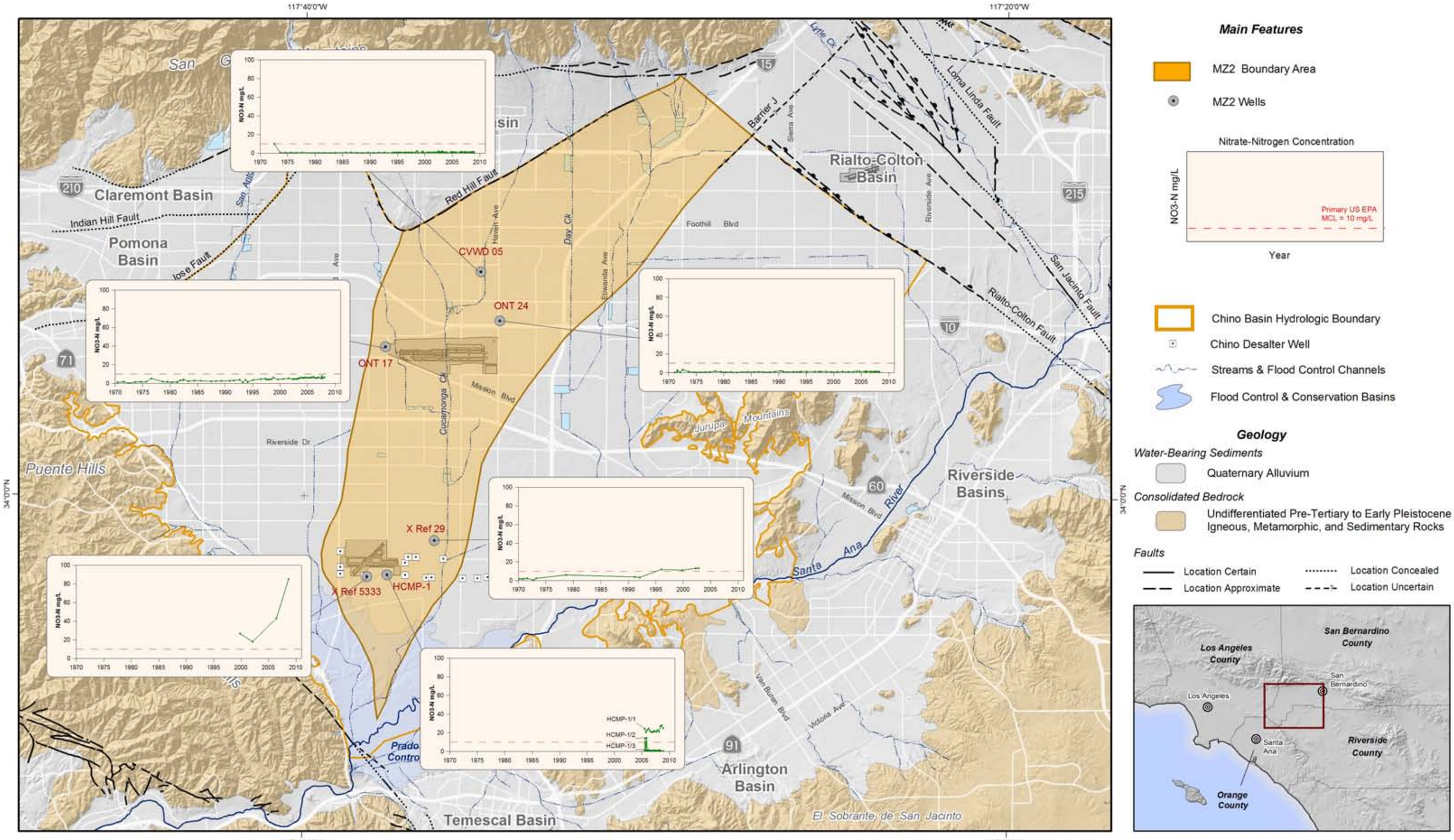
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Chino Basin Management Zone 2

Historical and Current Total Dissolved Solids Concentration

Figure 4-23



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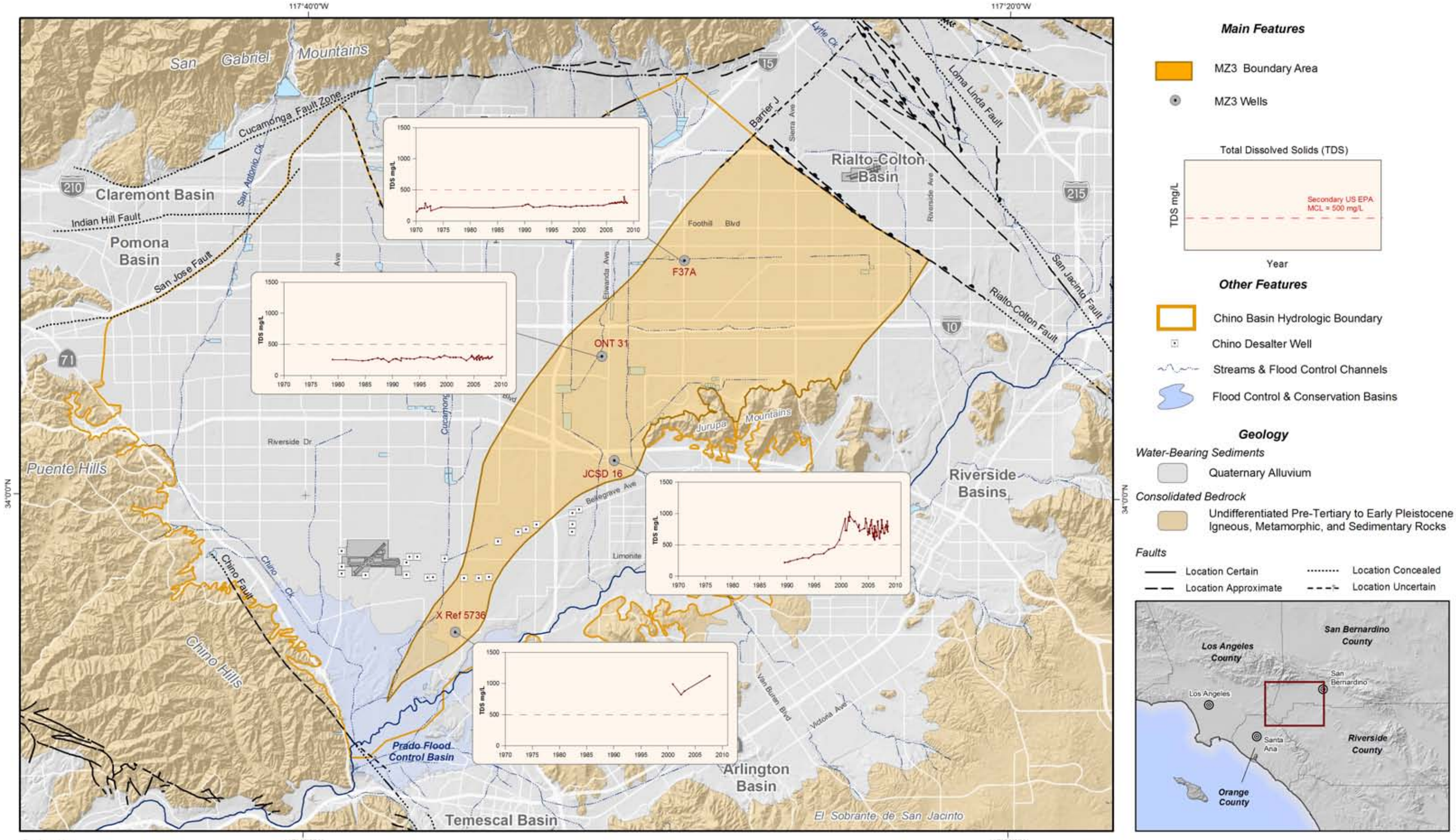
2008 State of the Basin Report
Groundwater Quality

Chino Basin Management Zone 2

Historical and Current Nitrate-Nitrogen Concentration

Figure 4-24



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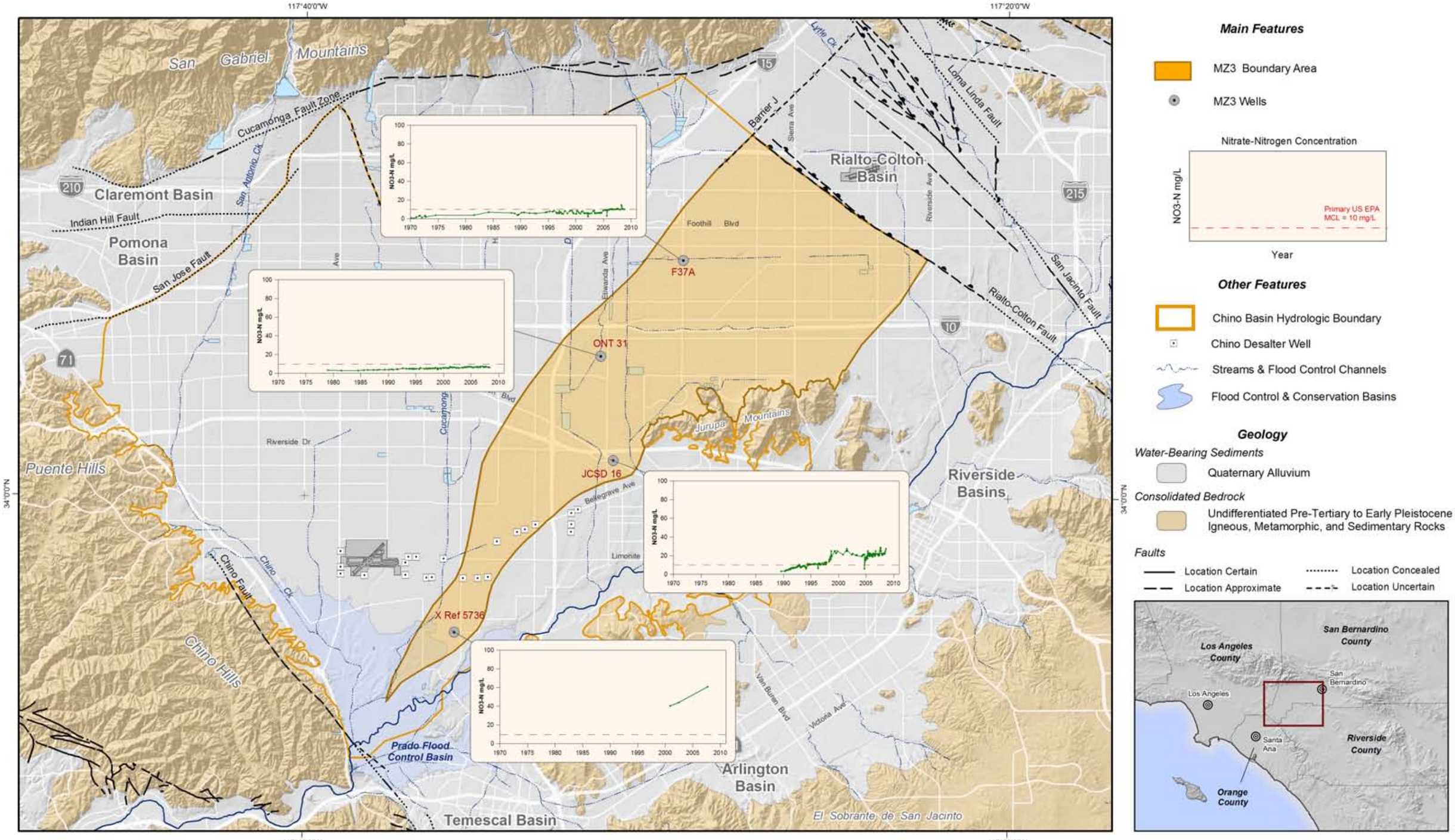
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Chino Basin Management Zone 3

Historical and Current Total Dissolved Solids Concentration

Figure 4-25



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File: Figure_4-26.mxd

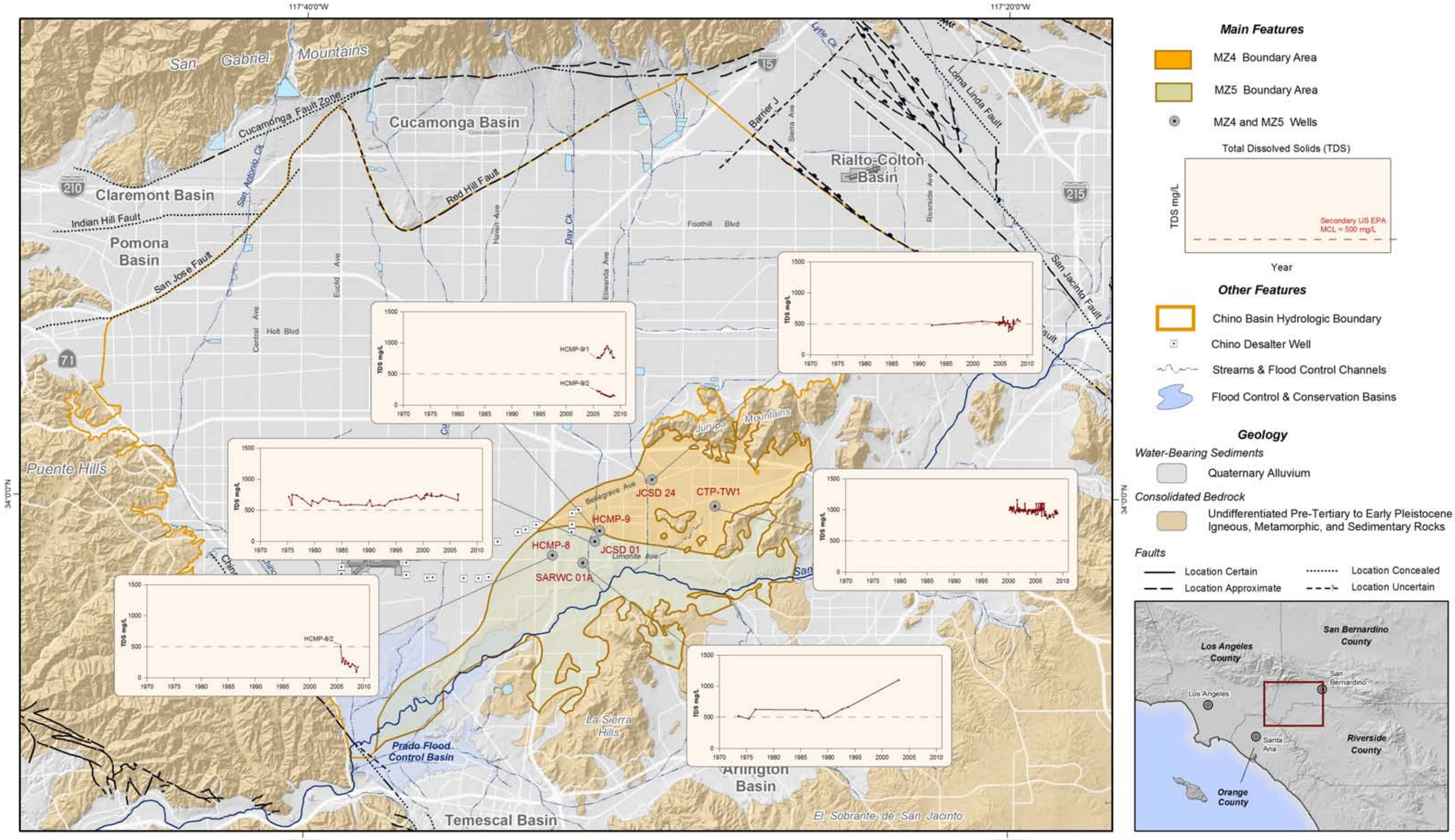
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Chino Basin Management Zone 3

Historical and Current Nitrate-Nitrogen Concentration

Figure 4-26



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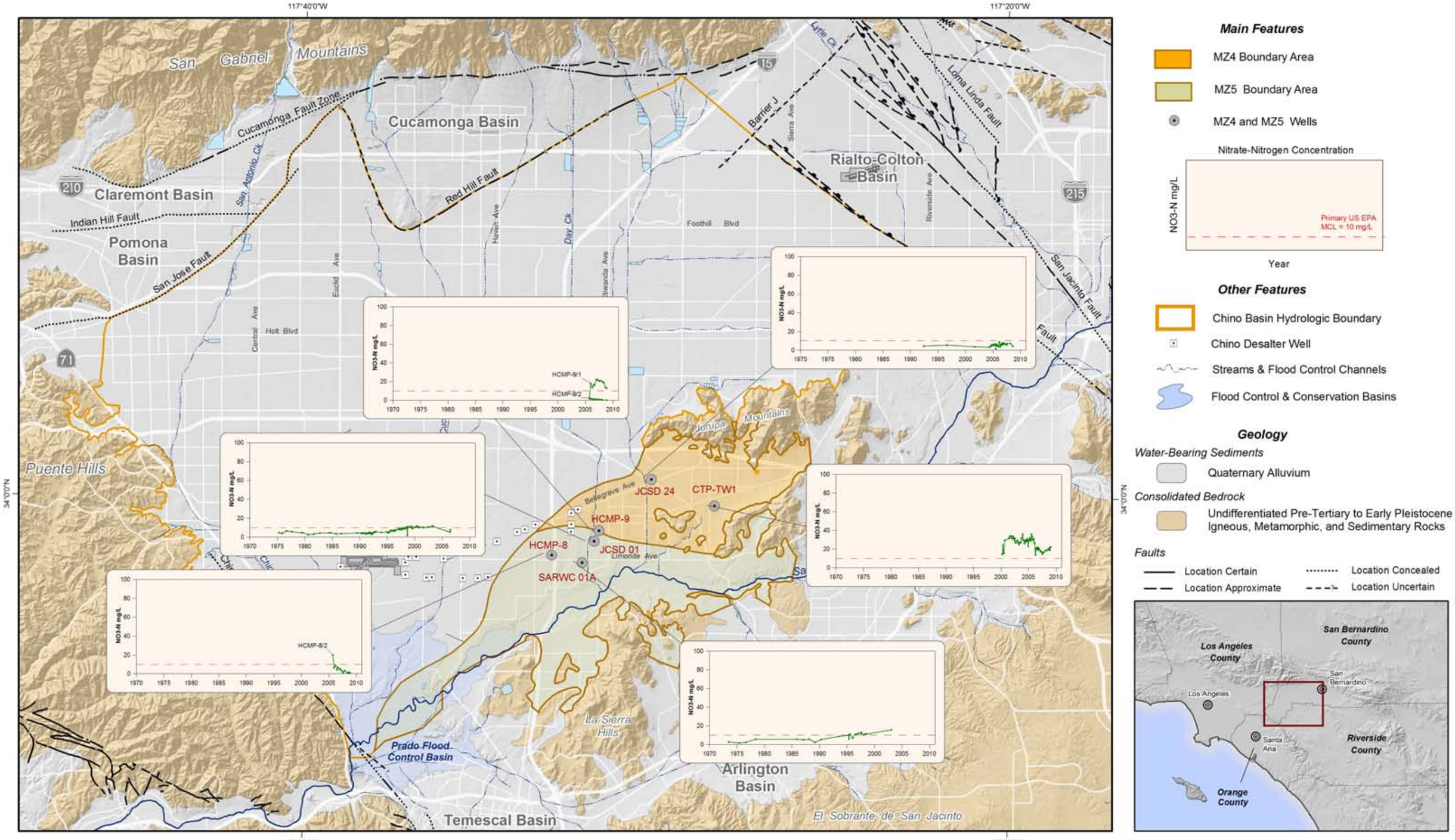
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Chino Basin Management Zone 4 and Zone 5

Historical and Current Total Dissolved Solids Concentration

Figure 4-27



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Date: 20090515
File: Figure_4-28.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Groundwater Quality

Chino Basin Management Zone 4 and Zone 5

Historical and Current Nitrate-Nitrogen Concentration

Figure 4-28

5.1 Background

One of the earliest indications of land subsidence in Chino Basin was the appearance of ground fissures in the City of Chino. These fissures appeared as early as 1973, but an accelerated occurrence of ground fissuring ensued after 1991 and resulted in damage to existing infrastructure (see Figure 5-1). The scientific studies that followed attributed the fissuring phenomenon to differential land subsidence caused by pumping of the underlying aquifer system and the consequent drainage and compaction of aquitard sediments.

5.1.1 OBMP Program Element 4

In 1999, the OBMP Phase I Report (WEI, 1999) identified pumping-induced drawdown and subsequent aquifer-system compaction as the most likely cause of land subsidence and ground fissuring observed in MZ1. Program Element 4 of the OBMP, *Develop and Implement a Comprehensive Groundwater Management Plan for Management Zone 1*, called for the development and implementation of an interim management plan for MZ1 that would:

- Minimize subsidence and fissuring in the short-term.
- Collect the information necessary to understand the extent, rate, and mechanisms of subsidence and fissuring.
- Formulate a management plan to abate future subsidence and fissuring or reduce it to tolerable levels.

In 2000, the Implementation Plan in the Peace Agreement called for an aquifer-system and land subsidence investigation in the southwestern region of MZ1 to support the development of a management plan for MZ1 (second and third bullets above). This investigation was titled the MZ1 Interim Monitoring Program (IMP). From 2001-2005, Watermaster developed, coordinated, and conducted the IMP under the guidance of the MZ1 Technical Committee, which is composed of representatives from all major MZ1 producers and their technical consultants. Specifically, the producers represented on the MZ1 Technical Committee include: the Agricultural Pool, the Cities of Chino, Chino Hills, Ontario, Pomona, and Upland; the Monte Vista Water District; the Southern California Water Company; and the State of California (CIM).

The main conclusions derived from the IMP were:

1. Groundwater production from the deep confined aquifer system in this area causes the greatest stress to the aquifer system. In other words, pumping of the deep aquifer system causes water level drawdowns that are much greater in magnitude and lateral extent than drawdowns caused by pumping of the shallow aquifer system.
2. Water level drawdowns due to pumping of the deep aquifer system can cause inelastic (permanent) compaction of the aquifer-system sediments, which results in permanent land subsidence. The initiation of inelastic compaction within the aquifer system was identified during this investigation when water levels fell below

a depth of about 250 feet in the PA-7 piezometer at Ayala Park.

3. The current state of aquifer-system deformation in south MZ1 (in the vicinity of Ayala Park) is essentially elastic. Very little inelastic (permanent) compaction is now occurring in this area, which is in contrast to the recent past when about 2.2 feet of land subsidence, accompanied by ground fissuring, occurred from about 1987 to 1995.
4. During this study, a previously undetected barrier to groundwater flow was identified. This barrier is located within the deep aquifer system and is aligned with the historical zone of ground fissuring. Pumping from the deep aquifer system is limited to the area west of the barrier, and the resulting drawdowns do not propagate eastward across the barrier. Thus, compaction occurs within the deep system on the west side of the barrier but not on the east side, which causes concentrated differential subsidence across the barrier and creates the potential for ground fissuring.
5. InSAR and ground level survey data indicate that permanent subsidence in the central region of MZ1 (north of Ayala Park) has occurred in the past and continues to occur today. The InSAR data also suggest that the groundwater barrier extends northward into central MZ1. These observations suggest that the conditions that very likely caused ground fissuring near Ayala Park in the 1990s are also present in central MZ1 and should be studied in more detail.

The investigation methods, results, and conclusions (listed above) are described in detail in the MZ1 Summary Report (WEI, 2006b). The investigation provided enough information for Watermaster to develop Guidance Criteria for the MZ1 producers in the investigation area that, if followed, would minimize the potential for subsidence and fissuring during the completion of the MZ1 Subsidence Management Plan (MZ1 Plan). The Guidance Criteria formed the basis for the MZ1 Plan, which was developed by the MZ1 Technical Committee and approved by Watermaster in October 2007. In November 2007, the California Superior Court, which retains continuing jurisdiction over the Chino Basin Adjudication, approved the MZ1 Plan and ordered its implementation.

The MZ1 Plan includes a listing of Managed Wells subject to the plan, a map of the so-called Managed Area in southern MZ1, an initial threshold water level (Guidance Level) at an index well in the Managed Area (245 feet below the top of the PA-7 well casing at Ayala Park in Chino [ft-brp]), and a plan for ongoing monitoring and annual reporting.

5.1.2 OBMP Program Element 1

The OBMP Phase I Report also noted that land subsidence was occurring in other parts of the basin besides Chino. Program Element 1 (PE1) of the OBMP and the Implementation Plan, *Develop and Implement a Comprehensive Monitoring Program*, called for basin-wide analysis of land subsidence via ground-level surveys and InSAR and ongoing monitoring based on the analysis of the subsidence data. Through 2008, basin-wide monitoring has been based on the ground-level survey data and InSAR data collected as part of the IMP and the MZ1 Plan implementation.

5.2 Ground-Level Monitoring Program

Implementation of the MZ1 Plan began in 2008. The MZ1 Plan calls for (1) the continued scope and frequency of monitoring implemented during the IMP within the MZ1 Managed Area and (2) expanded monitoring of the aquifer system and land subsidence in other areas of the Chino Basin where the IMP indicated concern for future subsidence and ground fissuring. The expanded monitoring efforts outside of the MZ1 Managed Area are consistent with the requirements PE1.

Watermaster's current ground-level monitoring program includes:

- *Piezometric Levels*. Piezometric levels are an important part of the ground-level monitoring program because piezometric changes are the mechanism for aquifer-system deformation and land subsidence. Watermaster monitors piezometric levels at about 33 wells in MZ1. Currently, a pressure-transducer/data-logger is installed at each of these wells and records one water level reading every 15 minutes. And, Watermaster records depth-specific water levels at the piezometers located at the Ayala Park Extensometer facility every 15 minutes.
- *Aquifer-System Deformation*. Watermaster records aquifer-system deformation at the Ayala Park Extensometer facility (see Figure 5-1). At this facility, two extensometers, completed at 550 ft-bgs and 1,400 ft-bgs, record the vertical component of aquifer-system compression and/or expansion once every 15 minutes (synchronized with the piezometric measurements).
- *Vertical Ground-Surface Deformation*. Watermaster monitors vertical ground-surface deformation via the ground-level surveying and remote sensing (InSAR) techniques established during the IMP. Currently, ground-level surveys are being conducted in the MZ1 Managed Area once per year. InSAR is the only monitoring technique being employed outside the MZ1 Managed Area, and InSAR data is analyzed once per year.
- *Horizontal Ground-Surface Deformation*. Watermaster monitors horizontal ground-surface displacement across the eastern side of the subsidence trough and the adjacent area east of the barrier/fissure zone. These data, obtained by electronic distance measurements (EDMs), are used to characterize the horizontal component of land surface displacement caused by groundwater production on either side of the fissure zone. Currently, Watermaster is collecting EDMs at a semiannual frequency (Spring/Fall) between east/west aligned benchmarks on Eucalyptus, Edison, Schaefer, and Philadelphia Avenues.

5.3 Results of Ground-Level Monitoring Program

At the conclusion of each fiscal year, the MZ1 Plan requires that Watermaster produce an MZ1 Annual Report that includes the results of the past year's monitoring. The 2008 MZ1 Annual Report (currently in preparation) will be the first such report published by Watermaster and will focus primarily on the intensive monitoring being conducted in the MZ1 Managed Area.

The ground-level monitoring results described below will focus primarily on the ground-level

survey and InSAR monitoring being conducted across the entire Chino Basin (PE1).

5.3.1 InSAR

Figure 5-2 is a map of the Chino Basin that shows InSAR results for 2005-2008. The InSAR data are generally coherent and useful in the northern urbanized areas of the basin but are generally incoherent and not as useful in the southern agricultural areas (light brown areas in Figure 5-2). This pattern of "coherence" relative to land use is typical of InSAR data.

Figure 5-2 shows that ground motion during 2005-2008 was relatively minor (less than about -0.02 ft of subsidence) in the northeastern parts of the basin, such as Fontana and Rancho Cucamonga. However, in northwestern parts of the basin, land subsidence of over -0.14 ft and -0.12 ft have been measured by InSAR in Pomona and Ontario, respectively.

Figure 5-2 also shows that ground motion is influenced by geologic faults that cut through the aquifer system and act as barriers to groundwater flow. For instance, the land surface elevation has increased (uplift) in the southern portion of the Cucamonga Basin—just north of the Red Hill Fault. The San Jose Fault is clearly influencing the pattern of ground motion in the Claremont, Pomona, and Chino Basins. Of most concern, with respect to the potential for ground fissuring, is the differential ground motion across the San Jose Fault between the Pomona and Chino Basins.

Historically, the City of Chino has experienced the most land subsidence (e.g. over -2.0 ft of subsidence within the MZ1 Managed Area during 1987-1999), but for 2005-2008, the InSAR data indicate that land subsidence was relatively minor in this area (less than about -0.04 ft).

5.3.2 Ground-Level Surveys

Figure 5-3 is a map of the western half of Chino Basin that shows both the InSAR and ground-level survey results for 2005-2008. The ground-level survey data generally corroborate the patterns and magnitude of ground motion shown in the InSAR data with a few exceptions:

- The ground-level survey data indicate a greater magnitude of land subsidence in the MZ1 Managed Area (maximum subsidence = -0.10 ft) than the InSAR data (maximum subsidence = -0.05 ft).
- In some areas, the ground-level survey data indicate minor subsidence while the InSAR data indicate minor uplift. In these instances, the difference between the ground-level survey and InSAR data is generally less than about 0.05 ft.

One advantage of the ground-level survey data is that it can provide information on ground motion in areas where InSAR data is absent. See, for example, the area shown on Figure 5-3 near at the intersection of Euclid Avenue and Kimball Avenue where the Chino I Desalter wells pump groundwater from the deep aquifer system. The survey data indicated maximum land subsidence of -0.24 ft in this area during 2005-2008.

5.4 Analysis of Ground Surface Displacement

Historical ground motion data (shown in Figure 5-1) and recent ground motion data (shown in Figures 5-2 and 5-3) indicate that land subsidence concerns in the Chino Basin are confined to certain portions of MZ1 and MZ2. These "areas of subsidence concern" are delineated and labeled in Figures 5-2 and 5-3. Besides the MZ1 Managed Area, Watermaster has designated four additional areas of subsidence concern: the Central MZ1 Area, the Pomona Area, the Ontario Area, and the Southeast Area.

The recent land subsidence that has been occurring in each of these areas is mainly controlled by recent and/or historical changes in groundwater levels, which, in turn, are mainly controlled by pumping and recharge.

Below, the relationships between groundwater pumping, aquifer recharge, groundwater levels, and ground motion, which help to reveal cause and effect; the current state of ground motion; and the nature of current land subsidence (i.e. elastic and/or inelastic, differential, etc.), are discussed by area of concern.

5.4.1 MZ1 Managed Area

Within the MZ1 Managed Area, pumping of the deep confined aquifer system causes water level drawdowns that are much greater in magnitude and lateral extent than drawdowns caused by pumping of the shallow aquifer system. Artificial recharge in the northern portions of MZ1 appears to have no immediate impact on groundwater levels in the deep aquifer system in the MZ1 Managed Area. These conclusions were established during the IMP (WEI, 2006b) and are shown graphically in Figure 5-4.

Figures 5-4 and 5-5 also show vertical ground motion at the Deep Extensometer at Ayala Park and at a benchmark monument (137/53) at the corner of Schaefer Avenue and Central Avenue. About -2.5 ft of subsidence occurred in portions of the MZ1 Managed Area from 1987-2000, but very little inelastic subsidence has occurred since 2000, and no additional ground fissuring has been observed.

Another conclusion of the IMP was that groundwater-level drawdowns due to pumping of the deep aquifer system can cause inelastic (permanent) compaction of the aquifer-system sediments, which results in permanent land subsidence. The initiation of inelastic compaction within the aquifer system was identified during the IMP when water levels fell below a depth of about 250 feet in the PA-7 piezometer at Ayala Park. From 2005 to 2008, water levels at PA-7 did not decline below 250 ft-brp , and very little, if any, inelastic compaction was recorded in the MZ1 Managed Area. Data from the MZ1 Managed Area are further analyzed in the 2008 MZ1 Annual Report (in preparation).

The IMP also identified a previously undetected barrier to groundwater flow on the east side of the MZ1 Managed Area. This barrier is located within the deep aquifer system and is aligned with the historical zone of ground fissuring (see Figure 5-3). Pumping from the deep aquifer system has been limited to the area west of the barrier, and the resulting drawdowns have not propagated eastward across the barrier. Thus, historical compaction occurred within the deep system on the west side of the barrier but not on the east side. Concentrated

differential subsidence across the barrier is the most likely cause of the ground fissuring observed in the early 1990s. The rate of land subsidence decreased to almost zero in the MZ1 Managed Area in the mid-1990s, and no additional ground fissuring has been observed.

5.4.2 Central MZ1 Area

The Central MZ1 Area is located directly north of the MZ1 Managed Area (see Figure 5-3). Figures 5-6 and 5-7 display time histories of groundwater pumping, aquifer recharge, groundwater levels, and ground motion in the Central MZ1 Area.

The ground motion time histories for Central MZ1 is similar to that of the MZ1 Managed Area—as much as -2.2 ft of inelastic subsidence occurred at the corner of Philadelphia and Monte Vista Avenue from 1987-2000, but very little inelastic subsidence has occurred since 2000. This similarity suggests a relationship to the causes of land subsidence in the MZ1 Managed Area; however, there is very little historical groundwater level data in this area to confirm this relationship.

Most of the wells with historical groundwater level records are in the northern part of Central MZ1 (see Figure 5-3) where historical subsidence was not as pronounced. From about 1935 to 1978, groundwater levels in these wells declined by about 150 ft. Groundwater levels increase by about 50 ft during the 1980s and remained relatively stable until 2005. Since 2005, groundwater levels have increased by about 25 ft, which is likely due to decreased pumping and increased recharge in MZ1.

5.4.3 Pomona Area

The Pomona Area is located directly north of the Central MZ1 Area (see Figure 5-3). Figures 5-8 and 5-9 display time histories of groundwater pumping, aquifer recharge, groundwater levels, and ground motion in the Pomona Area.

The ground motion time histories of the Pomona Area is based solely on InSAR data from 1992 to 1995, 1995 to 2000, and 2005 to 2008. These data indicate that land subsidence has occurred continuously in this area, generally at a rate of about 0.07 ft/yr. The rate of subsidence appears to be decreasing gradually with time.

From about 1935 to 1978, groundwater levels in the Pomona Area declined by about 175 ft or more. Groundwater levels increased by about 50 to 100 ft during the 1980s. From about 1990 to 2004, groundwater levels declined again by about 25 to 50 ft. And from 2004 to 2008, groundwater levels increased by about 25 to 50 ft. The groundwater level changes from 1990 to 2008 appear to be closely related to pumping and recharge in MZ1.

The observed, continuous land subsidence cannot be explained entirely by the corresponding changes in groundwater levels during this time (1992-2008). A plausible explanation for the subsidence is that thick, slowly-draining aquitards are compacting in response to the historical drawdowns that occurred from 1935 to 1978 (see Figure 5-9).

Lastly, the InSAR data in Figure 5-3 shows a steep gradient of subsidence across the San Jose Fault, indicating the potential for the accumulation of horizontal strain in the shallow

sediments and the possibility of ground fissuring. Ground fissuring is the main subsidence-related threat to infrastructure.

5.4.4 Ontario Area

The Ontario Area is located east of the Central MZ1 and the Pomona Areas (see Figure 5-3). Figures 5-10 and 5-11 display time histories of groundwater pumping, aquifer recharge, groundwater levels, and ground motion in the Ontario Area.

The ground motion time histories of the Ontario Area is based solely on InSAR data from 1992 to 1995, 1995 to 2000, and 2005 to 2008. These data indicate that land subsidence has occurred continuously in this area, generally at a rate of about 0.06 ft/yr. The rate of subsidence appears to be decreasing gradually with time.

From about 1935 to 1978, groundwater levels in the Ontario Area declined by about 125 ft. Groundwater levels increased by about 10 to 20 ft during the early 1980s and have remained relatively stable since then.

The observed continuous land subsidence from 1992 to 2008 is not explained by the relatively stable groundwater levels. A plausible explanation for the subsidence is that thick, slowly-draining aquitards are compacting in response to the historical drawdowns that occurred from 1935 to 1978 (see Figure 5-11).

5.4.5 Southeast Area

The Southeast Area is located east of the MZ1 Managed Area (see Figure 5-3). Figures 5-12 and 5-13 display time histories of groundwater pumping, aquifer recharge, groundwater levels, and ground motion in the Southeast Area.

The ground motion time histories of the Southeast Area is based solely on ground-level surveys performed from 1987to 2008. These data indicate that land subsidence has occurred continuously and slowly in this area, generally at a rate of about 0.02 ft/yr. However, the data also indicate that from 2005 to 2008 about -0.24 ft of subsidence occurred near the western portion of the Chino I Desalter well field where these wells are pumping from and causing drawdown within the deep confined aquifer system.

There is very little historical groundwater level data for this area prior to about 1990. The data since 1990 indicate relatively stable groundwater levels.

The observed slow but continuous land subsidence from 1987 to 2008 is not explained by the relatively stable groundwater levels. A plausible explanation for the subsidence is that thick, slowly-draining aquitards are compacting in response to the historical drawdowns that likely occurred prior to 1990.

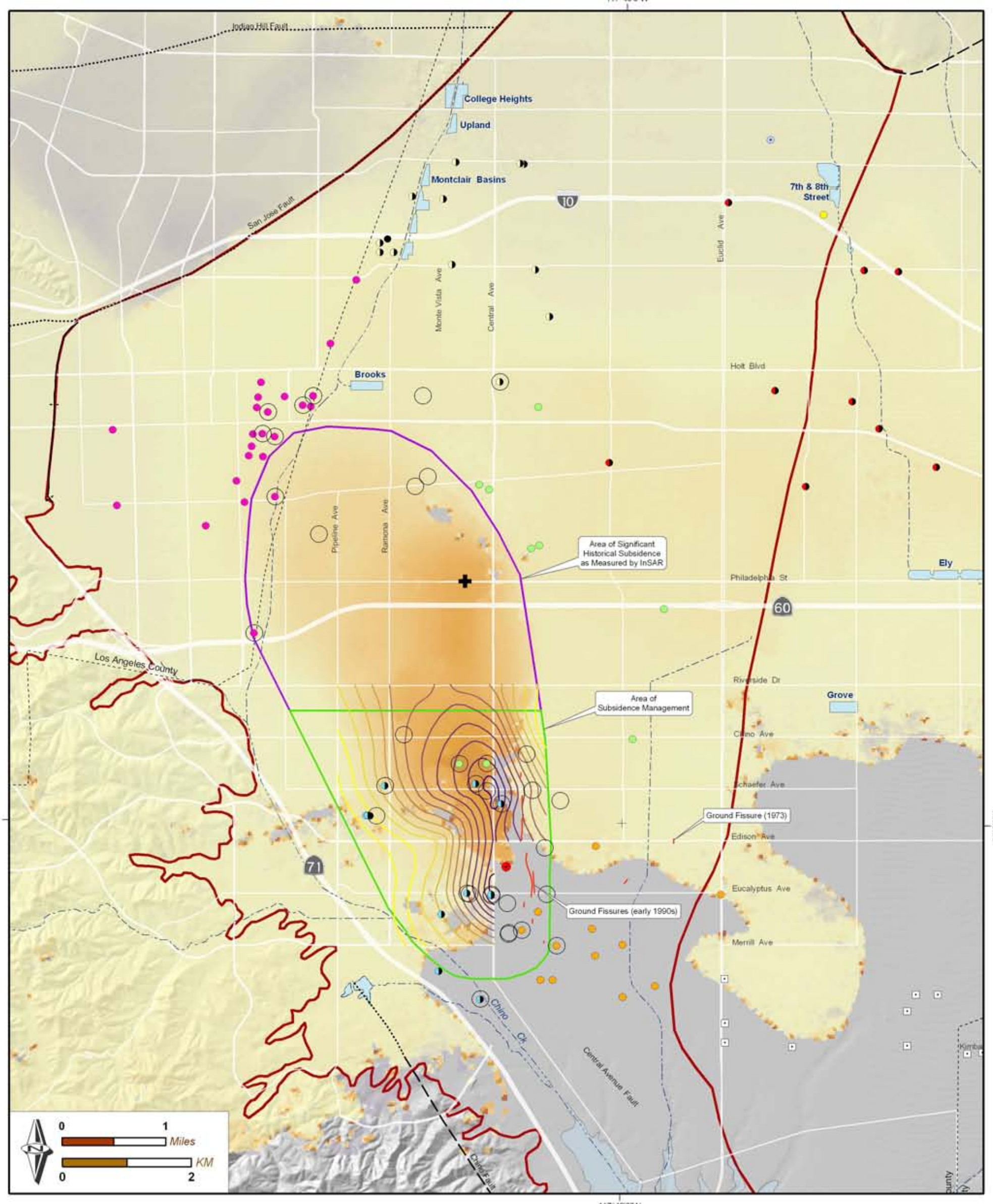
Lastly, the first ground fissures ever documented in the Chino Basin occurred in the Southeast Area in the early 1970s, but ground fissuring has not been observed in the Southeast Area since then.

5.5 Conclusions and Recommendations

The conclusions and recommendations for Watermaster's basin-wide ground-level monitoring program are provided below.

- Land subsidence does not appear to be a concern in the eastern and northernmost portions of Chino Basin. In these areas, the underlying aquifer system is composed primarily of coarse-grained sediments that are not prone to compaction.
- Land subsidence and the potential for ground fissuring are major concerns in the western and southern portions of the Chino Basin. In these areas, the underlying aquifer system consists of interbedded, fine-grained sediment layers (aquitards) that can drain and compact when groundwater levels decline in the adjacent coarse-grained aquifers. Ground fissuring has occurred in the past where land subsidence was differential (i.e. steep gradient of subsidence). Ground fissuring is the main subsidence-related threat to infrastructure.
- Land subsidence has been persistent across most of the western and southern portions of the Chino Basin since, at least, 1987 when land subsidence monitoring began. In many of these areas, land subsidence continues even during periods of groundwater level recovery, indicating that thick, slowly-draining aquitards are compacting in response to the large historical drawdowns of 1935 to 1978.
- Pumping-induced drawdown has caused accelerated occurrences of land subsidence in the recent past, including subsidence in the City of Chino during the early 1990s and, currently, in the vicinity of the Chino I Desalter well field. Watermaster should anticipate similar occurrences of land subsidence in areas (1) that are prone to subsidence and (2) where drawdown will occur in the future.
- Watermaster will continue its basin-wide ground-level monitoring program, using InSAR and ground-level surveys. Watermaster will consider expanding the ground-level surveys to cover the area of the proposed Chino Creek Desalter Well Field. This is an area that is prone to subsidence, where drawdown may occur near where ground fissuring has occurred in the past, and where InSAR data is not currently available. Watermaster will also consider expanding the ground-level surveys to cover the Pomona and Ontario Areas. In general, InSAR data coverage is continuous and of high quality throughout both areas, so ground-level surveys would primarily provide supporting and confirmation data for the InSAR and would occur at a frequency of once every three to five years.
- Watermaster will consider installing low-cost piezometer/extensometer facilities at appropriate locations in all Areas of Subsidence Concern. This type of facility has been successfully constructed and tested at Ayala Park in Chino. Such facilities record the requisite data (1) to monitor land subsidence and groundwater levels at high resolution and accuracy, (2) to provide the information necessary to characterize the elastic and/or inelastic nature of any land subsidence occurring in an area, (3) to provide the information necessary to develop criteria to manage subsidence, and (4) to provide the information necessary to characterize aquifer and aquitard properties that could be used in a predictive computer-simulation model of subsidence.

- Watermaster will consider building and calibrating predictive computer-simulation models of subsidence across all Areas of Subsidence Concern in the Chino Basin. These models would provide information on the rates and ultimate magnitude of land subsidence that could be associated with various basin management planning scenarios (i.e. pumping and recharge patterns). This information would be valuable to affected Watermaster parties.
- Because ground fissuring caused by differential land subsidence is the main threat to infrastructure, Watermaster will periodically inspect for signs of ground fissuring in areas that are experiencing differential land subsidence. In addition, Watermaster will consider monitoring the horizontal strain across these zones of potential ground fissuring in an effort to better understand and manage ground fissuring.



Subsidence Features

0.0

Contours of Relative Change in Land Surface Altitude as Measured by Leveling Surveys 1987 - 1999 (feet)

-2.2

+ 1.0

Relative Change in Land Surface Altitude as Measured by InSAR Oct 1993 - Dec 1995 (feet)

0.0

- 1.0

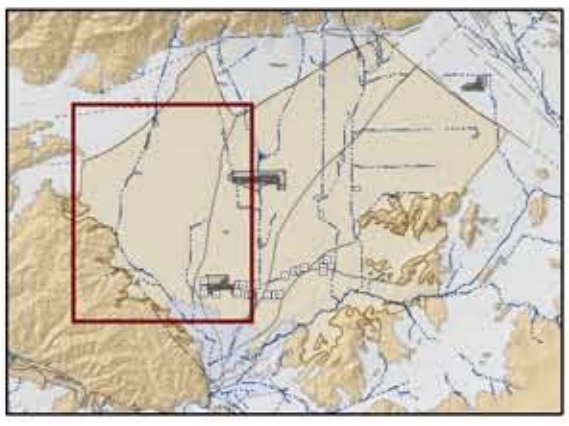
No InSAR Data

Active Production Wells in MZ-1 by Owner

- Ontario
- Pomona
- SAWC
- Upland
- SCWC
- CIM
- Chino Hills
- Chino
- MVWD

Other Features

- Well Used in MZ-1 Monitoring Program
- Ayala Park Extensometer Facility
- Proposed Central MZ-1 Piezometer
- Chino Basin Desalter Well (Existing)
- Management Zone 1 Boundary



Historical Land Surface Deformation in Management Zone 1

Leveling Surveys (1987-99) and InSAR (1993-95)

Figure 5-1

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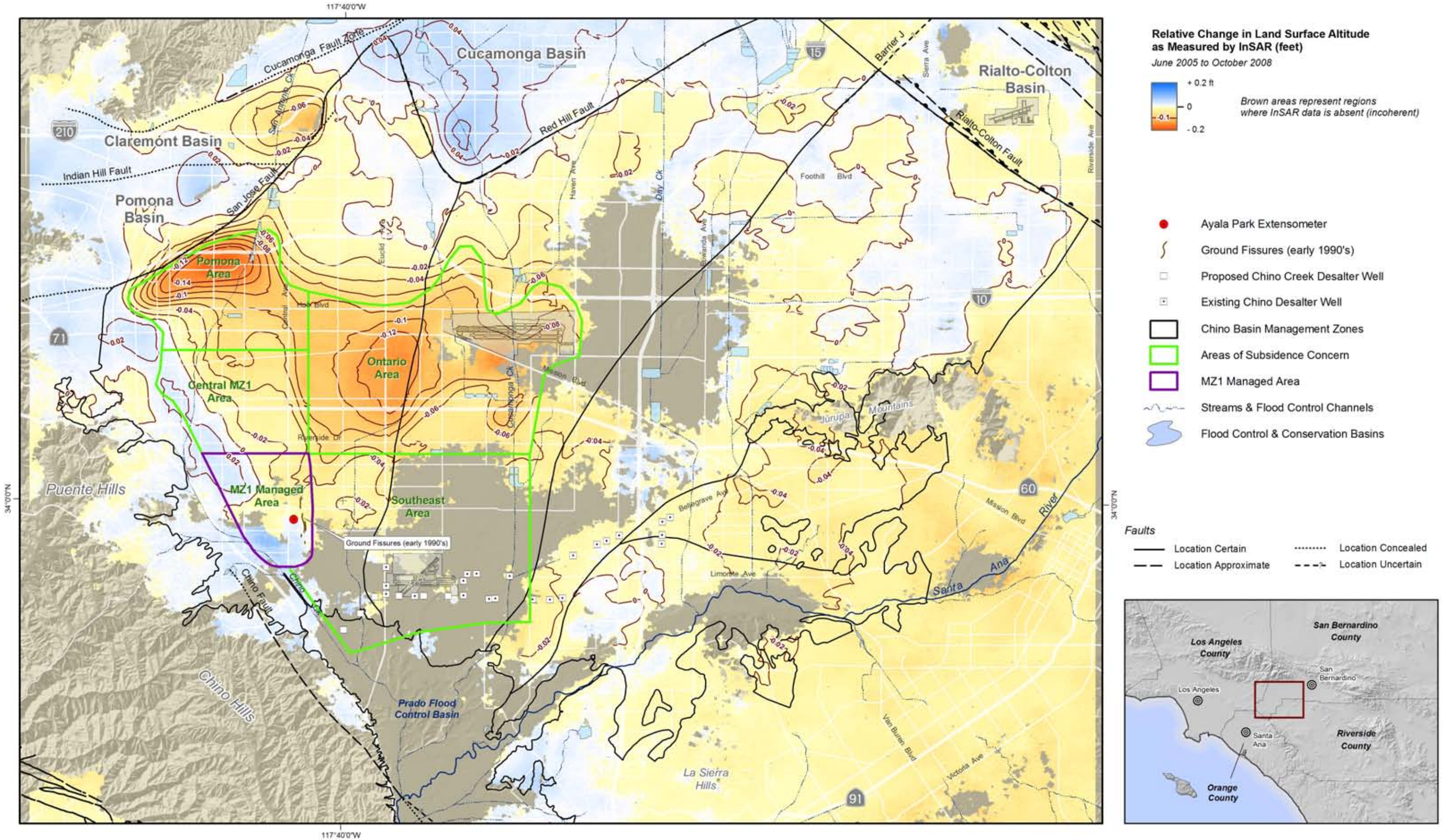
Author: AEM
Date: 20090621
File: Figure_5-1.mxd



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File: Figure_5-2.mxd

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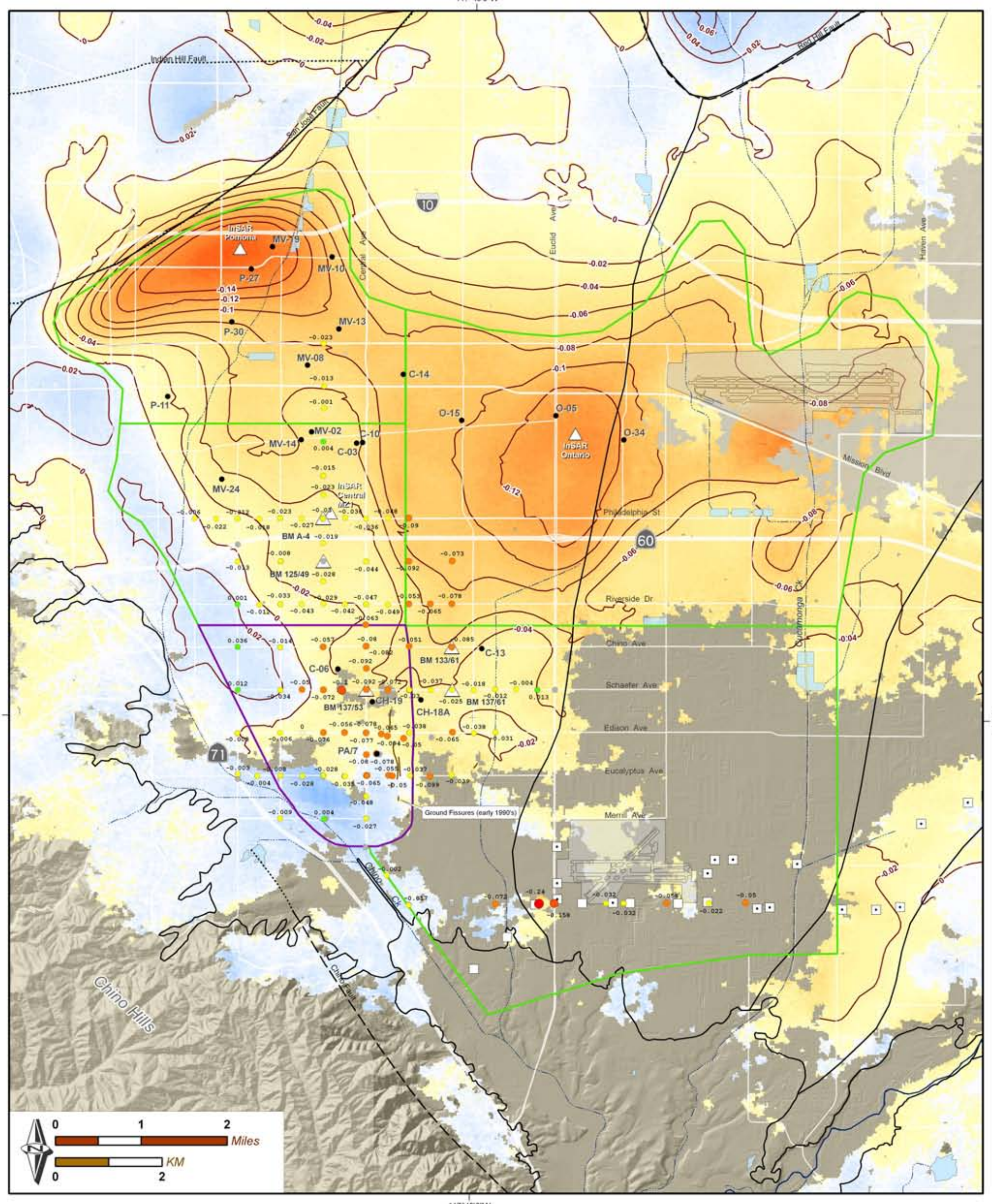
Vertical Ground Motion (2005-2008)
as Measured by InSAR in the Chino Basin Area

Figure 5-2



Insufficient Data
> 0.20
0.10 - 0.20
0.05 - 0.10
0.01 - 0.05
0.00
-0.01 - -0.05
-0.05 - -0.10
-0.10 - -0.20
< -0.20

Relative Change in Land Surface Altitude as Measured by Leveling Surveys Oct 2005 - Oct 2008 *(feet)*

+0.2 ft
0
-0.1
-0.2

Relative Change in Land Surface Altitude as Measured by InSAR June 2005 - Oct 2008 *(feet)*

Brown areas represent regions where InSAR data is absent (incoherent)

Water Level Wells (in Figures 5-4 to 5-13)

Chino Basin Desalter Well (Existing)

Proposed Chino Creek Desalter Well

Survey and InSAR Measurement Points (in Figures 5-4 to 5-13)

Chino Basin Management Zones

Subsidence Areas of Interest

MZ1 Managed Area

Vertical Ground Motion (2005-2008)

Leveling Surveys and InSAR in Western Chino Basin

Figure 5-3

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Figure 5-4
Groundwater Levels versus Ground Levels in the MZ1 Managed Area - 1993 to 2009

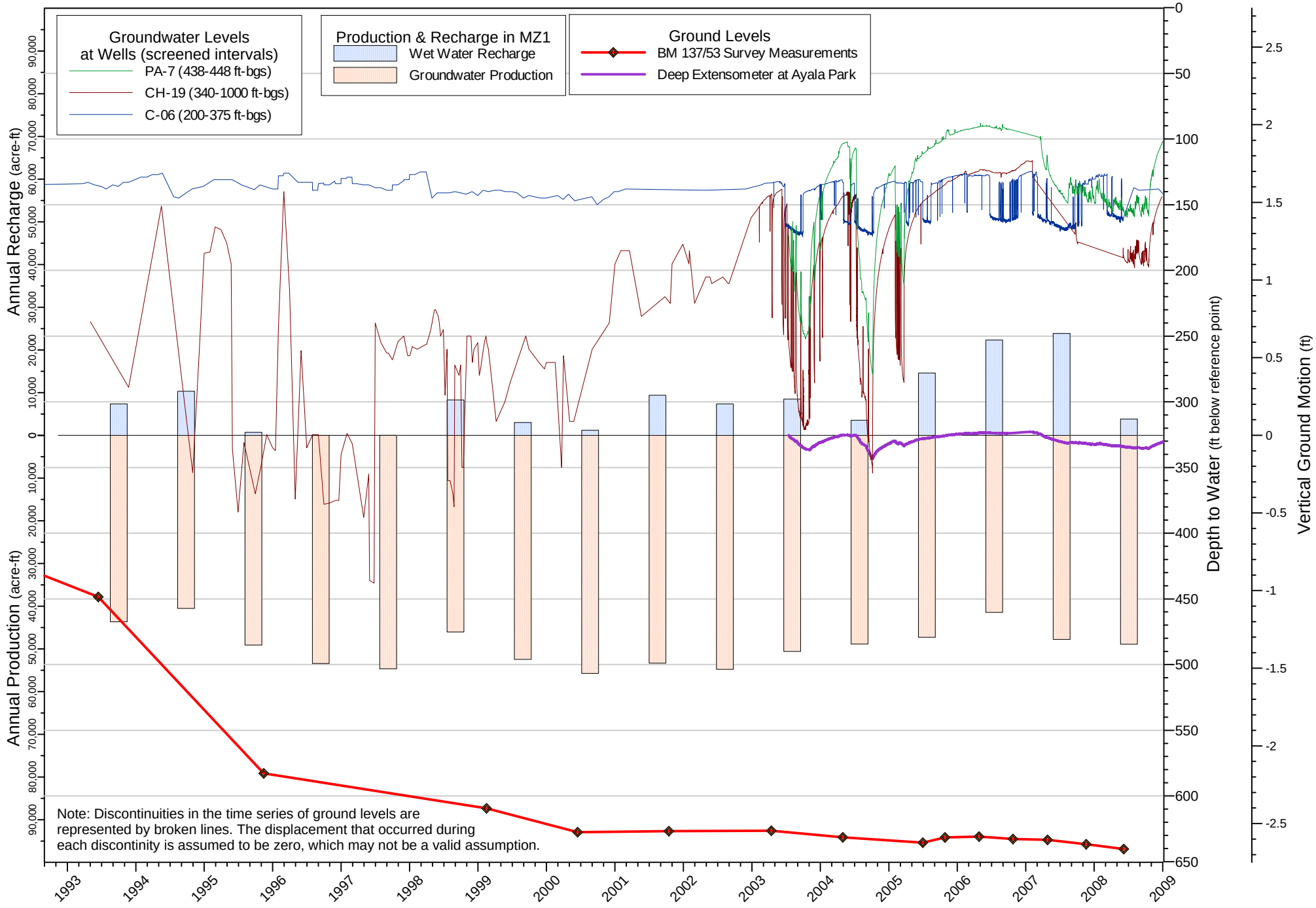


Figure 5-5
Groundwater Levels versus Ground Levels in the MZ1 Managed Area - 1935 to 2009

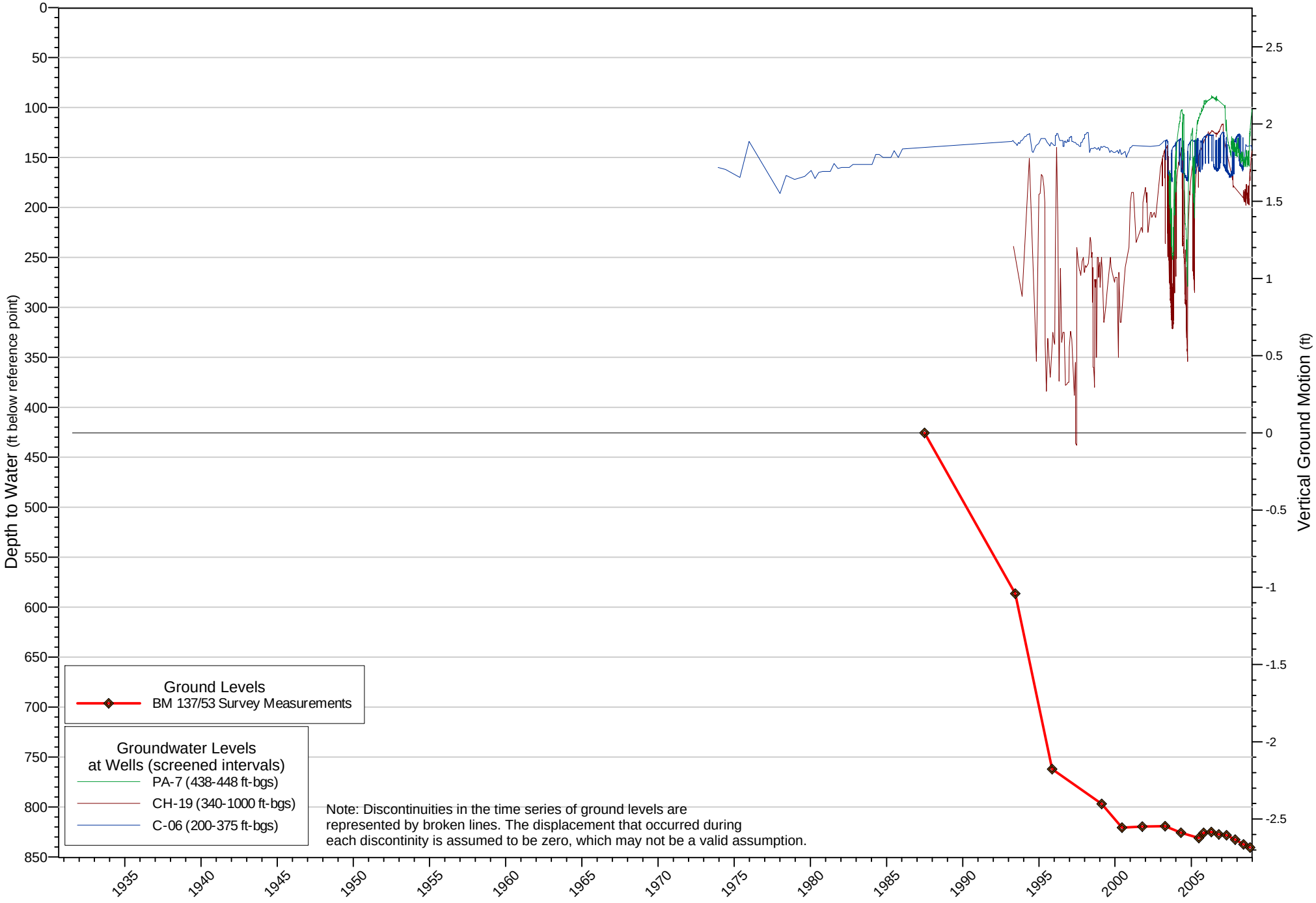


Figure 5-6
Groundwater Levels versus Ground Levels in the Central MZ1 Area - 1993 to 2009

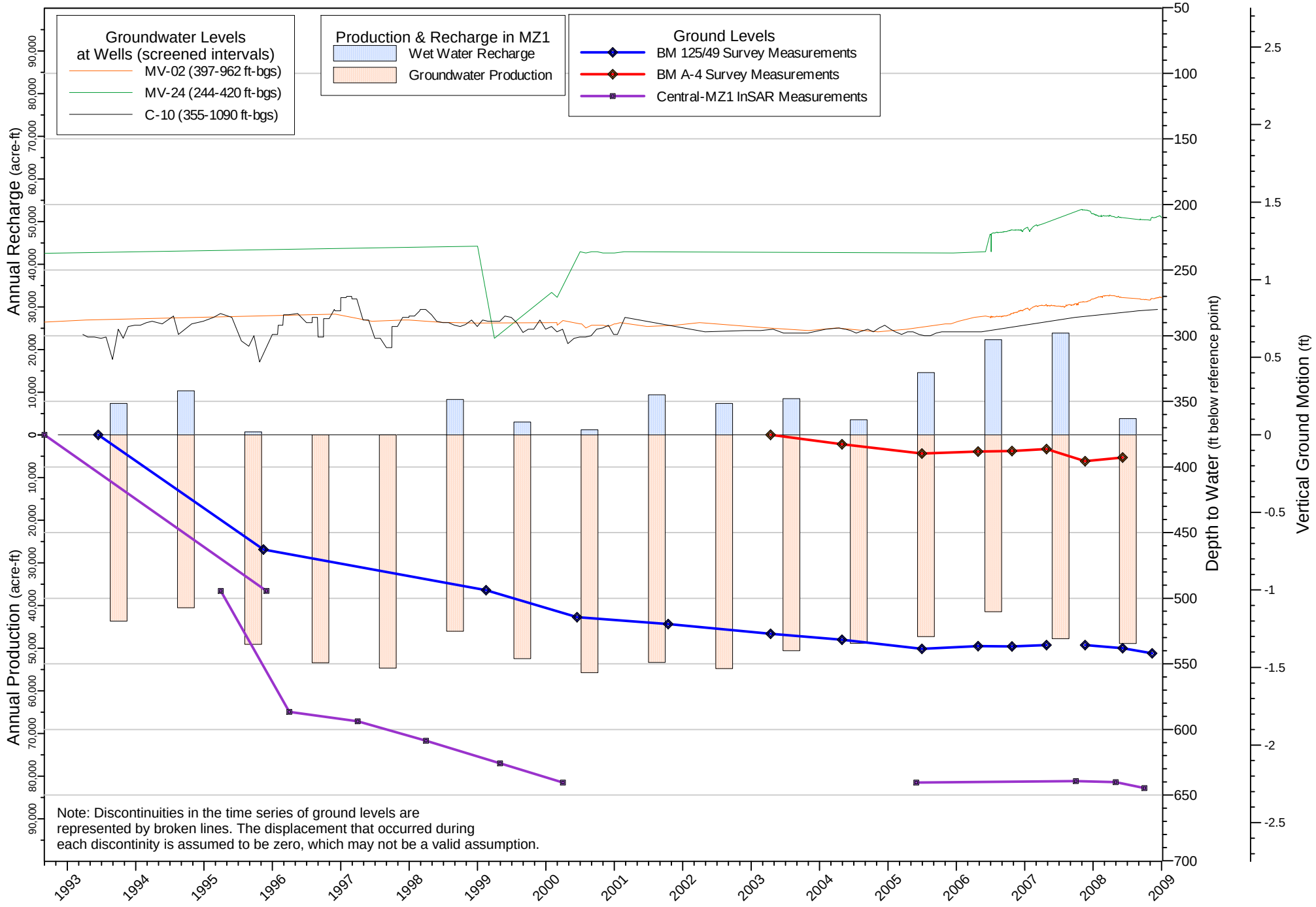


Figure 5-7
Groundwater Levels versus Ground Levels in the Central MZ1 Area - 1935 to 2009

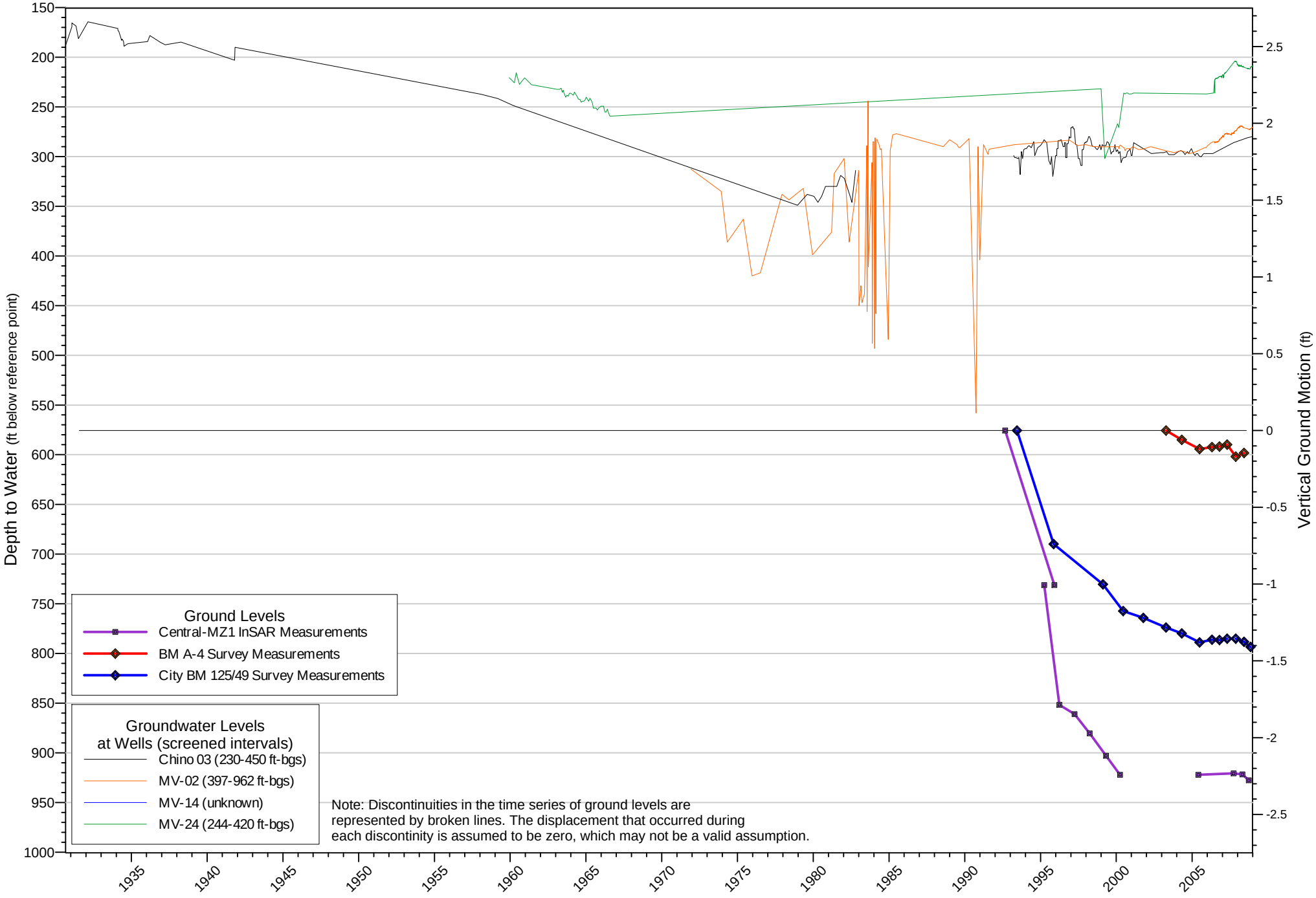


Figure 5-8
Groundwater Levels versus Ground Levels in the Pomona Area - 1993 to 2009

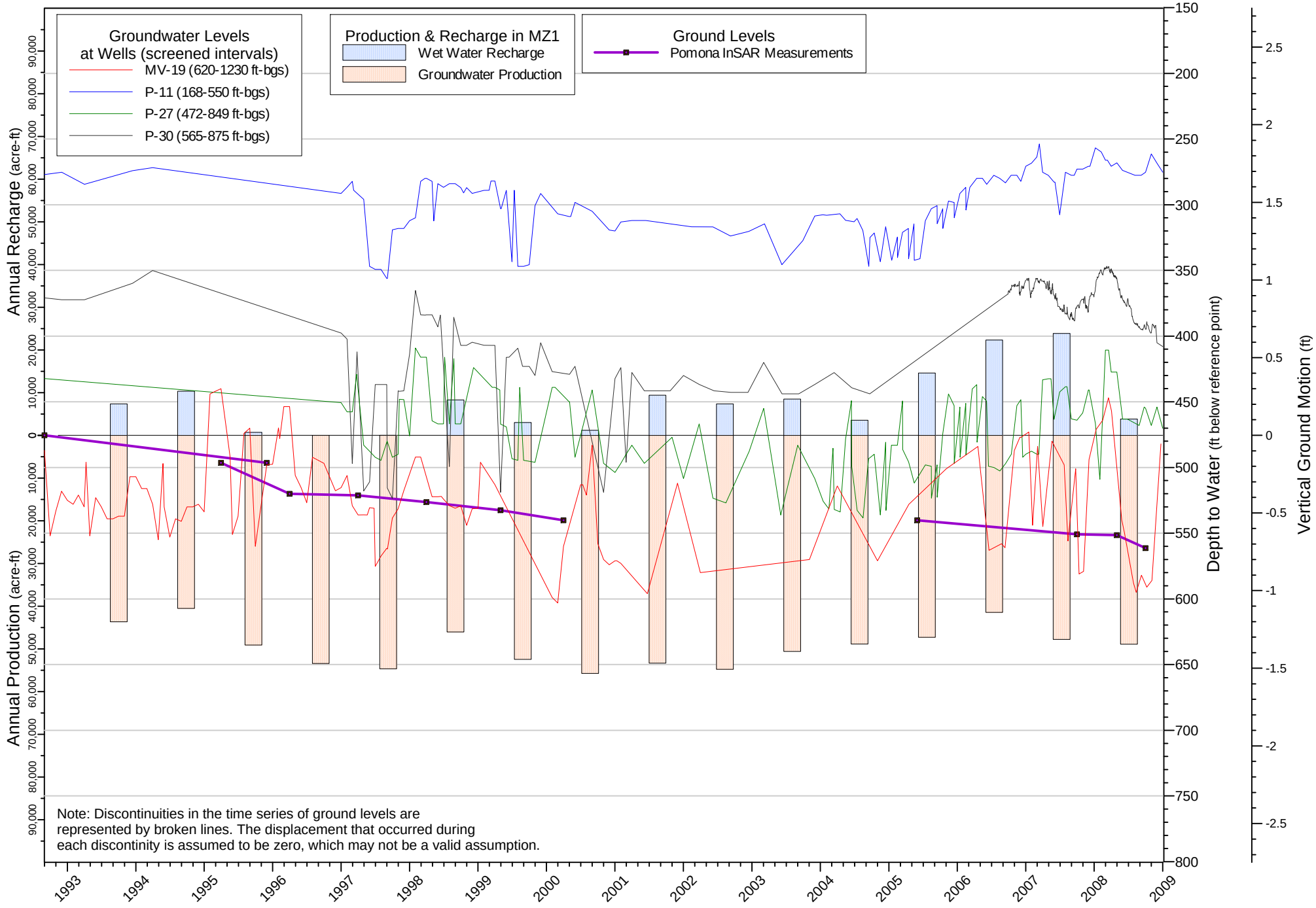


Figure 5-9
Groundwater Levels versus Ground Levels in the Pomona Area - 1935 to 2009

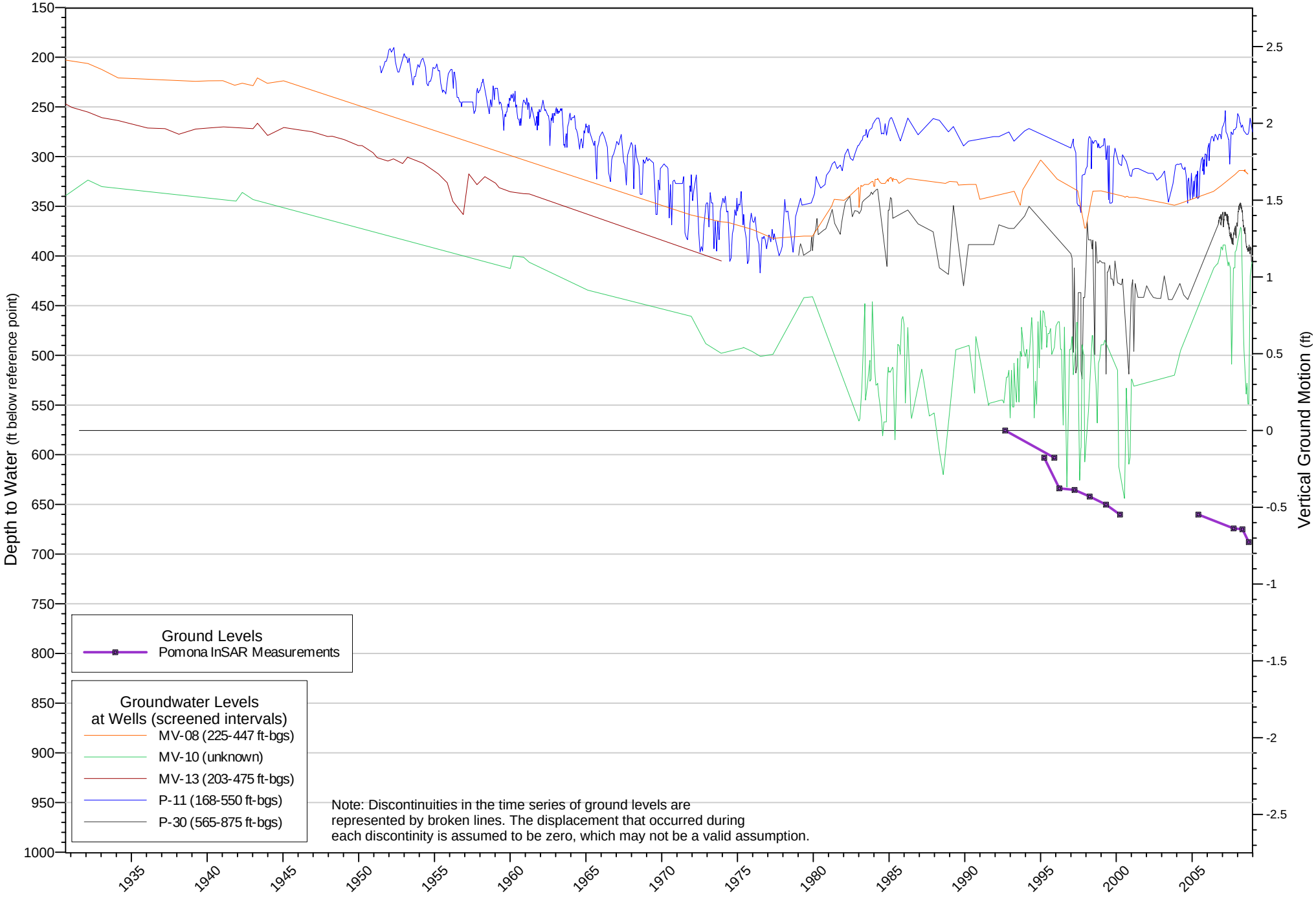


Figure 5-10
Groundwater Levels versus Ground Levels in the Ontario Area - 1993 to 2009

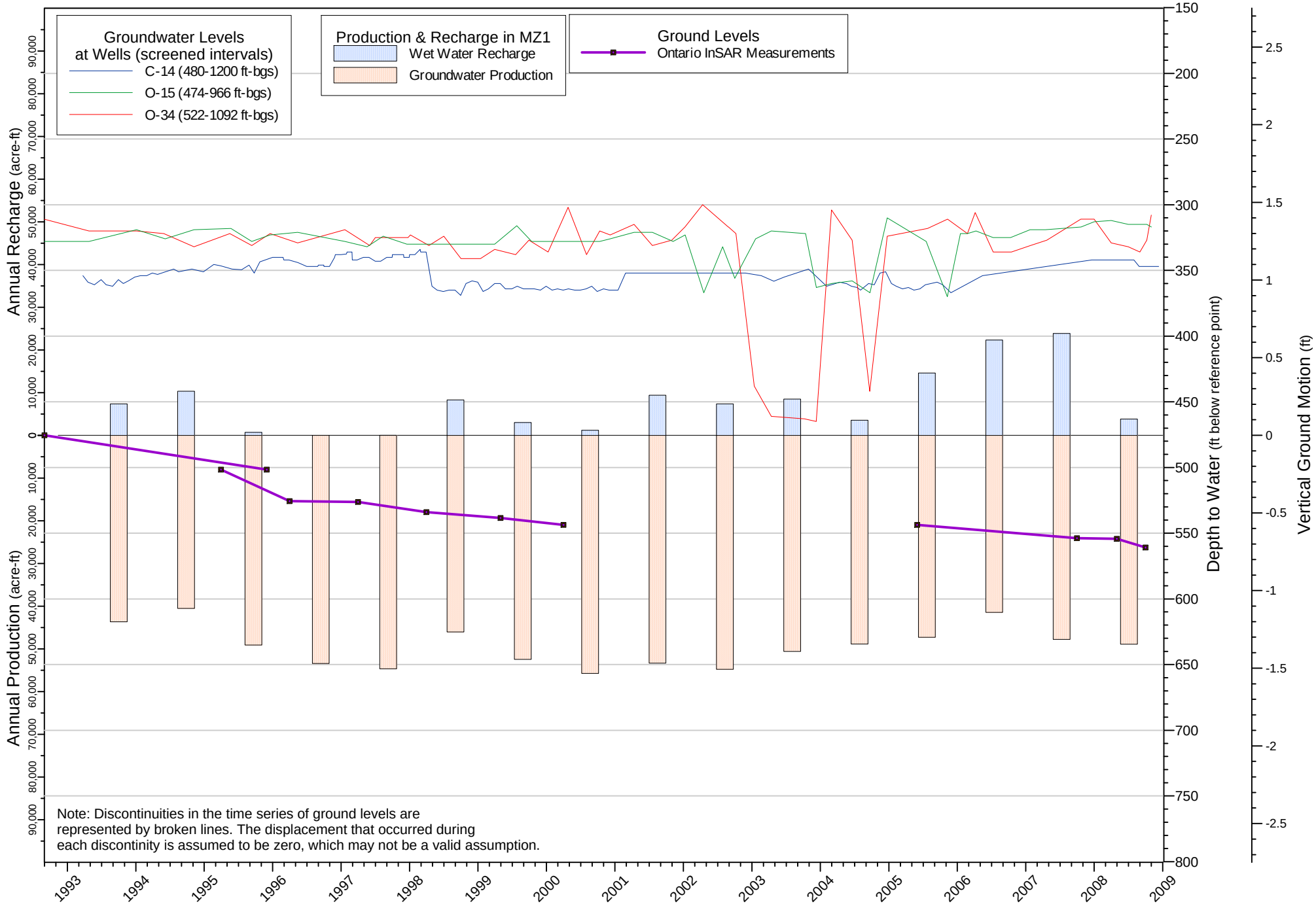


Figure 5-11
Groundwater Levels versus Ground Levels in the Ontario Area - 1930 to 2009

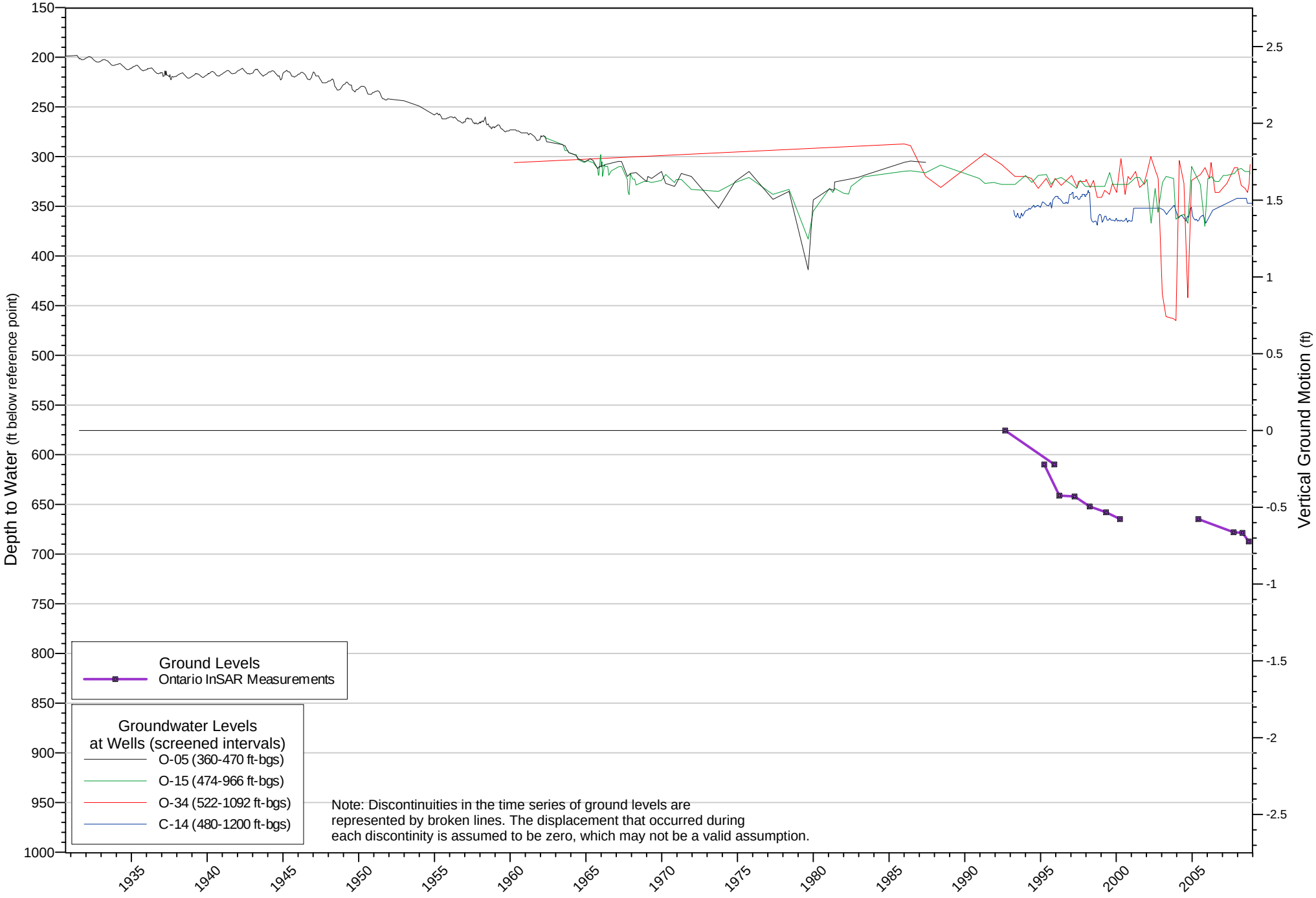


Figure 5-12
Groundwater Levels versus Ground Levels in the Southeast Area - 1993 to 2009

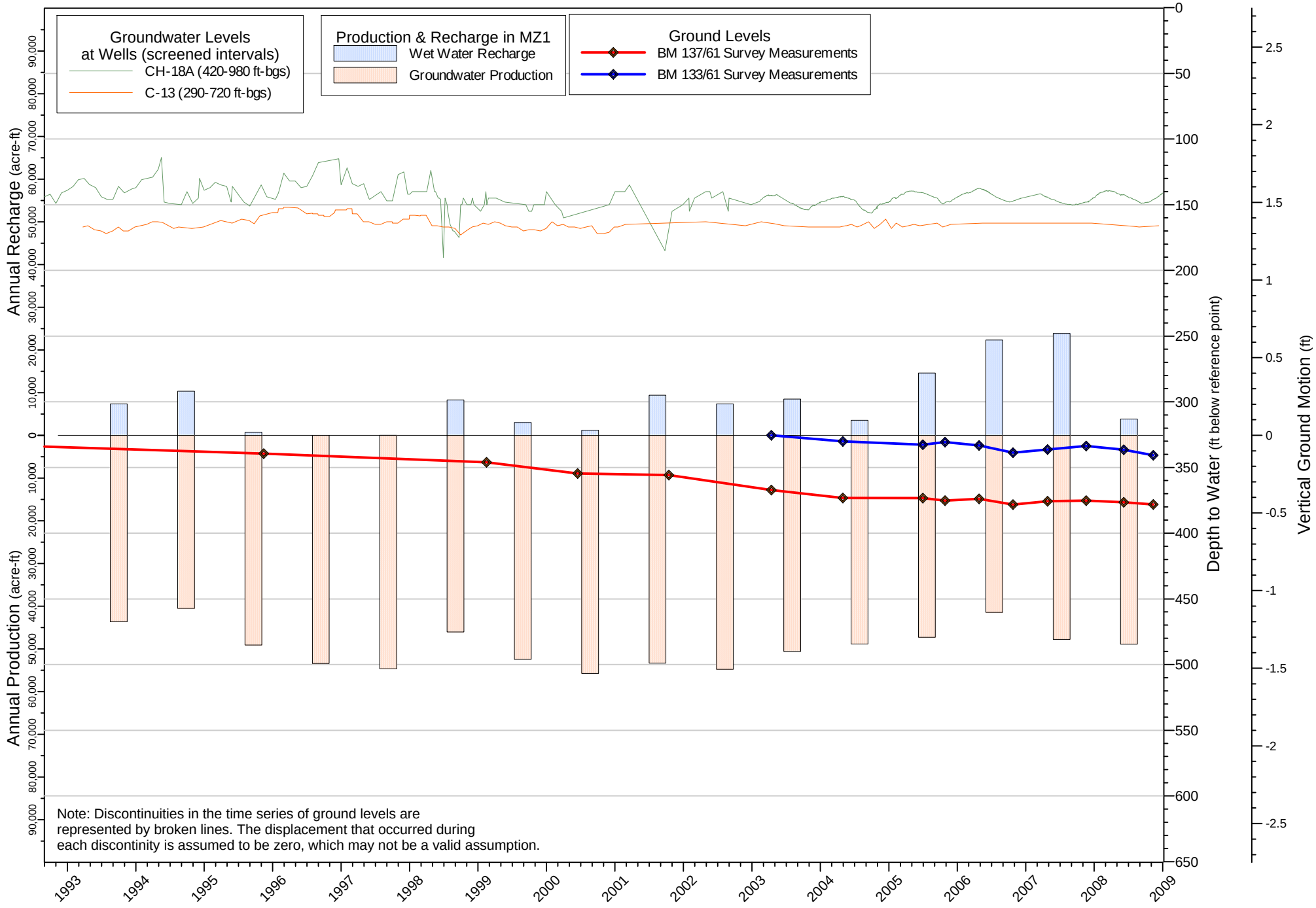
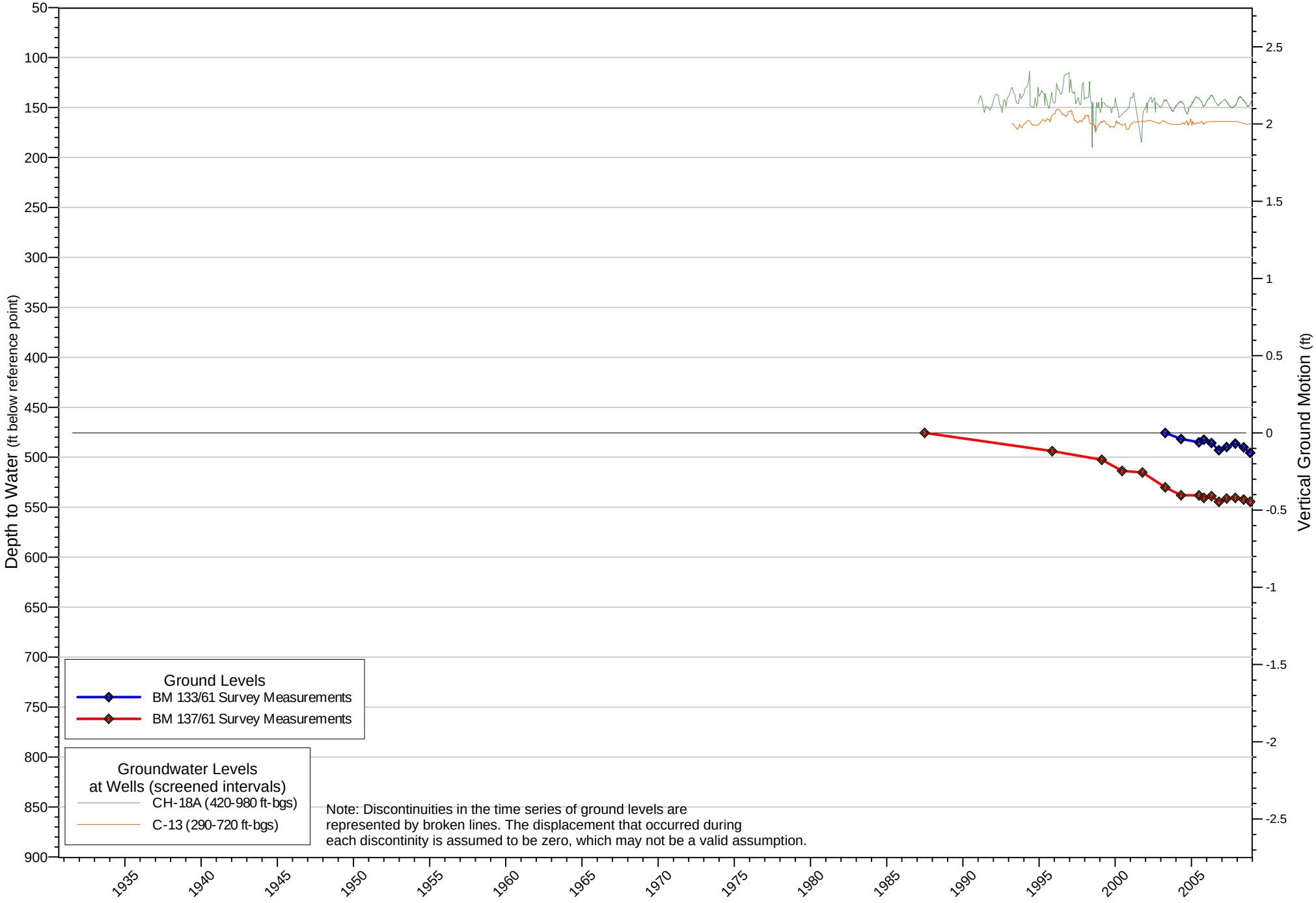


Figure 5-13
Groundwater Levels versus Ground Levels in the Southeast Area - 1930 to 2009



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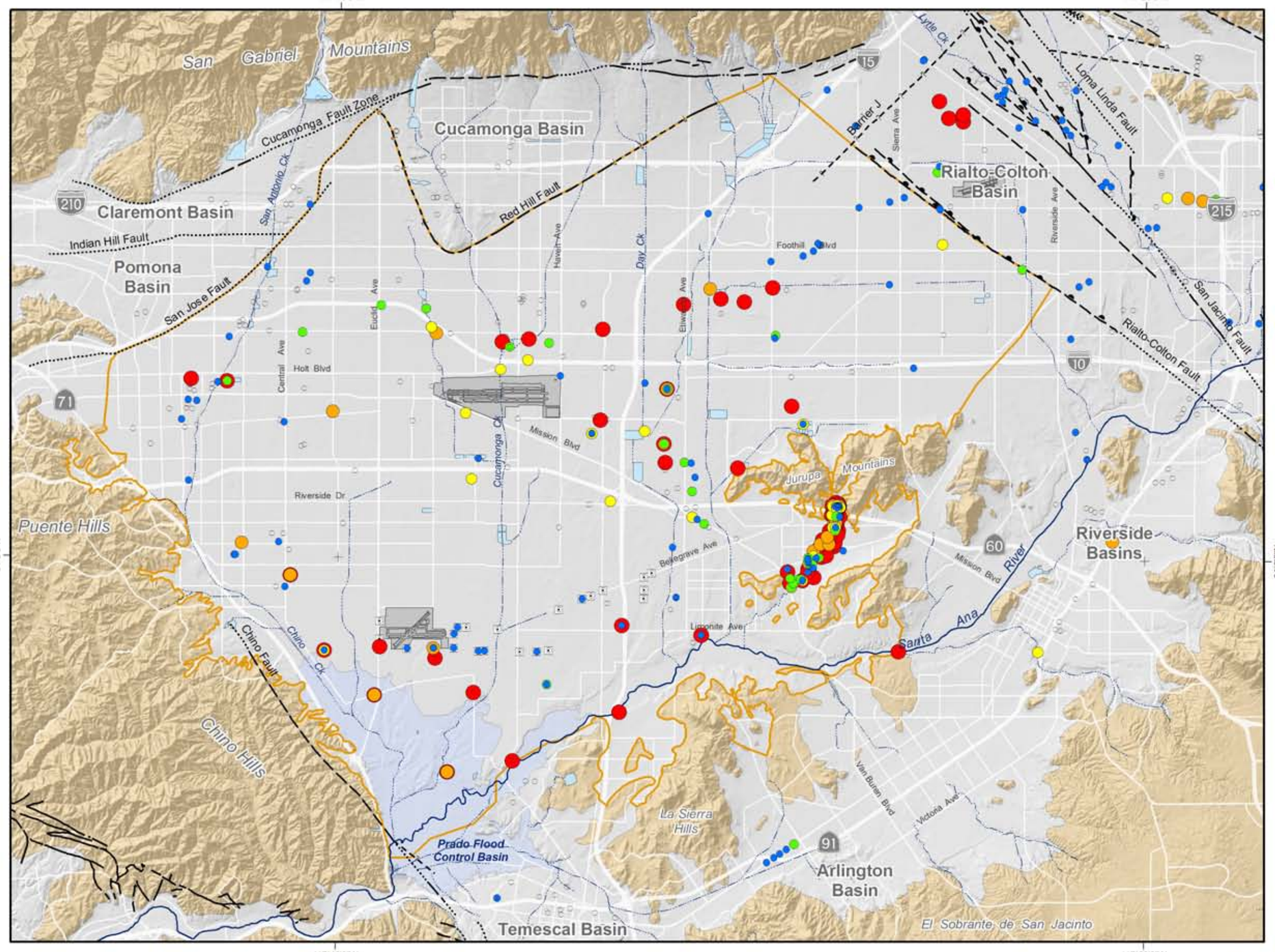
Appendix A

Groundwater Level Map

Appendix B

Groundwater Quality Maps



Main Features

Aluminum (mg/L)

- ND
- < 0.10
- 0.10 - 0.20
- 0.20 - 0.40
- 0.40 - 0.80
- > 0.80

Secondary EPA MCL = 2 mg/L
Primary CA MCL = 1 mg/L
Secondary CA MCL = 0.2 mg/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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File: Appendix_B_Aluminum.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 KM

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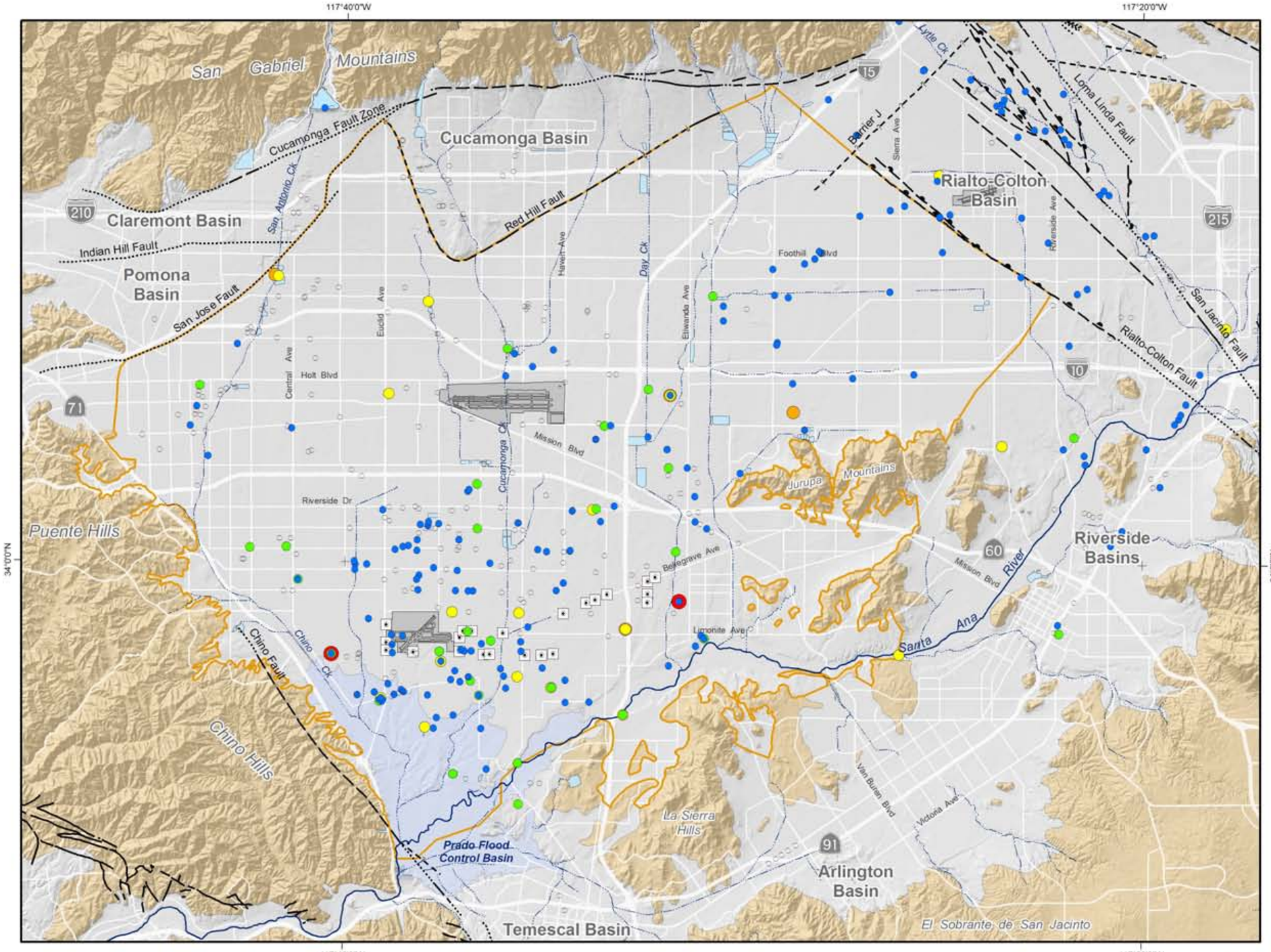
Appendix B

Aluminum in Groundwater

Maximum Concentration (July 2003 - June 2008)

Appendix B



Main Features

Color (Color Units)

- ND
- < 7.5
- 7.5 - 15
- 15 - 30
- 30 - 60
- > 60

Secondary EPA MCL = 15 Color Units
Secondary CA MCL = 15 Color Units

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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File: Appendix_B_Color.mxd

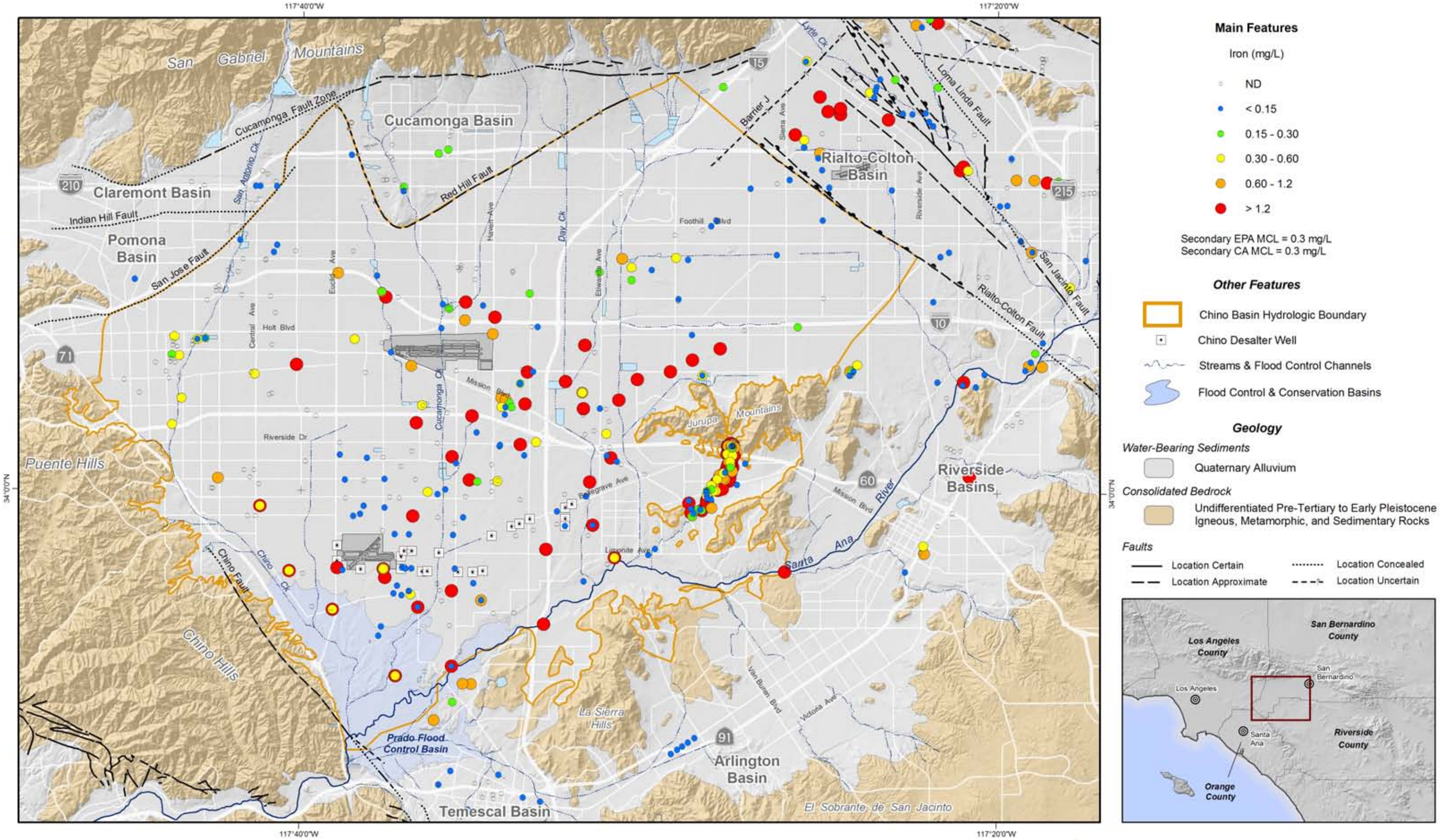
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Appendix B

Color in Groundwater

Maximum Concentration (July 2003 - June 2008)

Appendix B



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Author: VME
Date: 20090420
File: Appendix_B_Iron.mxd

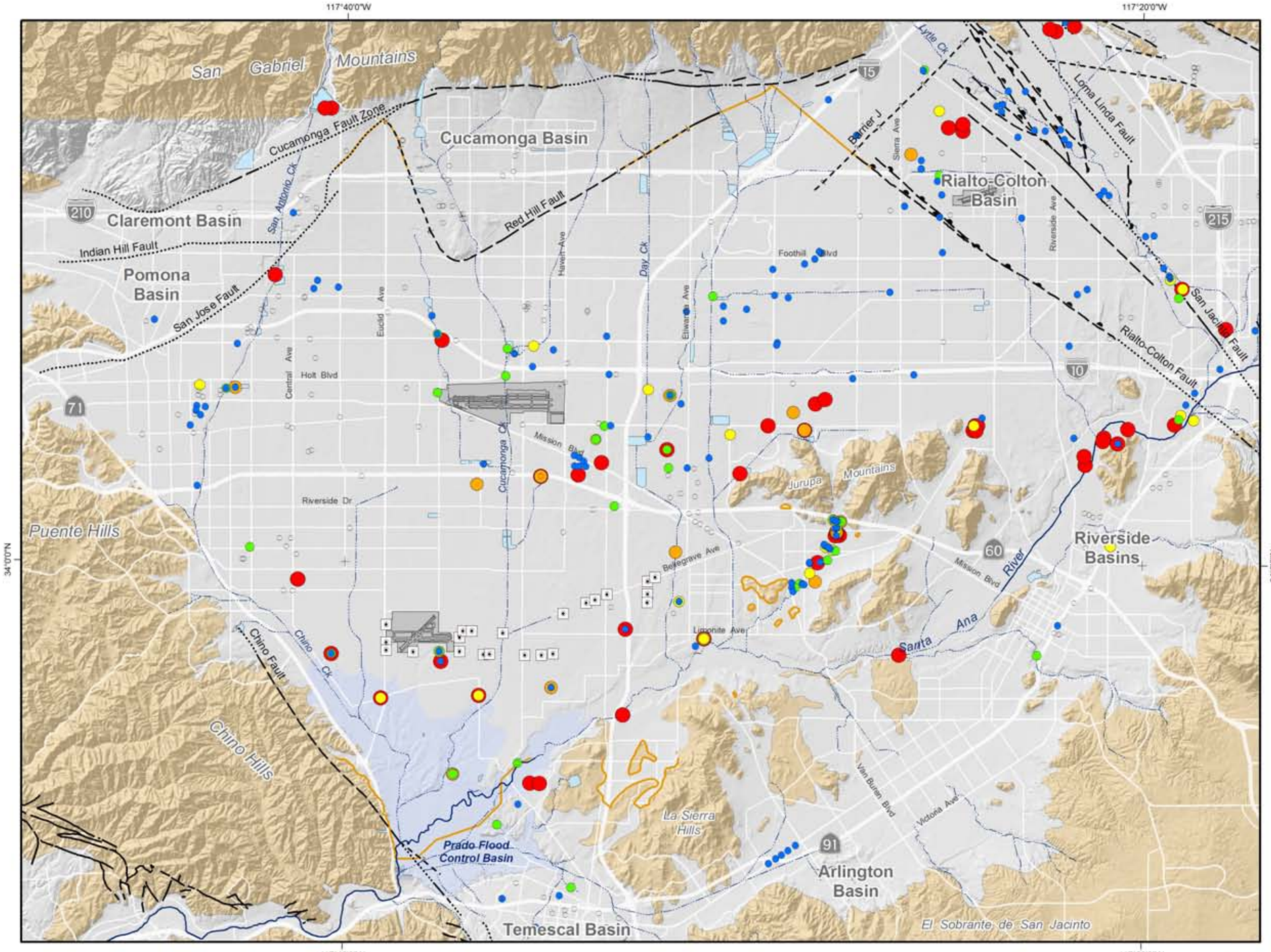
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Appendix B

Iron in Groundwater

Maximum Concentration (July 2003 - June 2008)

Appendix B



Main Features

Manganese (mg/L)

- ND
- < 0.025
- 0.025 - 0.050
- 0.050 - 0.10
- 0.10 - 0.20
- > 0.20

Secondary EPA MCL = 0.05 mg/L
Secondary CA MCL = 0.05 mg/L

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

Produced by:
WILDERMUTH ENVIRONMENTAL INC
23692 Birtcher Drive
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Author: VME
Date: 20090420
File: Appendix_B_Manganese.mxd

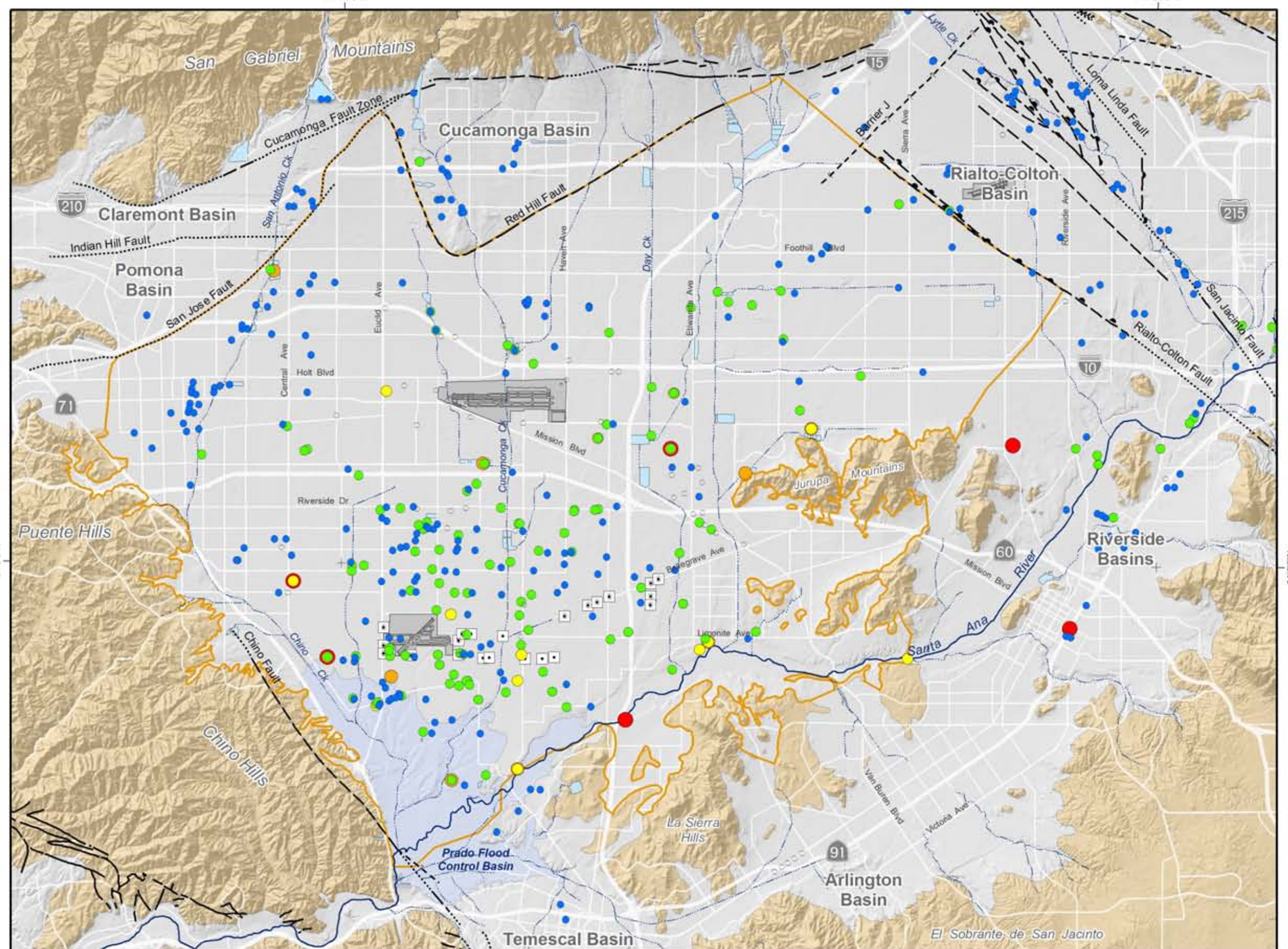
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Appendix B

Manganese in Groundwater

Maximum Concentration (July 2003 - June 2008)

Appendix B



Main Features

Odor (TON)

- ND
- < 1.5
- 1.5 - 3
- 3 - 6
- 6 - 12
- > 12

Secondary EPA MCL = 3 TON
Secondary CA MCL = 3 TON

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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Author: VME
Date: 20090420
File: Appendix_B_Odor.mxd

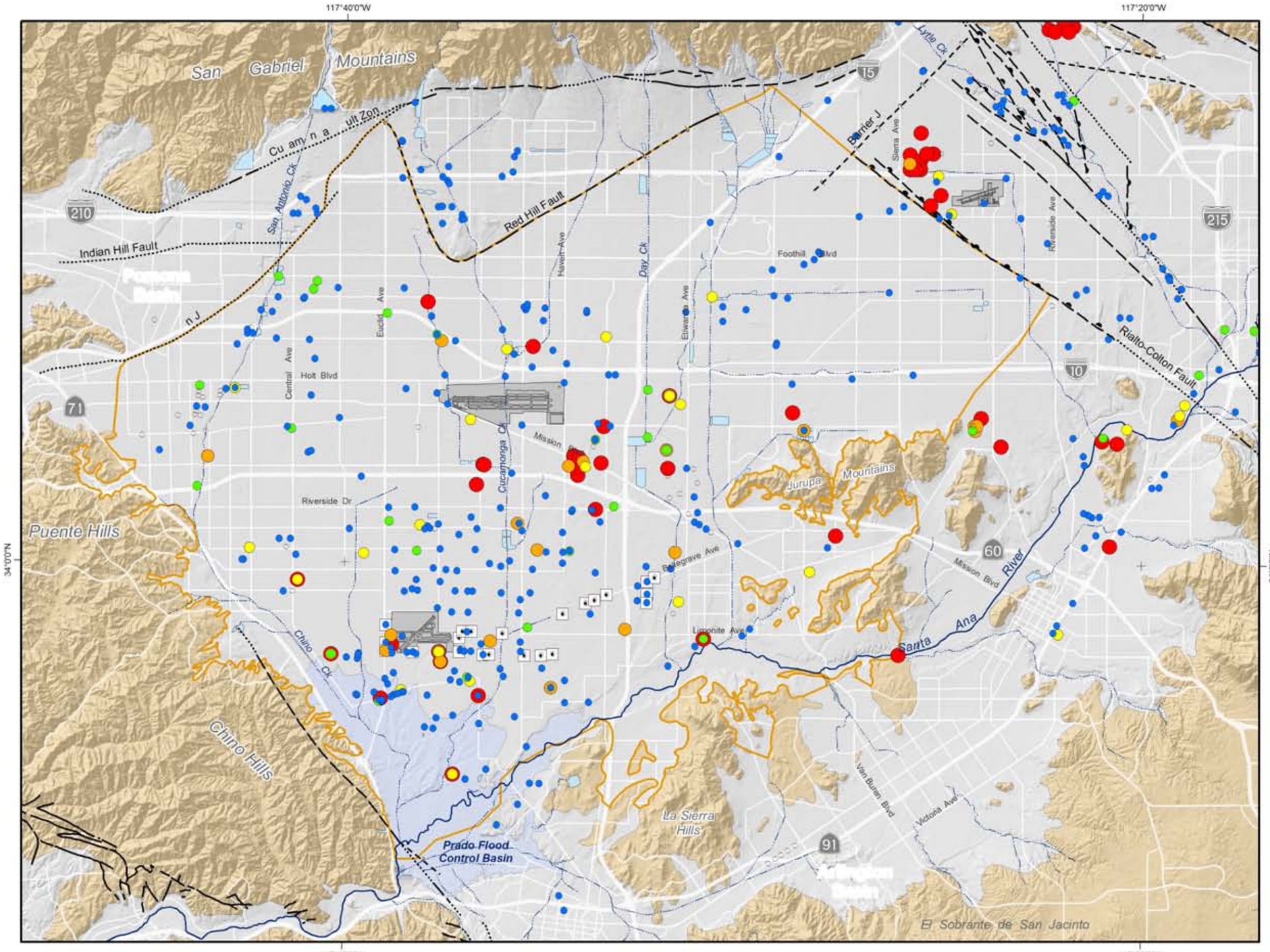
0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Appendix B

Odor in Groundwater

Maximum Concentration (July 2003 - June 2008)

Appendix B



Main Features

Turbidity (NTU)

- ND
- < 2.5
- 2.5 - 5
- 5 - 10
- 10 - 20
- > 20

Secondary EPA MCL = 5 NTU
Secondary CA MCL = 5 NTU

Other Features

- Chino Basin Hydrologic Boundary
- Chino Desalter Well
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

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

Faults

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

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Author: VME
Date: 20090420
File: Appendix_B_Turbidity.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 KM

2008 State of the Basin Report
Appendix B

Turbidity in Groundwater

Maximum Concentration (July 2003 - June 2008)

Appendix B

Appendix C

Groundwater Quality Exceedance Report

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical	Unit	Primary EPA MCL	Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
1,1,1-Trichloroethane	**ug/L**	**200**	**n/a**	**200**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.46	0.7	1.02	1.36	4.46	1.446	2641	499	5	0

1,1,2,2-Tetrachloroethane	**ug/L**	**n/a**	**n/a**	**1**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						2313	477	0	0

1,1,2-Trichloro-1,2,2-trifluoroethane	**ug/L**	**n/a**	**n/a**	**1200**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.5	0.63	1.1	6.5	185	32.488	1694	396	6	0

1,1,2-Trichloroethane	**ug/L**	**5**	**n/a**	**5**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.11	0.45	0.81	2.3	3.8	1.293	2625	499	5	0

1,1-Dichloroethane	**ug/L**	**n/a**	**n/a**	**5**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.1	0.56	1.3	3.4	6013	23.667	2730	509	39	11

1,1-Dichloroethene	**ug/L**	**7**	**n/a**	**6**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.19	1.94	5.4	11.8	190	13.667	2709	507	56	31

1,2,3-Trichloropropane	**ug/L**	**n/a**	**n/a**	**n/a**	**n/a**	**0.005**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0.012	0.13	0.94	3.1	0.491	1192	375	25	23

1,2,4-Trichlorobenzene	**ug/L**	**70**	**n/a**	**5**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.5	0.5	0.5		0.5	0.5	1008	285	1	0

1,2,4-Trimethylbenzene	**ug/L**	**n/a**	**n/a**	**n/a**	**n/a**	**330**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						2062	440	0	0

1,2-Dibromo-3-chloropropane	**ug/L**	**0.2**	**n/a**	**0.2**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.01	0.11	0.16	0.24	0.639	0.185	880	301	16	4

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical	Unit	Primary EPA MCL	Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
1,2-Dichlorobenzene	**ug/L**	**600**	**n/a**	**600**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						1200	292	0	0

1,2-Dichloroethane	**ug/L**	**5**	**n/a**	**0.5**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.1	0.34	0.45	0.6	3.1	0.611	2714	508	27	17

1,2-Dichloropropane	**ug/L**	**5**	**n/a**	**5**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.12	0.36	0.5	1.1	3.6	0.933	2607	502	25	0

1,3,5-Trimethylbenzene	**ug/L**	**n/a**	**n/a**	**n/a**	**n/a**	**330**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						1538	373	0	0

1,3-Dichloropropene	**ug/L**	**n/a**	**n/a**	**0.5**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
94	94	94		96.5	95.25	790	238	2	2

1,4-Dichlorobenzene	**ug/L**	**75**	**n/a**	**5**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.13	0.15	0.17	0.21	0.57	0.215	1271	295	1	0

1,4-Dioxane	**ug/L**	**n/a**	**n/a**	**n/a**	**n/a**	**3**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.1	0.29	0.5	0.99	46	1.289	577	63	10	3

2,3,7,8-Tetrachlorodibenzo-p-dioxin	**ug/L**	**3E-05**	**n/a**	**3E-05**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0	0		0	0	192	98	1	0

2,4-Dichlorophenoxyacetic acid	**ug/L**	**70**	**n/a**	**70**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						227	118	0	0

2-Chlorotoluene	**ug/L**	**n/a**	**n/a**	**n/a**	**n/a**	**140**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						1531	364	0	0

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical			Unit	Primary EPA MCL		Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
4-Chlorotoluene			**ug/L**	**n/a**		**n/a**	**n/a**	**n/a**	**140**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						1532	365	0	0
Alachlor			**ug/L**	**2**		**n/a**	**2**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						262	129	0	0
Aluminum			**mg/L**	**n/a**		**2**	**1**	**0.2**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.005	0.058	0.2	1.1	240	3.145	1437	355	250	153
Antimony			**ug/L**	**6**		**n/a**	**6**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.159	0.6	0.8	1.1	8.3	1.066	1341	350	46	1
Arsenic			**mg/L**	**0.01**		**n/a**	**0.05**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0.002	0.003	0.005	0.14	0.005	1565	381	247	24
Asbestos			**MFL**	**7**		**n/a**	**7**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.26	0.26	0.26		0.26	0.26	153	100	1	0
Atrazine			**ug/L**	**3**		**n/a**	**1**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.06	0.06	0.08	0.1	1.04	0.32	303	142	3	1
Barium			**mg/L**	**2**		**n/a**	**1**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0.042	0.07	0.13	160	0.629	1396	354	291	10
Bentazon			**ug/L**	**n/a**		**n/a**	**18**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						221	112	0	0
Benzene			**ug/L**	**5**		**n/a**	**1**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.11	0.14	0.16	0.52	1.5	0.4	2674	508	6	1

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical	Unit	Primary EPA MCL	Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
Benzo(a)pyrene	**ug/L**	**0.2**	**n/a**	**0.2**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.02	0.02	0.02		0.02	0.02	265	131	1	0

Beryllium	**mg/L**	**0.004**	**n/a**	**0.004**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0	0	0.001	0.008	0.001	1346	350	52	2

Boron	**mg/L**	**n/a**	**n/a**	**n/a**	**n/a**	**1**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
-0.004	0.1	0.161	0.3	2.5	0.228	1260	299	105	3

Bromate	**mg/L**	**0.01**	**n/a**	**0.01**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						2	1	0	0

Cadmium	**mg/L**	**0.005**	**n/a**	**0.005**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0	0	0	0.009	0	1355	351	140	1

Carbofuran	**ug/L**	**40**	**n/a**	**18**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						210	116	0	0

Carbon Disulfide	**ug/L**	**n/a**	**n/a**	**n/a**	**n/a**	**160**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.28	0.3	0.54	6.6	15.7	3.862	1102	272	8	0

Carbon Tetrachloride	**ug/L**	**5**	**n/a**	**0.5**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.16	0.16	0.9	1.2	1.2	0.753	2323	477	3	2

Chlorate	**mg/L**	**n/a**	**n/a**	**n/a**	**n/a**	**0.8**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.021	0.021	0.061	0.063	0.063	0.048	3	2	2	0

Chlordane	**ug/L**	**2**	**n/a**	**0.1**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						227	118	0	0

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical			Unit	Primary EPA MCL		Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
Chloride			**mg/L**	**n/a**		**250**	**n/a**	**250**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
2.3	12	30	95	2700	68.323	2361	428	428	25
Chlorine			**mg/L**	**4**		**n/a**	**4**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
4.1	50	73	130	486	97.758	110	96	95	95
Chlorine Dioxide			**mg/L**	**0.8**		**n/a**	**0.8**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						1	1	0	0
Chlorite			**mg/L**	**1**		**n/a**	**1**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						4	3	0	0
Chlorobenzene			**ug/L**	**100**		**n/a**	**70**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.28	0.6	0.79	1.4	1.7	0.962	2337	478	4	0
Chromium			**ug/L**	**100**		**n/a**	**50**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	3.5	6.5	13	1500	23.765	1762	372	329	30
Cis-1,2-Dichloroethene			**ug/L**	**70**		**n/a**	**6**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.1	0.7	2.4	6.3	71	6.832	2690	509	43	10
Color			**Assessment**	**n/a**		**15**	**n/a**	**15**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
1	3	5	5	100	6.707	1483	377	182	21
Copper			**mg/L**	**1.3**		**1**	**1.3**	**1**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0.001	0.002	0.004	150	0.504	1768	370	277	8
Cyanide			**ug/L**	**200**		**n/a**	**150**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
8.46	8.46	8.46		8.46	8.46	450	173	1	0

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical			Unit	Primary EPA MCL		Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
Dalapon			**ug/L**	**200**		**n/a**	**200**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						227	118	0	0
Di(2-ethylhexyl)adipate			**ug/L**	**400**		**n/a**	**400**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						260	128	0	0
Di(2-ethylhexyl)phthalate			**ug/L**	**6**		**n/a**	**4**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.77	1.3	3.3	8.3	440	36.405	261	124	9	4
Dichlorodifluoromethane			**ug/L**	**n/a**		**n/a**	**n/a**	**n/a**	**1000**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.17	0.5	0.8	2.5	29	3.07	2323	476	17	0
Dichloromethane			**ug/L**	**5**		**n/a**	**5**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.15	0.17	0.25	0.9	3	0.589	2468	482	53	0
Dinoseb			**ug/L**	**7**		**n/a**	**7**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						227	118	0	0
Diquat			**ug/L**	**20**		**n/a**	**20**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						198	108	0	0
Endothall			**ug/L**	**100**		**n/a**	**100**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						215	109	0	0
Endrin			**ug/L**	**2**		**n/a**	**2**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						231	122	0	0
Ethylbenzene			**ug/L**	**700**		**n/a**	**300**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.5	0.6	0.8	1.3	1.7	1.025	2380	481	8	0

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical	Unit	Primary EPA MCL	Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
Ethylene Dibromide	**ug/L**	**0.05**	**n/a**	**0.05**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.02	0.02	0.02	0.02	0.02	0.02	1227	360	1	0

Fluoride	**mg/L**	**4**	**2**	**2**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.05	0.2	0.3	0.7	7.6	0.538	1553	271	265	4

Foaming Agents	**mg/L**	**n/a**	**0.5**	**n/a**	**0.5**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.005	0.06	0.08	0.14	18	0.237	1140	226	76	2

Glyphosate	**ug/L**	**700**	**n/a**	**700**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						196	109	0	0

Gross Alpha	**pci/L**	**15**	**n/a**	**15**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	1.6	2.91	4.94	42	4.283	440	127	93	7

Haloacetic Acids 5 (HAA5)	**ug/L**	**60**	**n/a**	**60**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
1.5	8.9	11.8	13.6	90	14.747	24	7	4	1

Heptachlor	**ug/L**	**0.4**	**n/a**	**0.01**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						232	122	0	0

Heptachlor Epoxide	**ug/L**	**0.2**	**n/a**	**0.01**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						231	122	0	0

Hexachlorobenzene	**ug/L**	**1**	**n/a**	**1**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						271	137	0	0

Hexachlorocyclopentadiene	**ug/L**	**50**	**n/a**	**50**	**n/a**	**n/a**

Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						265	131	0	0

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical			Unit	Primary EPA MCL		Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
Iron			**mg/L**	**n/a**		**0.3**	**n/a**	**0.3**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.001	0.063	0.231	1.19	1714	7.298	2174	451	299	185
Isopropylbenzene			**ug/L**	**n/a**		**n/a**	**n/a**	**n/a**	**770**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						2015	438	0	0
Lead			**mg/L**	**0.015**		**n/a**	**0.015**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0	0.001	0.002	0.087	0.002	1365	353	189	7
Lindane			**ug/L**	**0.2**		**n/a**	**0.2**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						231	122	0	0
Manganese			**mg/L**	**n/a**		**0.05**	**n/a**	**0.05**	**0.5**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0.006	0.022	0.065	140	0.499	1752	281	167	58
Mercury			**mg/L**	**0.002**		**n/a**	**0.002**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0	0	0	0.002	0	1067	327	55	0
Methoxychlor			**ug/L**	**40**		**n/a**	**30**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						227	120	0	0
Methyl Isobutyl Ketone			**ug/L**	**n/a**		**n/a**	**n/a**	**n/a**	**120**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
5.3	5.3	5.3		5.3	5.3	2233	440	1	0
Methyl Tert-Butyl Ether			**ug/L**	**n/a**		**n/a**	**13**	**5**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.3	11	41	93	5800	136.23	2364	488	11	3
Molinate			**ug/L**	**n/a**		**n/a**	**20**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						298	133	0	0

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical			Unit	Primary EPA MCL		Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
n-Butylbenzene			**ug/L**	**n/a**		**n/a**	**n/a**	**n/a**	**260**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						1531	364	0	0
N-Nitrosodimethylamine			**ug/L**	**n/a**		**n/a**	**n/a**	**n/a**	**0.01**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.006	0.006	0.006		0.006	0.006	68	34	1	0
N-Nitrosodipropylamine			**ug/L**	**n/a**		**n/a**	**n/a**	**n/a**	**0.01**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						3	1	0	0
n-Propylbenzene			**ug/L**	**n/a**		**n/a**	**n/a**	**n/a**	**260**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						1532	365	0	0
Naphthalene			**ug/L**	**n/a**		**n/a**	**n/a**	**n/a**	**17**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.6	0.6	0.6	0.7	0.7	0.633	987	259	3	0
Nickel			**mg/L**	**n/a**		**n/a**	**0.1**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0.002	0.003	0.007	0.66	0.013	1340	349	253	7
Nitrate-Nitrogen			**mg/L**	**10**		**n/a**	**10**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.009	3.388	7.677	15.806	200	12.759	8891	594	588	395
Nitrite-Nitrogen			**mg/L**	**1**		**n/a**	**1**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0.05	0.1	0.15	35	1.759	1827	402	124	6
Odor			**TON**	**n/a**		**3**	**n/a**	**3**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
1	1	1	2	40	1.69	1371	366	315	28
Oxamyl			**ug/L**	**200**		**n/a**	**50**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						210	116	0	0

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical	Unit	Primary EPA MCL	Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
Pentachlorophenol	**ug/L**	**1**	**n/a**	**1**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*
						234
# of Wells Sampled	*# of Wells with Detects*	*# of Wells with Exceedances*				
123	0	0				
Perchlorate	**ug/L**	**n/a**	**n/a**	**6**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*
0.81	6	11	20	870	21.406	2260
# of Wells Sampled	*# of Wells with Detects*	*# of Wells with Exceedances*				
513	252	188				
pH	**pH**	**n/a**	**8.5**	**n/a**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*
0	7.3	7.64	7.9	770	7.921	2319
# of Wells Sampled	*# of Wells with Detects*	*# of Wells with Exceedances*				
394	394	14				
Picloram	**ug/L**	**500**	**n/a**	**500**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*
						227
# of Wells Sampled	*# of Wells with Detects*	*# of Wells with Exceedances*				
118	0	0				
Polychlorinated Biphenyls	**ug/L**	**0.5**	**n/a**	**0.5**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*
						225
# of Wells Sampled	*# of Wells with Detects*	*# of Wells with Exceedances*				
117	0	0				
Propachlor	**ug/L**	**n/a**	**n/a**	**n/a**	**n/a**	**90**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*
						183
# of Wells Sampled	*# of Wells with Detects*	*# of Wells with Exceedances*				
85	0	0				
Ra 226 + Ra 228	**pci/L**	**5**	**n/a**	**5**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*
0.16	0.5	0.5	0.57	0.8	0.513	20
# of Wells Sampled	*# of Wells with Detects*	*# of Wells with Exceedances*				
15	6	0				
Sec-Butylbenzene	**ug/L**	**n/a**	**n/a**	**n/a**	**n/a**	**260**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*
						1518
# of Wells Sampled	*# of Wells with Detects*	*# of Wells with Exceedances*				
364	0	0				
Selenium	**mg/L**	**0.05**	**n/a**	**0.05**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*
0	0.002	0.004	0.006	0.045	0.005	1333
# of Wells Sampled	*# of Wells with Detects*	*# of Wells with Exceedances*				
350	196	0				
Silver	**mg/L**	**n/a**	**0.1**	**n/a**	**0.1**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*
0	0	0	0	0.014	0	1369
# of Wells Sampled	*# of Wells with Detects*	*# of Wells with Exceedances*				
350	80	0				

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical			Unit	Primary EPA MCL		Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
Silvex			**ug/L**	**50**		**n/a**	**50**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						227	118	0	0
Simazine			**ug/L**	**4**		**n/a**	**4**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.05	0.05	0.2	0.4	0.92	0.274	311	148	6	0
Specific Conductance (lab)			**umhos/cm**	**n/a**		**n/a**	**n/a**	**900**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
60	375	540	1100	1600000	3016.663	2124	335	335	121
Strontium-90			**pci/L**	**n/a**		**n/a**	**8**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
-0.35	0	0.103	0.3	1.2	0.217	63	19	18	0
Styrene			**ug/L**	**100**		**n/a**	**100**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						2291	478	0	0
Sulfate			**mg/L**	**n/a**		**250**	**n/a**	**250**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
2.4	17	50	120	1200	82.22	2913	527	527	41
TDS			**mg/L**	**n/a**		**500**	**n/a**	**500**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
48	260	380	760	4790	553.745	3945	425	425	221
Tert-Butyl Alcohol			**ug/L**	**n/a**		**n/a**	**n/a**	**n/a**	**12**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
2	2.1	9.7	22	150	37.16	968	232	3	1
Tert-Butylbenzene			**ug/L**	**n/a**		**n/a**	**n/a**	**n/a**	**260**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						1530	365	0	0
Tetrachloroethene			**ug/L**	**5**		**n/a**	**5**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.14	1	1.8	5.7	182	7.975	3357	568	114	37

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical			Unit	Primary EPA MCL		Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
Thallium			**ug/L**	**2**		**n/a**	**2**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
-2.406	0.14	0.19	0.38	30.72	1.933	1260	349	41	6
Thiobencarb			**ug/L**	**n/a**		**n/a**	**70**	**1**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						407	159	0	0
Toluene			**ug/L**	**1000**		**n/a**	**150**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.11	0.5	0.71	2	9.8	1.694	2591	490	31	0
Total Xylene			**ug/L**	**10000**		**n/a**	**1750**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						1543	392	0	0
Toxaphene			**ug/L**	**3**		**n/a**	**3**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						227	118	0	0
Trans-1,2-Dichloroethene			**ug/L**	**100**		**n/a**	**10**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.2	0.28	0.72	1.7	7.73	1.313	2703	509	12	0
Trichloroethene			**ug/L**	**5**		**n/a**	**5**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.13	1.8	3.8	18	5620	64.883	3412	569	241	115
Trichlorofluoromethane			**ug/L**	**n/a**		**n/a**	**150**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.07	0.3	0.42	0.62	19	1.663	2042	420	18	0
Trihalomethanes			**ug/L**	**80**		**n/a**	**80**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.5	1.6	4.8	64.5	87.3	28.432	618	215	23	2
Tritium			**pci/L**	**n/a**		**n/a**	**20000**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
-199	-12.6	25.7	287	596	118.69	65	18	18	0

Water Quality Exceedance Report

Sampling Period: 7/1/2003 **to** 6/30/2008

Chemical			Unit	Primary EPA MCL		Secondary EPA MCL	Primary CA MCL	Secondary CA MCL	CA NL
Turbidity			**NTU**	**5**		**n/a**	**n/a**	**5**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0	0.21	0.52	2.6	2880	21.599	1699	360	320	78
Uranium			**pci/L**	**n/a**		**n/a**	**20**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.48	1.58	2.77	5.48	20.5	4.319	175	54	53	1
Vanadium			**mg/L**	**n/a**		**n/a**	**n/a**	**n/a**	**0.05**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.001	0.009	0.013	0.025	0.31	0.02	817	290	286	25
Vinyl Chloride			**ug/L**	**2**		**n/a**	**0.5**	**n/a**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
						2389	483	0	0
Zinc			**mg/L**	**n/a**		**5**	**n/a**	**5**	**n/a**
Min	*1st Quartile*	*Median*	*3rd Quartile*	*Maximum*	*Average*	*# of Samples*	*# of Wells Sampled*	*# of Wells with Detects*	*# of Wells with Exceedances*
0.001	0.003	0.006	0.014	9.853	0.061	1804	369	264	1

Primary EPA MCL — **Primary EPA MCLs are federally enforceable limits for chemicals in drinking water and are set as close as feasible to the corresponding EPA MCLG.**

Secondary EPA — **Secondary EPA MCLs apply to chemicals in drinking water that adversely affect its odor, taste, or appearance Secondary EPA MCLs are not based on direct health effects associated with the chemical. Secondary MCLs are consdered desireable goals and are not federally enforceable**
.

Primary CA MCL — **Primary CA MCLs are analogous to Primary EPA MCLs and are enforceable at the state level . If the California DHS has adopted a more stringent primary MCL than the EPA MCL, the primary CA MCL sould be enforceable.**

Secondary CA — **Secondary CA MCLs are analogous to Secondary EPA MCLs and are applicable at the state level. If the California DHS has adopted a more stringent secondary MCL than the EPA MCL, the secondary CA MCL would be applied.**

CA NL — **California Notification Levels are health -based criteria similar to US EPA Health Advisories. CA NLs are not enforceable, but are levels at which the California Department of Health Services strongly urges water purveyors to take corrective actions.**

Appendix D

Compact Disk

Appendix D

1978 Chino Basin Judgment

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FILED
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FILED - West District
San Bernardino County Clerk
OCT 25 1989

SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF SAN BERNARDINO

MICROFILMED

CHINO BASIN MUNICIPAL WATER DISTRICT, Plaintiff, v. CITY OF CHINO, et al. Defendants.	No. 164327

JUDGMENT

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SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF SAN BERNARDINO

CHINO BASIN MUNICIPAL WATER DISTRICT, Plaintiff, v. CITY OF CHINO, et al. Defendants.	No. 164327 JUDGMENT

I. INTRODUCTION

1. Pleadings, Parties and Jurisdiction. The complaint herein was filed on January 2, 1975, seeking an adjudication of water rights, injunctive relief and the imposition of a physical solution. A first amended complaint was filed on July 16, 1976. The defaults of certain defendants have been entered, and certain other defendants dismissed. Other than defendants who have been dismissed or whose defaults have been entered, all defendants have appeared herein. By answers and order of this Court, the issues have been made those of a full inter se adjudication between the

parties. This Court has jurisdiction of the subject matter of this action and of the parties herein.

2. Stipulation For Judgment. Stipulation for entry of judgment has been filed by and on behalf of a majority of the parties, representing a majority of the quantitative rights herein adjudicated.

3. Trial; Findings and Conclusions. Trial was commenced on December 16, 1977, as to the non-stipulating parties, and findings of fact and conclusions of law have been entered disposing of the issues in the case.

4. Definitions. As used in this Judgment, the following terms shall have the meanings herein set forth:

(a) Active Parties. All parties other than those who have filed with Watermaster a written waiver of service of notices, pursuant to Paragraph 58.

(b) Annual or Year -- A fiscal year, July 1 through June 30, following, unless the context shall clearly indicate a contrary meaning.

(c) Appropriative Right -- The annual production right of a producer from the Chino Basin other than pursuant to an overlying right.

(d) Basin Water -- Ground water within Chino Basin which is part of the Safe Yield, Operating Safe Yield, or replenishment water in the Basin as a result of operations under the Physical Solution decreed herein. Said term does not include Stored Water.

(e) CBMWD -- Plaintiff Chino Basin Municipal Water District.

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(f) Chino Basin or Basin -- The ground water basin underlying the area shown as such on Exhibit "B" and within the boundaries described in Exhibit "K".

(g) Chino Basin Watershed -- The surface drainage area tributary to and overlying Chino Basin.

(h) Ground Water -- Water beneath the surface of the ground and within the zone of saturation, i.e., below the existing water table.

(i) Ground Water Basin -- An area underlain by one or more permeable formations capable of furnishing substantial water storage.

(j) Minimal Producer -- Any producer whose production does not exceed five acre-feet per year.

(k) MWD -- The Metropolitan Water District of Southern California.

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

(m) Overdraft -- A condition wherein the total annual production from the Basin exceeds the Safe Yield thereof.

(n) Overlying Right -- The appurtenant right of an owner of lands overlying Chino Basin to produce water from the Basin for overlying beneficial use on such lands.

(o) Person. Any individual, partnership, association, corporation, governmental entity or agency, or other organization.

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(p) PVMWD -- Defendant Pomona Valley Municipal Water District.

(q) Produce or Produced -- To pump or extract ground water from Chino Basin.

(r) Producer -- Any person who produces water from Chino Basin.

(s) Production -- Annual quantity, stated in acre feet, of water produced.

(t) Public Hearing -- A hearing after notice to all parties and to any other person legally entitled to notice.

(u) Reclaimed Water -- Water which, as a result of processing of waste water, is suitable for a controlled use.

(v) Replenishment Water -- Supplemental water used to recharge the Basin pursuant to the Physical Solution, either directly by percolating 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.

(w) Responsible Party -- The owner, co-owner, lessee or other person designated by multiple parties interested in a well as the person responsible for purposes of filing reports hereunder.

(x) Safe Yield -- The long-term average annual quantity of ground water (excluding replenishment or stored water but including return flow to the Basin from use of replenishment or stored water) which can be produced from the Basin under cultural conditions of a particular year without causing an undesirable result.

(y) SBVMWD -- San Bernardino Valley Municipal Water

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District.

(z) State Water -- Supplemental Water imported through the State Water Resources Development System, pursuant to Chapter 8, Division 6, Part 6 of the Water Code.

(aa) Stored Water -- Supplemental water held in storage, as a result of direct spreading, in lieu delivery, or otherwise, for subsequent withdrawal and use pursuant to agreement with Watermaster.

(bb) Supplemental Water -- Includes both water imported to Chino Basin from outside Chino Basin Watershed, and reclaimed water.

(cc) WMWD -- Defendant Western Municipal Water District of Riverside County.

5. List of Exhibits. The following exhibits are attached to this Judgment and made a part hereof:

"A" -- "Location Map of Chino Basin" showing boundaries of Chino Basin Municipal Water District, and other geographic and political features.

"B" -- "Hydrologic Map of Chino Basin" showing hydrologic features of Chino Basin.

"C" -- Table Showing Parties in Overlying (Agricultural) Pool.

"D" -- Table Showing Parties in Overlying (Non-agricultural Pool and Their Rights.

"E" -- Table Showing Appropriators and Their Rights.

"F" -- Overlying (Agricultural) Pool Pooling Plan.

"G" -- Overlying (Non-agricultural) Pool Pooling Plan.

"H" -- Appropriative Pool Pooling Plan.

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"I" -- Engineering Appendix.

"J" -- Map of In Lieu Area No. 1.

"K" -- Legal Description of Chino Basin.

II. DECLARATION OF RIGHTS

A. HYDROLOGY

6. Safe Yield. The Safe Yield of Chino Basin is 140,000 acre feet per year.

7. Overdraft and Prescriptive Circumstances. In each year for a period in excess of five years prior to filing of the First Amended Complaint herein, the Safe Yield of the Basin has been exceeded by the annual production therefrom, and Chino Basin is and has been for more than five years in a continuous state of overdraft. The production constituting said overdraft has been open, notorious, continuous, adverse, hostile and under claim of right. The circumstances of said overdraft have given notice to all parties of the adverse nature of such aggregate over-production.

B. WATER RIGHTS IN SAFE YIELD

8. Overlying Rights. The parties listed in Exhibits "C" and "D" are the owners or in possession of lands which overlie Chino Basin. As such, said parties have exercised overlying water rights in Chino Basin. All overlying rights owned or exercised by parties listed in Exhibits "C" and "D" have, in the aggregate, been limited by prescription except to the extent such rights have been preserved by self-help by said parties. Aggregate preserved overlying rights in the Safe Yield for agricultural pool use, including the rights of the State of California, total 82,800 acre feet per year. Overlying rights for non-agricultural pool use

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total 7,366 acre feet per year and are individually decreed for each affected party in Exhibit "D". No portion of the Safe Yield of Chino Basin exists to satisfy unexercised overlying rights, and such rights have all been lost by prescription. However, uses may be made of Basin Water on overlying lands which have no preserved overlying rights pursuant to the Physical Solution herein. All overlying rights are appurtenant to the land and cannot be assigned or conveyed separate or apart therefrom.

9. Appropriative Rights. The parties listed in Exhibit "E" are the owners of appropriative rights, including rights by prescription, in the unadjusted amounts therein set forth, and by reason thereof are entitled under the Physical Solution to share in the remaining Safe Yield, after satisfaction of overlying rights and rights of the State of California, and in the Operating Safe Yield in Chino Basin, in the annual shares set forth in Exhibit "E".

(a) Loss of Priorities. By reason of the long continued overdraft in Chino Basin, and in light of the complexity of determining appropriative priorities and the need for conserving and making maximum beneficial use of the water resources of the State, each and all of the parties listed in Exhibit "E" are estopped and barred from asserting special priorities or preferences, inter se. All of said appropriative rights are accordingly deemed and considered of equal priority.

(b) Nature and Quantity. All rights listed in Exhibit "E" are appropriative and prescriptive in nature. By reason of the status of the parties, and the provisions of Section

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1007 of the Civil Code, said rights are immune from reduction or limitation by prescription.

10. Rights of the State of California. The State of California, by and through its Department of Corrections, Youth Authority and Department of Fish and Game, is a significant producer of ground water from and the State is the largest owner of land overlying Chino Basin. The precise nature and scope of the claims and rights of the State need not be, and are not, defined herein. The State, through said departments, has accepted the Physical Solution herein decreed, in the interests of implementing the mandate of Section 2 of Article X of the California Constitution. For all purposes of this Judgment, all future production by the State or its departments or agencies for overlying use on State-owned lands shall be considered as agricultural pool use.

C. RIGHTS TO AVAILABLE GROUND WATER STORAGE CAPACITY

11. Available Ground Water Storage Capacity. There exists in Chino Basin a substantial amount of available ground water storage capacity which is not utilized for storage or regulation of Basin Waters. Said reservoir capacity can appropriately be utilized for storage and conjunctive use of supplemental water with Basin Waters. It is essential that said reservoir capacity utilization for storage and conjunctive use of supplemental water be undertaken only under Watermaster control and regulation, in order to protect the integrity of both such Stored Water and Basin Water in storage and the Safe Yield of Chino Basin.

12. Utilization of Available Ground Water Capacity. Any person or public entity, whether a party to this action or not, may make reasonable beneficial use of the available ground water

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storage capacity of Chino Basin for storage of supplemental water; provided that no such use shall be made except pursuant to written agreement with Watermaster, as authorized by Paragraph 28. In the allocation of such storage capacity, the needs and requirements of lands overlying Chino Basin and the owners of rights in the Safe Yield or Operating Safe Yield of the Basin shall have priority and preference over storage for export.

III. INJUNCTION

13. Injunction Against Unauthorized Production of Basin Water. Each party in each of the respective pools is enjoined, as follows:

(a) Overlying (Agricultural) Pool. Each party in the Overlying (Agricultural) Pool, its officers, agents, employees, successors and assigns, is and they each are ENJOINED AND RESTRAINED from producing ground water from Chino Basin in any year hereafter in excess of such party's correlative share of the aggregate of 82,800 acre feet allocated to said Pool, except pursuant to the Physical Solution or a storage water agreement.

(b) Overlying (Non-Agricultural) Pool. Each party in the Overlying (Non-agricultural) Pool, its officers, agents, employees, successors and assigns, is and they each are ENJOINED AND RESTRAINED from producing ground water of Chino Basin in any year hereafter in excess of such party's decreed rights in the Safe Yield, except pursuant to the provisions of the Physical Solution or a storage water agreement.

(c) Appropriative Pool. Each party in the

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Appropriative Pool, its officers, agents, employees, successors and assigns, is and they are each ENJOINED AND RESTRAINED from producing ground water of Chino Basin in any year hereafter in excess of such party's decreed share of Operating Safe Yield, except pursuant to the provisions of the Physical Solution or a storage water agreement.

14. Injunction Against Unauthorized Storage or Withdrawal of Stored Water. Each party, its officers, agents, employees, successors and assigns is and they each are ENJOINED AND RESTRAINED from storing supplemental water in Chino Basin for withdrawal, or causing withdrawal of, water stored by that party, except pursuant to the terms of a written agreement with Watermaster and in accordance with Watermaster regulations. Any supplemental water stored or recharged in the Basin, except pursuant to such a Watermaster agreement, shall be deemed abandoned and not classified as Stored Water. This paragraph has no application, as such, to supplemental water spread or provided in lieu by Watermaster pursuant to the Physical Solution.

IV. CONTINUING JURISDICTION

15. Continuing Jurisdiction. Full jurisdiction, power and authority are retained and reserved to the Court as to all matters contained in this judgment, except:

(a) The redetermination of Safe Yield, as set forth in Paragraph 6, during the first ten (10) years of operation of the Physical Solution;

(b) The allocation of Safe Yield as between the several pools as set forth in Paragraph 44 of the Physical Solution;

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(c) The determination of specific quantitative rights and shares in the declared Safe Yield or Operating Safe Yield herein declared in Exhibits "D" and "E"; and

(d) The amendment or modification of Paragraphs 7(a) and (b) of Exhibit "H", during the first ten (10) years of operation of the Physical Solution, and thereafter only upon affirmative recommendation of at least 67% of the voting power (determined pursuant to the formula described in Paragraph 3 of Exhibit "H"), but not less than one-third of the members of the Appropriative Pool Committee representatives of parties who produce water within CBMWD or WMWD; after said tenth year the formula set forth in said Paragraph 7(a) and 7(b) of Exhibit "H" for payment of the costs of replenishment water may be changed to 100% gross or net, or any percentage split thereof, but only in response to recommendation to the Court by affirmative vote of at least 67% of said voting power of the Appropriative Pool representatives of parties who produce ground water within CBMWD or WMWD, but not less than one-third of their number. In such event, the Court shall act in conformance with such recommendation unless there are compelling reasons to the contrary; and provided, further, that the fact that the allocation of Safe Yield or Operating Safe Yield shares may be rendered moot by a recommended change in the formula for replenishment assessments shall not be deemed to be such a "compelling reason."

Said continuing jurisdiction is provided for the purpose of enabling the Court, upon application of any party, the Watermaster, the Advisory Committee or any Pool Committee, by motion and, upon

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at least 30 days' notice thereof, and after hearing thereon, to make such further or supplemental orders or directions as may be necessary or appropriate for interpretation, enforcement or carrying out of this Judgment, and to modify, amend or amplify any of the provisions of this Judgment.

V. WATERMASTER

A. APPOINTMENT

16. Watermaster Appointment. CBMWD, acting by and through a majority of its board of directors, is hereby appointed Watermaster, to administer and enforce the provisions of this Judgment and any subsequent instructions or orders of the Court hereunder. The term of appointment of Watermaster shall be for five (5) years. The Court will by subsequent orders provide for successive terms or for a successor Watermaster. Watermaster may be changed at any time by subsequent order of the Court, on its own motion, or on the motion of any party after notice and hearing. Unless there are compelling reasons to the contrary, the Court shall act in conformance with a motion requesting the Watermaster be changed if such motion is supported by a majority of the voting power of the Advisory Committee.

B. POWERS AND DUTIES

17. Powers and Duties. Subject to the continuing supervision and control of the Court, Watermaster shall have and may exercise the express powers, and shall perform the duties, as provided in this Judgment or hereafter ordered or authorized by the Court in the exercise of the Court's continuing jurisdiction.

18. Rules and Regulations. Upon recommendation by the

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Advisory Committee, Watermaster shall make and adopt, after public hearing, appropriate rules and regulations for conduct of Watermaster affairs, including meeting schedules and procedures, and compensation of members of Watermaster at not to exceed $25 per member per meeting, or $300 per member per year, whichever is less, plus reasonable expenses related to activities within the Basin. Thereafter, Watermaster may amend said rules from time to time upon recommendation, or with approval of the Advisory Committee after hearing noticed to all active parties. A copy of said rules and regulations, and of any amendments thereof, shall be mailed to each active party.

19. Acquisition of Facilities. Watermaster may purchase, lease, acquire and hold all necessary facilities and equipment; provided, that it is not the intent of the Court that Watermaster acquire any interest in real property or substantial capital assets.

20. Employment of Experts and Agents. Watermaster may employ or retain such administrative, engineering, geologic, accounting, legal or other specialized personnel and consultants as may be deemed appropriate in the carrying out of its powers and shall require appropriate bonds from all officers and employees handling Watermaster funds. Watermaster shall maintain records for purposes of allocation of costs of such services as well as of all other expenses of Watermaster administration as between the several pools established by the Physical Solution.

21. Measuring Devices. Watermaster shall cause parties, pursuant to uniform rules, to install and maintain in good operating condition, at the cost of each party, such necessary measuring

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devices or meters as Watermaster may deem appropriate. Such measuring devices shall be inspected and tested as deemed necessary by Watermaster, and the cost thereof shall constitute an expense of Watermaster.

22. Assessments. Watermaster is empowered to levy and collect all assessments provided for in the pooling plans and Physical Solution.

23. Investment of Funds. Watermaster may hold and invest any and all Watermaster funds in investments authorized from time to time for public agencies of the State of California.

24. Borrowing. Watermaster may borrow from time to time amounts not exceeding the annual anticipated receipts of Watermaster during such year.

25. Contracts. Watermaster may enter into contracts for the performance of any powers herein granted; provided, however, that Watermaster may not contract with or purchase materials, supplies or services from CBMWD, except upon the prior recommendation and approval of the Advisory Committee and pursuant to written order of the Court.

26. Cooperation With Other Agencies. Subject to prior recommendation or approval of the Advisory Committee, Watermaster may act jointly or cooperate with agencies of the United States and the State of California or any political subdivisions, municipalities or districts or any person to the end that the purpose of the Physical Solution may be fully and economically carried out.

27. Studies. Watermaster may, with concurrence of the Advisory Committee or affected Pool Committee and in accordance with Paragraph 54(b), undertake relevant studies of hydrologic

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conditions, both quantitative and qualitative, and operating aspects of implementation of the management program for Chino Basin.

28. Ground Water Storage Agreements. Watermaster shall adopt, with the approval of the Advisory Committee, uniformly applicable rules and a standard form of agreement for storage of supplemental water, pursuant to criteria therefor set forth in Exhibit "I". Upon appropriate application by any person, Watermaster shall enter into such a storage agreement; provided that all such storage agreements shall first be approved by written order of the Court, and shall by their terms preclude operations which will have a substantial adverse impact on other producers.

29. Accounting for Stored Water. Watermaster shall calculate additions, extractions and losses and maintain an annual account of all Stored Water in Chino Basin, and any losses of water supplies or Safe Yield of Chino Basin resulting from such Stored Water.

30. Annual Administrative Budget. Watermaster shall submit to Advisory Committee an administrative budget and recommendation for each fiscal year on or before March 1. The Advisory Committee shall review and submit said budget and their recommendations to Watermaster on or before April 1, following. Watermaster shall hold a public hearing on said budget at its April quarterly meeting and adopt the annual administrative budget which shall include the administrative items for each pool committee. The administrative budget shall set forth budgeted items in sufficient detail as necessary to make a proper allocation of the expense among the several pools, together with Watermaster's proposed allocation. The budget shall contain such additional comparative information

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or explanation as the Advisory Committee may recommend from time to time. Expenditures within budgeted items may thereafter be made by Watermaster in the exercise of powers herein granted, as a matter of course. Any budget transfer in excess of 20% of a budget category during any budget year or modification of such administrative budget during any year shall be first submitted to the Advisory Committee for review and recommendation.

31. Review Procedures. All actions, decisions or rules of Watermaster shall be subject to review by the Court on its own motion or on timely motion by any party, the Watermaster (in the case of a mandated action), the Advisory Committee, or any Pool Committee, as follows:

(a) Effective Date of Watermaster Action. Any action, decision or rule of Watermaster shall be deemed to have occurred or been enacted on the date on which written notice thereof is mailed. Mailing of copies of approved Watermaster minutes to the active parties shall constitute such notice to all parties.

(b) Noticed Motion. Any party, the Watermaster (as to any mandated action), the Advisory Committee, or any Pool Committee may, by a regularly noticed motion, apply to the Court for review of any Watermaster's action, decision or rule. Notice of such motion shall be served personally or mailed to Watermaster and to all active parties. Unless otherwise ordered by the Court, such motion shall not operate to stay the effect of such Watermaster action, decision or rule.

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(c) Time for Motion. Notice of motion to review any Watermaster action, decision or rule shall be served and filed within ninety (90) days after such Watermaster action, decision or rule, except for budget actions, in which event said notice period shall be sixty (60) days.

(d) De Novo Nature of Proceedings. Upon the filing of any such motion, the Court shall require the moving party to notify the active parties, the Watermaster, the Advisory Committee and each Pool Committee, of a date for taking evidence and argument, and on the date so designated shall review de novo the question at issue. Watermaster's findings or decision, if any, may be received in evidence at said hearing, but shall not constitute presumptive or prima facie proof of any fact in issue.

(e) Decision. The decision of the Court in such proceeding shall be an appealable supplemental order in this case. When the same is final, it shall be binding upon the Watermaster and all parties.

C. ADVISORY AND POOL COMMITTEES

32. Authorization. Watermaster is authorized and directed to cause committees of producer representatives to be organized to act as Pool Committees for each of the several pools created under the Physical Solution. Said Pool Committees shall, in turn, jointly form an Advisory Committee to assist Watermaster in performance of its functions under this judgment. Pool Committees shall be composed as specified in the respective pooling plans, and the Advisory Committee shall be composed of not to exceed ten (10) voting representatives from each pool, as designated by the

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respective Pool Committee. WMWD, PVMWD and SBVMWD shall each be entitled to one non-voting representative on said Advisory Committee.

33. Term and Vacancies. Members of any Pool Committee, shall serve for the term, and vacancies shall be filled, as specified in the respective pooling plan. Members of the Advisory Committee shall serve at the will of their respective Pool Committee.

34. Voting Power. The voting power on each Pool Committee shall be allocated as provided in the respective pooling plan. The voting power on the Advisory Committee shall be one hundred (100) votes allocated among the three pools in proportion to the total assessments paid to Watermaster during the preceding year; provided, that the minimum voting power of each pool shall be

(a) Overlying (Agricultural) Pool 20,

(b) Overlying (Non-agricultural) Pool 5, and

(c) Appropriative Pool 20.

In the event any pool is reduced to its said minimum vote, the remaining votes shall be allocated between the remaining pools on said basis of assessments paid to Watermaster by each such remaining pool during the preceding year. The method of exercise of each pool's voting power on the Advisory Committee shall be as determined by the respective pool committees.

35. Quorum. A majority of the voting power of the Advisory Committee or any Pool Committee shall constitute a quorum for the transaction of affairs of such Advisory or Pool Committee; provided, that at least one representative of each Pool Committee shall be required to constitute a quorum of the Advisory Committee. No Pool Committee representative may purposely absent himself or

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herself, without good cause, from an Advisory Committee meeting to deprive it of a quorum. Action by affirmative vote of a majority of the entire voting power of any Pool Committee or the Advisory Committee shall constitute action by such committee. Any action or recommendation of a Pool Committee or the Advisory Committee shall be transmitted to Watermaster in writing, together with a report of any dissenting vote or opinion.

36. Compensation. Pool or Advisory Committee members may receive compensation, to be established by the respective pooling plan, but not to exceed twenty-five dollars ($25.00) for each meeting of such Pool or Advisory Committee attended, and provided that no member of a Pool or Advisory Committee shall receive compensation of more than three hundred ($300.00) dollars for service on any such committee during any one year. All such compensation shall be a part of Watermaster administrative expense. No member of any Pool or Advisory Committee shall be employed by Watermaster or compensated by Watermaster for professional or other services rendered to such Pool or Advisory Committee or to Watermaster, other than the fee for attendance at meetings herein provided, plus reimbursement of reasonable expenses related to activities within the Basin.

37. Organization.

(a) Organizational Meeting. At its first meeting in each year, each Pool Committee and the Advisory Committee shall elect a chairperson and a vice chairperson from its membership. It shall also select a secretary, a treasurer and such assistant secretaries and treasurers as may be appropriate, any of whom may, but need not, be members of

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such Pool or Advisory Committee.

(b) Regular Meetings. All Pool Committees and the Advisory Committee shall hold regular meetings at a place and time to be specified in the rules to be adopted by each Pool and Advisory Committee. Notice of regular meetings of any Pool or Advisory Committee, and of any change in time or place thereof, shall be mailed to all active parties in said pool or pools.

(c) Special Meetings. Special meetings of any Pool or Advisory Committee may be called at any time by the Chairperson or by any three (3) members of such Pool or Advisory Committee by delivering notice personally or by mail to each member of such Pool or Advisory Committee and to each active party at least 24 hours before the time of each such meeting in the case of personal delivery, and 96 hours in the case of mail. The calling notice shall specify the time and place of the special meeting and the business to be transacted. No other business shall be considered at such meeting.

(d) Minutes. Minutes of all Pool Committee, Advisory Committee and Watermaster meetings shall be kept at Watermaster's offices. Copies thereof shall be mailed or otherwise furnished to all active parties in the pool or pools concerned. Said copies of minutes shall constitute notice of any Pool or Advisory Committee action therein reported, and shall be available for inspection by any party.

(e) Adjournments. Any meeting of any Pool or Advisory Committee may be adjourned to a time and place specified in the order of adjournment. Less than a quorum may so adjourn

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from time to time. A copy of the order or notice of adjournment shall be conspicuously posted forthwith on or near the door of the place where the meeting was held.

38. Powers and Functions. The powers and functions of the respective Pool Committees and the Advisory Committee shall be as follows:

(a) Pool Committees. Each Pool Committee shall have the power and responsibility for developing policy recommendations for administration of its particular pool, as created under the Physical Solution. All actions and recommendations of any Pool Committee which require Watermaster implementation shall first be noticed to the other two pools. If no objection is received in writing within thirty (30) days, such action or recommendation shall be transmitted directly to Watermaster for action. If any such objection is received, such action or recommendation shall be reported to the Advisory Committee before being transmitted to Watermaster.

(b) Advisory Committee. The Advisory Committee shall have the duty to study, and the power to recommend, review and act upon all discretionary determinations made or to be made hereunder by Watermaster.

[1] Committee Initiative. When any recommendation or advice of the Advisory Committee is received by Watermaster, action consistent therewith may be taken by Watermaster; provided, that any recommendation approved by 80 votes or more in the Advisory Committee shall constitute a mandate for action by Watermaster consistent therewith. If Watermaster is unwilling or unable to act

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pursuant to recommendation or advice from the Advisory Committee (other than such mandatory recommendations), Watermaster shall hold a public hearing, which shall be followed by written findings and decision. Thereafter, Watermaster may act in accordance with said decision, whether consistent with or contrary to said Advisory Committee recommendation. Such action shall be subject to review by the Court, as in the case of all other Watermaster determinations.

[2] Committee Review. In the event Watermaster proposes to take any discretionary action, other than approval or disapproval of a Pool Committee action or recommendation properly transmitted, or execute any agreement not theretofore within the scope of an Advisory Committee recommendation, notice of such intended action shall be served on the Advisory Committee and its members at least thirty (30) days before the Watermaster meeting at which such action is finally authorized.

(c) Review of Watermaster Actions. Watermaster (as to mandated action), the Advisory Committee or any Pool Committee shall be entitled to employ counsel and expert assistance in the event Watermaster or such Pool or Advisory Committee seeks Court review of any Watermaster action or failure to act. The cost of such counsel and expert assistance shall be Watermaster expense to be allocated to the affected pool or pools.

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VI. PHYSICAL SOLUTION

A. GENERAL

39. Purpose and Objective. Pursuant to the mandate of Section 2 of Article X of the California Constitution, the Court hereby adopts and orders the parties to comply with a Physical Solution. The purpose of these provisions is to establish a legal and practical means for making the maximum reasonable beneficial use of the waters of Chino Basin by providing the optimum economic, long-term, conjunctive utilization of surface waters, ground waters and supplemental water, to meet the requirements of water users having rights in or dependent upon Chino Basin.

40. Need for Flexibility. It is essential that this Physical Solution provide maximum flexibility and adaptability in order that Watermaster and the Court may be free to use existing and future technological, social, institutional and economic options, in order to maximize beneficial use of the waters of Chino Basin. To that end, the Court's retained jurisdiction will be utilized, where appropriate, to supplement the discretion herein granted to the Wastermaster.

41. Watermaster Control. Watermaster, with the advice of the Advisory and Pool Committees, is granted discretionary powers in order to develop an optimum basin management program for Chino Basin, including both water quantity and quality considerations. Withdrawals and supplemental water replenishment of Basin Water, and the full utilization of the water resources of Chino Basin, must be subject to procedures established by and administered through Watermaster with the advice and assistance of the Advisory and Pool Committees composed of the affected producers. Both the

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quantity and quality of said water resources may thereby be preserved and the beneficial utilization of the Basin maximized.

42. General Pattern of Operations. It is contemplated that the rights herein decreed will be divided into three (3) operating pools for purposes of Watermaster administration. A fundamental premise of the Physical Solution is that all water users dependent upon Chino Basin will be allowed to pump sufficient waters from the Basin to meet their requirements. To the extent that pumping exceeds the share of the Safe Yield assigned to the Overlying Pools, or the Operating Safe Yield in the case of the Appropriative Pool, each pool will provide funds to enable Watermaster to replace such overproduction. The method of assessment in each pool shall be as set forth in the applicable pooling plan.

B. POOLING

43. Multiple Pools Established. There are hereby established three (3) pools for Watermaster administration of, and for the allocation of responsibility for, and payment of, costs of replenishment water and other aspects of this Physical Solution.

(a) Overlying (Agricultural) Pool. The first pool shall consist of the State of California and all overlying producers who produce water for other than industrial or commercial purposes. The initial members of the pool are listed in Exhibit "C".

(b) Overlying (Non-agricultural) Pool. The second pool shall consist of overlying producers who produce water for industrial or commercial purposes. The initial members of this pool are listed in Exhibit "D".

(c) Appropriative Pool. A third and separate pool shall

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consist of owners of appropriative rights. The initial members of the pool are listed in Exhibit "E".

Any party who changes the character of his use may, by subsequent order of the Court, be reassigned to the proper pool; but the allocation of Safe Yield under Paragraph 44 hereof shall not be changed. Any non-party producer or any person who may hereafter commence production of water from Chino Basin, and who may become a party to this physical solution by intervention, shall be assigned to the proper pool by the order of the Court authorizing such intervention.

44. Determination and Allocation of Rights to Safe Yield of Chino Basin. The declared Safe Yield of Chino Basin is hereby allocated as follows:

Pool	Allocation
Overlying (Agricultural) Pool	414,000 acre feet in any five (5) consecutive years.
Overlying (Non-agricultural) Pool.	7,366 acre feet per year.
Appropriative Pool	49,834 acre feet per year.

The foregoing acre foot allocations to the overlying pools are fixed. Any subsequent change in the Safe Yield shall be debited or credited to the Appropriative Pool. Basin Water available to the Appropriative Pool without replenishment obligation may vary from year to year as the Operating Safe Yield is determined by Watermaster pursuant to the criteria set forth in Exhibit "I".

45. Annual Replenishment. Watermaster shall levy and collect assessments in each year, pursuant to the respective pooling plans, in amounts sufficient to purchase replenishment water to replace production by any pool during the preceding year which exceeds that

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pool's allocated share of Safe Yield in the case of the overlying pools, or Operating Safe Yield in the case of the Appropriative Pool. It is anticipated that supplemental water for replenishment of Chino Basin may be available at different rates to the various pools to meet their replenishment obligations. If such is the case, each pool will be assessed only that amount necessary for the cost of replenishment water to that pool, at the rate available to the pool, to meet its replenishment obligation.

46. Initial Pooling Plans. The initial pooling plans, which are hereby adopted, are set forth in Exhibits "F", "G" and "H", respectively. Unless and until modified by amendment of the judgment pursuant to the Court's continuing jurisdiction, each such plan shall control operation of the subject pool.

C. REPORTS AND ACCOUNTING

47. Production Reports. Each party or responsible party shall file periodically with Watermaster, pursuant to Watermaster rules, a report on a form to be prescribed by Watermaster showing the total production of such party during the preceding reportage period, and such additional information as Watermaster may require, including any information specified by the affected Pool Committee.

48. Watermaster Reports and Accounting. Watermaster's annual report, which shall be filed on or before November 15 of each year and shall apply to the preceding year's operation, shall contain details as to operation of each of the pools and a certified audit of all assessments and expenditures pursuant to this Physical Solution and a review of Watermaster activities.

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D. REPLENISHMENT

49. Sources of Supplemental Water. Supplemental water may be obtained by Watermaster from any available source. Watermaster shall seek to obtain the best available quality of supplemental water at the most reasonable cost for recharge in the Basin. To the extent that costs of replenishment water may vary between pools, each pool shall be liable only for the costs attributable to its required replenishment. Available sources may include, but are not limited to:

(a) Reclaimed Water. There exist a series of agreements generally denominated the Regional Waste Water Agreements between CBMWD and owners of the major municipal sewer systems within the basin. Under those agreements, which are recognized hereby but shall be unaffected and unimpaired by this judgment, substantial quantities of reclaimed water may be made available for replenishment purposes. There are additional sources of reclaimed water which are, or may become, available to Watermaster for said purposes. Maximum beneficial use of reclaimed water shall be given high priority by Watermaster.

(b) State Water. State water constitutes a major available supply of supplemental water. In the case of State Water, Watermaster purchases shall comply with the water service provisions of the State's water service contracts. More specifically, Watermaster shall purchase State Water from MWD for replenishment of excess production within CBMWD, WMWD and PVMWD, and from SBVMWD to replenish excess production within SBVMWD's boundaries in Chino Basin, except to the

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extent that MWD and SBVMWD give their consent as required by such State water service contracts.

(c) Local Import. There exist facilities and methods for importation of surface and ground water supplies from adjacent basins and watersheds.

(d) Colorado River Supplies. MWD has water supplies available from its Colorado River Aqueduct.

50. Methods of Replenishment. Watermaster may accomplish replenishment of overproduction from the Basin by any reasonable method, including:

(a) Spreading and percolation or Injection of water in existing or new facilities, subject to the provisions of Paragraphs 19, 25 and 26 hereof.

(b) In Lieu Procedures. Watermaster may make, or cause to be made, deliveries of water for direct surface use, in lieu of ground water production.

E. REVENUES

51. Production Assessment. Production assessments, on whatever basis, may be levied by Watermaster pursuant to the pooling plan adopted for the applicable pool.

52. Minimal Producers. Minimal Producers shall be exempted from payment of production assessments, upon filing of production reports as provided in Paragraph 47 of this Judgment, and payment of an annual five dollar ($5.00) administrative fee as specified by Watermaster rules.

53. Assessment Proceeds -- Purposes. Watermaster shall have the power to levy assessments against the parties (other than minimal pumpers) based upon production during the preceding period

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of assessable production, whether quarterly, semi-annually or annually, as may be determined most practical by Watermaster or the affected Pool Committee.

54. Administrative Expenses. The expenses of administration of this Physical Solution shall be categorized as either (a) general Watermaster administrative expense, or (b) special project expense.

(a) General Watermaster Administrative Expense shall include office rental, general personnel expense, supplies and office equipment, and related incidental expense and general overhead.

(b) Special Project Expense shall consist of special engineering, economic or other studies, litigation expense, meter testing or other major operating expenses. Each such project shall be assigned a Task Order number and shall be separately budgeted and accounted for.

General Watermaster administrative expense shall be allocated and assessed against the respective pools based upon allocations made by the Watermaster, who shall make such allocations based upon generally accepted cost accounting methods. Special Project Expense shall be allocated to a specific pool, or any portion thereof, only upon the basis of prior express assent and finding of benefit by the Pool Committee, or pursuant to written order of the Court.

55. Assessments -- Procedure. Assessments herein provided for shall be levied and collected as follows:

(a) Notice of Assessment. Watermaster shall give written notice of all applicable assessments to each party on

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or before ninety (90) days after the end of the production period to which such assessment is applicable.

(b) Payment. Each assessment shall be payable on or before thirty (30) days after notice, and shall be the obligation of the party or successor owning the water production facility at the time written notice of assessment is given, unless prior arrangement for payment by others has been made in writing and filed with Watermaster.

(c) Delinquency. Any delinquent assessment shall bear interest at 10% per annum (or such greater rate as shall equal the average current cost of borrowed funds to the Watermaster) from the due date thereof. Such delinquent assessment and interest may be collected in a show-cause proceeding herein instituted by the Watermaster, in which case the Court may allow Watermaster its reasonable costs of collection, including attorney's fees.

56. Accumulation of Replenishment Water Assessment Proceeds. In order to minimize fluctuation in assessment and to give Watermaster flexibility in purchase and spreading of replenishment water, Watermaster may make reasonable accumulations of replenishment water assessment proceeds. Interest earned on such retained funds shall be added to the account of the pool from which the funds were collected and shall be applied only to the purchase of replenishment water.

57. Effective Date. The effective date for accounting and operation under this Physical Solution shall be July 1, 1977, and the first production assessments hereunder shall be due after July 1, 1978. Watermaster shall, however, require installation of

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meters or measuring devices and establish operating procedures immediately, and the costs of such Watermaster activity (not including the cost of such meters and measuring devices) may be recovered in the first administrative assessment in 1978.

VII. MISCELLANEOUS PROVISIONS

58. Designation of Address for Notice and Service. Each party shall designate the name and address to be used for purposes of all subsequent notices and service herein, either by its endorsement on the Stipulation for Judgment or by a separate designation to be filed within thirty (30) days after Judgment has been served. Said designation may be changed from time to time by filing a written notice of such change with the Watermaster. Any party desiring to be relieved of receiving notices of Watermaster or committee activity may file a waiver of notice on a form to be provided by Watermaster. Thereafter such party shall be removed from the Active Party list. Watermaster shall maintain at all times a current list of active parties and their addresses for purposes of service. Watermaster shall also maintain a full current list of names and addresses of all parties or their successors, as filed herein. Copies of such lists shall be available, without cost, to any party, the Advisory Committee or any Pool Committee upon written request therefor.

59. Service of Documents. Delivery to or service upon any party or active party by the Watermaster, by any other party, or by the Court, of any item required to be served upon or delivered to such party or active party under or pursuant to the Judgment shall be made personally or by deposit in the United States mail, first

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class, postage prepaid, addressed to the designee and at the address in the latest designation filed by such party or active party.

60. Intervention After Judgment. Any non-party assignee of the adjudicated appropriative rights of any appropriator, or any other person newly proposing to produce water from Chino Basin, may become a party to this judgment upon filing a petition in intervention. Said intervention must be confirmed by order of this Court. Such intervenor shall thereafter be a party bound by this judgment and entitled to the rights and privileges accorded under the Physical Solution herein, through the pool to which the Court shall assign such intervenor.

61. Loss of Rights. Loss, whether by abandonment, forfeiture or otherwise, of any right herein adjudicated shall be accomplished only (1) by a written election by the owner of the right filed with Watermaster, or (2) by order of the Court upon noticed motion and after hearing.

62. Scope of Judgment. Nothing in this Judgment shall be deemed to preclude or limit any party in the assertion against a neighboring party of any cause of action now existing or hereafter arising based upon injury, damage or depletion of water supply available to such party, proximately caused by nearby pumping which constitutes an unreasonable interference with such complaining party's ability to extract ground water.

63. Judgment Binding on Successors. This Judgment and all provisions thereof are applicable to and binding upon not only the parties to this action, but also upon their respective heirs, executors, administrators, successors, assigns, lessees and

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licensees and upon the agents, employees and attorneys in fact of all such persons.

64. Costs. No party shall recover any costs in this proceeding from any other party.

Dated: JAN 27 1978.

Judge

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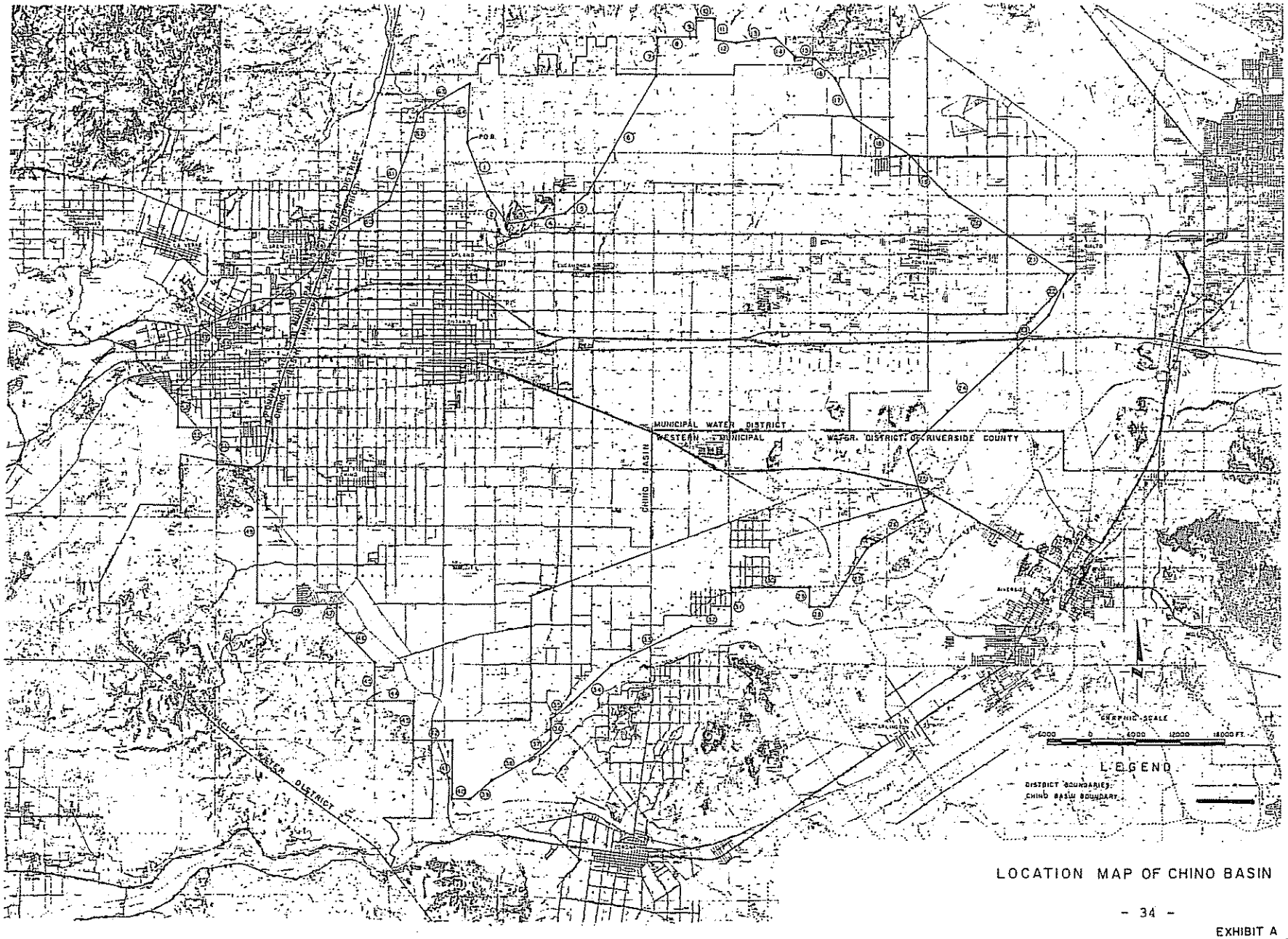
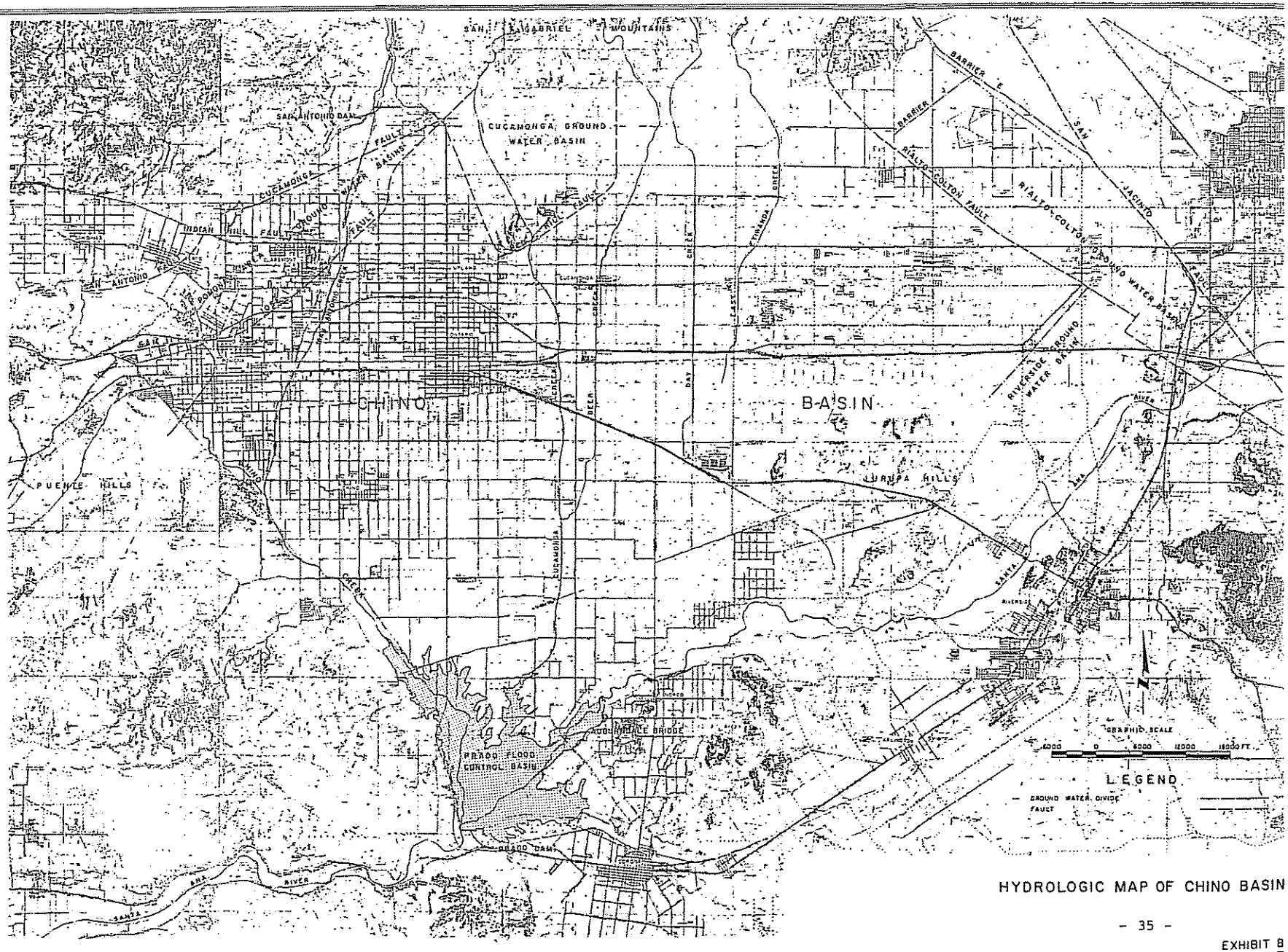


LOCATION MAP OF CHINO BASIN

EXHIBIT A



HYDROLOGIC MAP OF CHINO BASIN

EXHIBIT B

STIPULATING OVERLYING AGRICULTURAL PRODUCERS

STATE OF CALIFORNIA
COUNTY OF SAN BERNARDINO
Abacherli Dairy, Inc.
Abacherli, Frank
Abacherli, Shirley
Abbona, Anna
Abbona, James
Abbona, Jim
Abbona, Mary
Agliani, Amelia H.
Agman, Inc.
Aguerre, Louis B.
Ahmanson Trust Co.
Akiyama, Shizuye
Akiyama, Tomoo
Akkerman, Dave
Albers, J. N.
Albers, Nellie
Alewyn, Jake J.
Alewyn, Normalee
Alger, Mary D.
Alger, Raymond
Allen, Ben F.
Allen, Jane F.
Alta-Dena Dairy
Anderson Farms
Anguiano, Sarah L. S.
Anker, Gus
Aphessetche, Xavier
Arena Mutual Water Assn.
Armstrong Nurseries, Inc.
Arretche, Frank
Arretche, Jean Pierre
Arvidson, Clarence F.
Arvidson, Florence
Ashley, George W.
Ashley, Pearl E.
Atlas Farms
Atlas Ornamental Iron Works, Inc.
Aukeman, Carol
Aukeman, Lewis
Ayers, Kenneth C., aka Kelley Ayers
Bachoc, Raymond
Baldwin, Edgar A.
Baldwin, Lester
Banbury, Carolyn
Bangma Dairy
Bangma, Arthur
Bangma, Ida
Bangma, Martin
Bangma, Sam
Barba, Anthony B.
Barba, Frank
Barcellos, Joseph
Barnhill, Maurine W.

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1	Barnhill, Paul	Boersma, Angie
2	Bartel, Dale	Boersma, Berdina
3	Bartel, Ursula	Boersma, Frank
4	Bartel, Willard	Boersma, Harry
5	Barthelemy, Henry	Boersma, Paul
6	Barthelemy, Roland	Boersma, Sam
7	Bassler, Donald V., M.D.	Boersma, William L.
8	Bates, Lowell R.	Bohlander & Holmes, Inc.
9	Bates, Mildred L.	Bokma, Peter
10	Beahm, James W.	Bollema, Jacob
11	Beahm, Joan M.	Boonstoo, Edward
12	Bekendam, Hank	Bootsma, Jim
13	Bekendam, Pete	Borba, Dolene
14	Bello, Eugene	Borba, Dolores
15	Bello, Olga	Borba, Emily
16	Beltman, Evelyn	Borba, George
17	Beltman, Tony	Borba, John
18	Bergquist Properties, Inc.	Borba, John & Sons
19	Bevacqua, Joel A.	Borba, John Jr.
20	Bevacqua, Marie B.	Borba, Joseph A.
21	Bidart, Bernard	Borba, Karen E.
22	Bidart, Michael J.	Borba, Karen M.
23	Binnell, Wesley	Borba, Pete, Estate of
24	Black, Patricia E.	Borba, Ricci
25	Black, Victor	Borba, Steve
26	Bodger, John & Sons Co.	Borba, Tom
27	Boer, Adrian	Bordisso, Alleck
28	Boersma and Wind Dairy	Borges, Angelica M.

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Borges, Bernadette
Borges, John O.
Borges, Linda L.
Borges, Manual Jr.
Borges, Tony
Bos, Aleid
Bos, Gerrit
Bos, John
Bos, John
Bos, Margaret
Bos, Mary
Bos, Mary Beth
Bos, Tony
Bosch, Henrietta
Bosch, Peter T.
Boschma, Betty
Boschma, Frank
Boschma, Greta
Boschma, Henry
Bosma, Dick
Bosma, Florence G.
Bosma, Gerrit
Bosma, Jacob J.
Bosma, Jeanette Thea
Bosman, Frank
Bosman, Nellie
Bosnyak, Goldie M.
Bosnyak, Martin
Bothof, Roger W.
Bouma, Cornie
Bouma, Emma
Bouma, Henry P.
Bouma, Martin
Bouma, Peter G. & Sons Dairy
Bouma, Ted
Bouman, Helen
Bouman, Sam
Bower, Mabel E.
Boys Republic
Breedyk, Arie
Breedyk, Jessie
Briano Brothers
Briano, Albert
Briano, Albert Trustee for
Briano, Albert Frank
Briano, Lena
Brink, Russell N.
Brinkerhoff, Margaret
Brinkerhoff, Robert L.
Britschgi, Florence
Britschgi, Magdalena Garetto
Britschgi, Walter P.
Brommer, Marvin
Brookside Enterprizes, dba
Brookside Vineyard Co.
Brothers Three Dairy

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Brown, Eugene
Brun, Martha M.
Brun, Peter Robert
Buma, Duke
Buma, Martha
Bunse, Nancy
Bunse, Ronnie L.
Caballero, Bonnie L.
Caballero, Richard F.
Cable Airport Inc.
Cadlini, Donald
Cadlini, Jesse R.
Cadlini, Marie Edna
Cambio, Anna
Cambio, Charles, Estate of
Cambio, William V.
Cardoza, Florence
Cardoza, Olivi
Cardoza, Tony
Carnesi, Tom
Carver, Robt M., Trustee
Cauffman, John R.
Chacon Bros.
Chacon, Elvera P.
Chacon, Joe M.
Chacon, Robert M.
Chacon, Virginia L.
Chez, Joseph C.
Chino Corona Investment
Chino Water Co.
Christensen, Leslie
Christensen, Richard G.
Christian, Ada R.
Christian, Harold F.
Christy, Ella J.
Christy, Ronald S.
Cihigoyenetche, Jean
Cihigoyenetche, Leona
Cihigoyenetche, Martin
Clarke, Arthur B.
Clarke, Nancy L.
Clarke, Phyllis J.
Coelho, Isabel
Coelho, Joe A. Jr.
Collins, Howard E.
Collins, Judith F.
Collinsworth, Ester L.
Collinsworth, John E.
Collinsworth, Shelby
Cone Estate (05-2-00648/649)
Consolidated Freightways Corp. of Delaware
Corona Farms Co.
Corra, Rose
Costa, Dimas S.
Costa, Laura

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1 Costa, Myrtle
2 Costamagna, Antonio
3 Costamagna, Joseph
4 Cousyn, Claus B.
5 Cramer, Carole F.
6 Cramer, William R.
7 Crossroads Auto Dismantlers, Inc.
8 Crouse, Beatrice I.
9 Crouse, Roger
10 Crowley, Juanita C.
11 Crowley, Ralph
12 Cucamonga Vintners
13 D'Astici, Teresa
14 Da Costa, Cecilia B.
15 Da Costa, Joaquim F.
16 Daloisio, Norman
17 De Berard Bros.
18 De Berard, Arthur, Trustee
19 De Berard, Charles
20 De Berard, Chas., Trustee
21 De Berard, Helan J.
22 De Berard, Robert
23 De Berard, Robert, Trustee
24 De Bie, Adrian
25 De Bie, Henry
26 De Bie, Margaret M.
27 De Bie, Marvin
28 De Boer, Fred

De Boer, L. H.
De Boer, Sidney
De Bos, Andrew
De Graaf, Anna Mae
De Graaf, Gerrit
De Groot, Dick
De Groot, Dorothy
De Groot, Ernest
De Groot, Henrietta
De Groot, Jake
De Groot, Pete Jr.
De Haan, Bernadena
De Haan, Henry
De Hoog, Adriana
De Hoog, Joe
De Hoog, Martin
De Hoog, Martin L.
De Hoog, Mitch
De Hoog, Tryntje
De Jager, Cobi
De Jager, Edward D.
De Jong Brothers Dairy
De Jong, Cornelis
De Jong, Cornelius
De Jong, Grace
De Jong, Jake
De Jong, Lena
De Leeuw, Alice

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1 De Leeuw, Sam
2 De Soete, Agnes
3 De Soete, Andre
4 De Vries, Abraham
5 De Vries, Case
6 De Vries, Dick
7 De Vries, Evelyn
8 De Vries, Henry, Estate of
9 De Vries, Hermina
10 De Vries, Jack H.
11 De Vries, Jane
12 De Vries, Janice
13 De Vries, John
14 De Vries, John J.
15 De Vries, Neil
16 De Vries, Ruth
17 De Vries, Theresa
18 De Wit, Gladys
19 De Wit, Peter S.
20 De Wyn, Evert
21 De Zoete, Hattie V.
22 De Zoete, Leo A.
23 Decker, Hallie
24 Decker, Henry A.
25 Demmer, Ernest
26 Di Carlo, Marie
27 Di Carlo, Victor
28 Di Tommaso, Frank

Dirkse, Catherine
Dirkse, Charles C.
Dixon, Charles E.
Dixon, Geraldine A.
Doesberg, Hendrica
Doesburg, Theodorus P.
Dolan, Marion
Dolan, Michael H.
Dominguez, Helen
Dominguez, Manual
Donkers, Henry A.
Donkers, Nellie G.
Dotta Bros.
Douma Brothers Dairy
Douma, Betty A.
Douma, Fred A.
Douma, Hendrika
Douma, Herman G.
Douma, Narleen J.
Douma, Phillip M.
Dow Chemical Co.
Dragt, Rheta
Dragt, William
Driftwood Dairy Farm
Droogh, Case
Duhalde, Marian
Duhalde, Lauren
Duits, Henrietta

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1 Duits, John
2 Dunlap, Edna Kraemer,
3 Estate of
4 Durrington, Glen
5 Durrington, William F.
6 Dusi, John, Sr.
7 Dykstra, Dick
8 Dykstra, John
9 Dykstra, John & Sons
10 Dykstra, Wilma
11 Dyt, Cor
12 Dyt, Johanna
13 E and S Grape Growers
14 Eaton, Thomas, Estate of
15 Echeverria, Juan
16 Echeverria, Carlos
17 Echeverria, Pablo
18 Eilers, E. Myrle
19 Eilers, Henry W.
20 El Prado Golf Course
21 Ellsworth, Rex C.
22 Engelsma, Jake
23 Engelsma, Susan
24 Escojeda, Henry
25 Etiwanda Grape Products Co.
26 Euclid Ave. Investment One
27 Euclid Ave. Investment Four
28 Euclid Ave. Three Investment

Excelsior Farms
F.D.I.C.
Fagundes, Frank M.
Fagundes, Mary
Fernandes, Joseph Jr.
Fernandes, Velma C.
Ferraro, Ann
Ferreira, Frank J.
Ferreira, Joe C. Jr.
Ferreira, Narcie
Filippi, J. Vintage Co.
Filippi, Joseph
Filippi, Joseph A.
Filippi, Mary E.
Fitzgerald, John R.
Flameling Dairy Inc.
Flamingo Dairy
Foss, Douglas E.
Foss, Gerald R.
Foss, Russel
Fred & John Troost No. 1 Inc.
Fred & Maynard Troost No. 2 Inc.
Freitas, Beatriz
Freitas, Tony T.
Gakle, Louis L.
Galleano Winery, Inc.
Galleano, Bernard D.
Galleano, D.
Galleano, Mary M.

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1 Garcia, Pete
2 Gardner, Leland V.
3 Gardner, Lola M.
4 Garrett, Leonard E.
5 Garrett, Patricia T.
6 Gastelluberry, Catherine
7 Gastelluberry, Jean
8 Gilstrap, Glen E.
9 Gilstrap, Marjorie J.
10 Godinho, John
11 Godinho, June
12 Gonsalves, Evelyn
13 Gonsalves, John
14 Gorzeman, Geraldine
15 Gorzeman, Henry A.
16 Gorzeman, Joe
17 Govea, Julia
18 Goyenetche, Albert
19 Grace, Caroline E.
20 Grace, David J.
21 Gravatt, Glenn W.
22 Gravatt, Sally Mae
23 Greydanus Dairy, Inc.
24 Greydanus, Rena
25 Griffin Development Co.
26 Haagsma, Dave
27 Haagsma, John
28 Hansen, Mary D.

Hansen, Raymond F.
Hanson, Ardeth W.
Harada, James T.
Harada, Violet A.
Haringa, Earl and Sons
Haringa, Herman
Haringa, Rudy
Haringa, William
Harper, Cecilia de Mille
Harrington, Winona
Harrison, Jacqueline A.
Hatanaka, Kenichi
Heida, Annie
Heida, Don
Heida, Jim
Heida, Sam
Helms, Addison D.
Helms, Irma A.
Hermans, Alma I.
Hermans, Harry
Hettinga, Arthur
Hettinga, Ida
Hettinga, Judy
Hettinga, Mary
Hettinga, Wilbur
Heublein, Inc., Grocery Products Group
Hibma, Catherine M.

EXHIBIT "C"

Hibma, Sidney
Hicks, Kenneth I.
Hicks, Minnie M.
Higgins Brick Co.
Highstreet, Alfred V.
Highstreet, Evada V.
Hilarides, Bertha as Trustee
Hilarides, Frank
Hilarides, John as Trustee
Hindelang, Tillie
Hindelang, William
Hobbs, Bonnie C.
Hobbs, Charles W.
Hobbs, Hazel I.
Hobbs, Orlo M.
Hoekstra, Edward
Hoekstra, George
Hoekstra, Grace
Hoekstra, Louie
Hofer, Paul B.
Hofer, Phillip F.
Hofstra, Marie
Hogeboom, Jo Ann M.
Hogeboom, Maurice D.
Hogg, David V.
Hogg, Gene P.
Hogg, Warren G.
Hohberg, Edith J.
Hohberg, Harold C.
Hohberg, Harold W.
Holder, Arthur B.
Holder, Dorothy F.
Holmes, A. Lee
Holmes, Frances P.
Hoogeboom, Gertrude
Hoogeboom, Pete
Hoogendam, John
Hoogendam, Tena
Houssels, J. K. Thoroughbred Farm
Hunt Industries
Idsinga, Ann
Idsinga, William W.
Imbach Ranch, Inc.
Imbach, Kenneth E.
Imbach, Leonard K.
Imbach, Oscar K.
Imbach, Ruth M.
Indaburu, Jean
Indaburu, Marceline
Iseli, Kurt H.
Ito, Kow
J & B Dairy Inc.
Jaques, Johnny C. Jr.
Jaques, Mary
Jaques, Mary Lou

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Jay Em Bee Farms	Knevelbaard, John
Johnson Bro's Egg Ranches, Inc.	Knudsen, Ejnar
Johnston, Ellwood W.	Knudsen, Karen M.
Johnston, George F. Co.	Knudsen, Kenneth
Johnston, Judith H.	Knudson, Robert
Jones, Leonard P.	Knudson, Darlene
Jongsma & Sons Dairy	Koel, Helen S.
Jongsma, Diana A.	Koetsier, Gerard
Jongsma, Dorothy	Koetsier, Gerrit J.
Jongsma, George	Koetsier, Jake
Jongsma, Harold	Koning, Fred W.
Jongsma, Henry	Koning, Gloria
Jongsma, John	Koning, J. W. Estate
Jongsma, Nadine	Koning, James A.
Jongsma, Tillie	Koning, Jane
Jordan, Marjorie G.	Koning, Jane C.
Jordan, Troy O.	Koning, Jennie
Jorritsma, Dorothy	Koning, John
Juliano, Albert	Koning, Victor A.
Kamper, Cornelis	Kooi Holstein Corporation
Kamstra, Wilbert	Koolhaas, Kenneth E.
Kaplan, Lawrence J.	Koolhaas, Simon
Kasbergen, Martha	Koolhaas, Sophie Grace
Kasbergen, Neil	Koopal, Grace
Kazian, Angelen Estate of	Koopal, Silas
Kingsway Const. Corp.	Koopman, Eka
Klapps Market	Koopman, Gene T.
Kline, James K.	Koopman, Henry G.

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Koopman, Ted
Koopman, Tena
Koot, Nick
Koster, Aart
Koster, Frances
Koster, Henry B.
Koster, Nellie
Kroes, Jake R.
Kroeze, Bros
Kroeze, Calvin E.
Kroeze, John
Kroeze, Wesley
Kruckenberg, Naomi
Kruckenberg, Perry
L. D. S. Welfare Ranch
Labrucherie, Mary Jane
Labrucherie, Raymond F.
Lako, Samuel
Landman Corp.
Lanting, Broer
Lanting, Myer
Lass, Jack
Lass, Sandra L.
Lawrence, Cecelia, Estate of
Lawrence, Joe H., Estate of
Leal, Bradley W.
Leal, John C.
Leal, John Craig
Leck, Arthur A.
Leck, Evelyn M.
Lee, Harold E.
Lee, Helen J.
Lee, Henrietta C.
Lee, R. T. Construction Co.
Lekkerkerk, Adriana
Lekkerkerk, L. M.
Lekkerkerker, Nellie
Lekkerkerker, Walt
Lewis Homes of California
Livingston, Dorothy M.
Livingston, Rex E.
Lokey, Rosemary Kraemer
Lopes, Candida A.
Lopes, Antonio S.
Lopez, Joe D.
Lourenco, Carlos, Jr.
Lourenco, Carmelina P.
Lourenco, Jack C.
Lourenco, Manual H.
Lourenco, Mary
Lourenco, Mary
Luiten, Jack
Luiz, John M.
Luna, Christine I.
Luna, Ruben T.
Lusk, John D. and Son
a California corporation

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Lyon, Gregory E.
Lyon, Paula E.
M & W Co. #2
Madole, Betty M.
Madole, Larry B.
Marquez, Arthur
Marquine, Jean
Martin, Lelon O.
Martin, Leon O.
Martin, Maria D.
Martin, Tony J.
Martins, Frank
Mathias, Antonio
Mc Cune, Robert M.
Mc Masters, Gertrude
Mc Neill, J. A.
Mc Neill, May F.
Mees, Leon
Mello and Silva Dairy
Mello and Sousa Dairy
Mello, Emilia
Mello, Enos C.
Mello, Mercedes
Mendiondo, Catherine
Mendiondo, Dominique
Meth. Hosp. - Sacramento
Metzger, R. S.
Metzger, Winifred
Mickel, Louise
Miersma, Dorothy
Meirsma, Harry C.
Minaberry, Arnaud
Minaberry, Marie
Mistretta, Frank J.
Mocho and Plaa Inc.
Mocho, Jean
Mocho, Noeline
Modica, Josephine
Montes, Elizabeth
Montes, Joe
Moons, Beatrice
Moons, Jack
Moramarco, John A. Enterprises
Moreno, Louis W.
Moss, John R.
Motion Pictures Associates, Inc.
Moynier, Joe
Murphy, Frances V.
Murphy, Myrl L.
Murphy, Naomi
Nanne, Martin Estate of
Nederend, Betty
Nederend, Hans
Norfolk, James
Norfolk, Martha
Notrica, Louis

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Nyberg, Lillian N.
Nyenhuis, Annie
Nyenhuis, Jim
Occidental Land Research
Okumura, Marion
Okumura, Yuiche
Oldengarm, Effie
Oldengarm, Egbert
Oldengarm, Henry
Oliviera, Manuel L.
Oliviera, Mary M.
Olson, Albert
Oltmans Construction Co.
Omlin, Anton
Omlin, Elsie L.
Ontario Christian School Assn.
Oord, John
Oostdam, Jacoba
Oostdam, Pete
Oosten, Agnes
Oosten, Anthonia
Oosten, Caroline
Oosten, John
Oosten, Marinus
Oosten, Ralph
Orange County Water District
Ormonde, Manuel
Ormonde, Pete, Jr.
Ormonde, Viva
Ortega, Adeline B.
Ortega, Bernard Dino
Osterkamp, Joseph S.
Osterkamp, Margaret A.
P I E Water Co.
Palmer, Eva E.
Palmer, Walter E.
Parente, Luis S.
Parente, Mary Borba
Parks, Jack B.
Parks, Laura M.
Patterson, Lawrence E. Estate of
Payne, Clyde H.
Payne, Margo
Pearson, Athelia K.
Pearson, William C.
Pearson, William G.
Pene, Robert
Perian, Miller
Perian, Ona E.
Petrissans, Deanna
Petrissans, George
Petrissans, Jean P.
Petrissans, Marie T.
Pickering, Dora M.
(Mrs. A. L. Pickering)
Pierce, John

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1 Pierce, Sadie
2 Pietszak, Sally
3 Pine, Joe
4 Pine, Virginia
5 Pires, Frank
6 Pires, Marie
7 Plaa, Jeanne
8 Plaa, Michel
9 Plantenga, Agnes
10 Plantenga, George
11 Poe, Arlo D.
12 Pomona Cemetery Assn.
13 Porte, Cecelia, Estate of
14 Porte, Garritt, Estate of
15 Portsmouth, Vera McCarty
16 Ramella, Mary M.
17 Ramirez, Concha
18 Rearick, Hildegard H.
19 Rearick, Richard R.
20 Reinalda, Clarence
21 Reitsma, Greta
22 Reitsma, Louis
23 Rice, Bernice
24 Rice, Charlie E.
25 Richards, Karin
26 (Mrs. Ronnie Richards)
27 Richards, Ronald L.
28 Ridder, Jennie Wassenaar

Righetti, A. T.
Riley, George A.
Riley, Helen C.
Robbins, Jack K.
Rocha, John M.
Rocha, Jose C.
Rodrigues, John
Rodrigues, Manuel
Rodrigues, Manuel, Jr.
Rodrigues, Mary L.
Rodriquez, Daniel
Rogers, Jack D.
Rohrer, John A.
Rohrer, Theresa D.
Rohrs, Elizabeth H.
Rossetti, M. S.
Roukema, Angeline
Roukema, Ed.
Roukema, Nancy
Roukema, Siebren
Ruderian, Max J.
Russell, Fred J.
Rusticus, Ann
Rusticus, Charles
Rynsburger, Arie
Rynsburger, Berdena, Trust
Rynsburger, Joan Adele
Rynsburger, Thomas

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1 S. P. Annex, Inc.
2 Salisbury, Elinor J.
3 Sanchez, Edmundo
4 Sanchez, Margarita O.
5 Santana, Joe Sr.
6 Santana, Palmira
7 Satragni, John B. Jr.
8 Scaramella, George P.
9 Schaafsma Bros.
10 Schaafsma, Jennie
11 Schaafsma, Peter
12 Schaafsma, Tom
13 Schaap, Andy
14 Schaap, Ids
15 Schaap, Maria
16 Schacht, Sharon C.
17 Schakel, Audrey
18 Schakel, Fred
19 Schmid, Olga
20 Schmidt, Madeleine
21 Schoneveld, Evert
22 Schoneveld, Henrietta
23 Schoneveld, John
24 Schoneveld, John Allen
25 Schug, Donald E.
26 Schug, Shirley A.
27 Schuh, Bernatta M.
28 Schuh, Harold H.

Scott, Frances M.
Scott, Linda F.
Scott, Stanley A.
Scritsmier, Lester J.
Serl, Charles A.
Serl, Rosalie P.
Shady Grove Dairy, Inc.
Shamel, Burt A.
Shelby, Harold E.
Shelby, John A.
Shelby, Velma M.
Shelton, Alice A.
Sherwood, Robert W.
Sherwood, Sheila J.
Shue, Eva
Shue, Gilbert
Sieperda, Anne
Sieperda, James
Sigrist, Hans
Sigrist, Rita
Silveira, Arline L.
Silveira, Frank
Silveira, Jack
Silveira, Jack P. Jr.
Simas, Dolores
Simas, Joe
Singleton, Dean
Singleton, Elsie R.

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Sinnott, Jim	Staal, John
Sinnott, Mildred B.	Stahl, Zippora P.
Slegers, Dorothy	Stampfl, Berta
Slegers, Hubert J.	Stampfl, William
Slegers, Jake	Stanley, Robert E.
Slegers, Jim	Stark, Everett
Slegers, Lenwood M.	Stellingwerf, Andrew
Slegers, Martha	Stellingwerf, Henry
Slegers, Tesse J.	Stellingwerf, Jenette
Smith, Edward S.	Stellingwerf, Shana
Smith, Helen D.	Stellingwerf, Stan
Smith, James E.	Stelzer, Mike C.
Smith, Keith J.	Sterk, Henry
Smith, Lester W.	Stiefel, Winifred
Smith, Lois Maxine	Stiefel, Jack D.
Smith, Marjorie W.	Stigall, Richard L.
Soares, Eva	Stigall, Vita
Sogioka, Mitsuyoshi	Stockman's Inn
Sogioka, Yoshimato	Stouder, Charlotte A.
Sousa, Sam	Stouder, William C.
Southern Pacific Land Co.	Struikmans, Barbara
Southfield, Eddie	Struikmans, Gertie
Souza, Frank M.	Struikmans, Henry Jr.
Souza, Mary T.	Struikmans, Henry Sr.
Spickerman, Alberta	Struikmans, Nellie
Spickerman, Florence	Swager, Edward
Spickerman, Rudolph	Swager, Gerben
Spyksma, John	Swager, Johanna

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1 Swager, Marion
2 Swierstra, Donald
3 Swierstra, Fanny
4 Sybrandy, Ida
5 Sybrandy, Simon
6 Sytsma, Albert
7 Sytsma, Edith
8 Sytsma, Jennie
9 Sytsma, Louie
10 Te Velde, Agnes
11 Te Velde, Bay
12 Te Velde, Bernard A.
13 Te Velde, Bonnie
14 Te Velde, Bonnie G.
15 Te Velde, George
16 Te Velde, George, Jr.
17 Te Velde, Harm
18 Te Velde, Harriet
19 Te Velde, Henry J.
20 Te Velde, Jay
21 Te Velde, Johanna
22 Te Velde, John H.
23 Te Velde, Ralph A.
24 Te Velde, Zwaantina, Trustee
25 Ter Maaten, Case
26 Ter Maaten, Cleone
27 Ter Maaten, Steve
28 Terpstra, Carol

Terpstra, Theodore G.
Teune, Tony
Teunissen, Bernard
Teunissen, Jane
Thomas, Ethel M.
Thommen, Alice
Thommen, Fritz
Tillema, Allie
Tillema, Harold
Tillema, Klaas D.
Timmons, William R.
Tollerup, Barbara
Tollerup, Harold
Trapani, Louis A.
Trimlett, Arlene R.
Trimlett, George E.
Tristant, Pierre
Tuinhout, Ale
Tuinhout, Harry
Tuinhout, Hilda
Tuls, Elizabeth
Tuls, Jack S.
Tuls, Jake
Union Oil Company of California
United Dairyman's Co-op.
Urquhart, James G.
Usle, Cathryn
Usle, Faustino

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1 V & Y Properties
2 Vaile, Beryl M.
3 Valley Hay Co.
4 Van Beek Dairy Inc.
5 Van Canneyt Dairy
6 Van Canneyt, Maurice
7 Van Canneyt, Wilmer
8 Van Dam, Bas
9 Van Dam, Isabelle
10 Van Dam, Nellie
11 Van Den Berg, Gertrude
12 Van Den Berg, Joyce
13 Van Den Berg, Marinus
14 Van Den Berg, Marvin
15 Van Der Linden, Ardith
16 Van Der Linden, John
17 Van Der Linden, Stanley
18 Van Der Veen, Kenneth
19 Van Diest, Anna T.
20 Van Diest, Cornelius
21 Van Diest, Ernest
22 Van Diest, Rena
23 Van Dyk, Bart
24 Van Dyk, Jeanette
25 Van Foeken, Martha
26 Van Foeken, William
27 Van Hofwegan, Steve
28 Van Hofwegen, Adrian A.

Van Hofwegen, Clara
Van Hofwegen, Jessie
Van Klaveren, A.
Van Klaveren, Arie
Van Klaveren, Wilhelmina
Van Klaveren, William
Van Leeuwen, Arie C.
Van Leeuwen, Arie C.
Van Leeuwen, Arlan
Van Leeuwen, Clara G.
Van Leeuwen, Cornelia L.
Van Leeuwen, Harriet
Van Leeuwen, Jack
Van Leeuwen, John
Van Leeuwen, Letie
Van Leeuwen, Margie
Van Leeuwen, Paul
Van Leeuwen, William A.
Van Ravenswaay, Donald
Van Ryn Dairy
Van Ryn, Dick
Van Surksum, Anthonetta
Van Surksum, John
Van Veen, John
Van Vliet, Effie
Van Vliet, Hendrika
Van Vliet, Hugo
Van Vliet, Klaas

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Vande Witte, George	Vander Laan, Katie
Vanden Berge, Gertie	Vander Laan, Martin Jr.
Vanden Berge, Gertie	Vander Laan, Tillie
Vanden Berge, Jack	Vander Leest, Anna
Vanden Berge, Jake	Vander Leest, Ann
Vanden Brink, Stanley	Vander Meer, Alice
Vander Dussen, Agnes	Vander Meer, Dick
Vander Dussen, Cor	Vander Poel, Hank
Vander Dussen, Cornelius	Vander Poel, Pete
Vander Dussen, Edward	Vander Pol, Irene
Vander Dussen, Geraldine Marie	Vander Pol, Margie
Vander Dussen, James	Vander Pol, Marines
Vander Dussen, John	Vander Pol, William P.
Vander Dussen, Nelvina	Vander Schaaf, Earl
Vander Dussen, Rene	Vander Schaaf, Elizabeth
Vander Dussen, Sybrand Jr.	Vander Schaaf, Henrietta
Vander Dussen, Sybrand Sr.	Vander Schaaf, John
Vander Dussen Trustees	Vander Schaaf, Ted
Vander Eyk, Case Jr.	Vander Stelt, Catherine
Vander Eyk, Case Sr.	Vander Stelt, Clarence
Vander Feer, Peter	Vander Tuig, Arlene
Vander Feer, Rieka	Vander Tuig, Sylvester
Vander Laan, Ann	Vander Veen, Joe A.
Vander Laan, Ben	Vandervlag, Robert
Vander Laan, Bill	Vander Zwan, Peter
Vander Laan, Corrie	Vanderford, Betty W.
Vander Laan, Henry	Vanderford, Claud R.
Vander Laan, James	Vanderham, Adrian

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1 Vanderham, Cornelius
2 Vanderham, Cornelius P.
3 Vanderham, Cory
4 Vanderham, E. Jane
5 Vanderham, Marian
6 Vanderham, Martin
7 Vanderham, Pete C.
8 Vanderham, Wilma
9 Vasquez, Eleanor
10 Veenendaal, Evert
11 Veenendaal, John H.
12 Veiga, Dominick Sr.
13 Verbree, Jack
14 Verbree, Tillie
15 Verger, Bert
16 Verger, Betty
17 Verhoeven, Leona
18 Verhoeven, Martin
19 Verhoeven, Wesley
20 Vermeer, Dick
21 Vermeer, Jantina
22 Vernola Ranch
23 Vernola, Anthonietta
24 Vernola, Anthony
25 Vernola, Frank
26 Vernola, Mary Ann
27 Vernola, Pat F.
28 Vestal, Frances Lorraine

Vestal, J. Howard
Visser, Gerrit
Visser, Grace
Visser, Henry
Visser, Jess
Visser, Louie
Visser, Neil
Visser, Sam
Visser, Stanley
Visser, Tony D.
Visser, Walter G.
Von Der Ahe, Fredric T.
Von Euw, George
Von Euw, Marjorie
Von Lusk, a limited partnership
Voortman, Anna Marie
Voortman, Edward
Voortman, Edwin J.
Voortman, Gertrude Dena
Wagner, Richard H.
Walker, Carole R.
Walker, Donald E.
Walker, Wallace W.
Wardle, Donald M.
Warner, Dillon B.
Warner, Minnie
Wassenaar, Peter W.
Waters, Michael

EXHIBIT "C"

Weeda, Adriana
Weeda, Daniel
Weeks, O. L.
Weeks, Verona E.
Weidman, Maurice
Weidman, Virginia
Weiland, Adaline I.
Weiland, Peter J.
Wesselink, Jules
West, Katharine R.
West, Russel
West, Sharon Ann
Western Horse Property
Westra, Alice
Westra, Henry
Westra, Hilda
Westra, Jake J.
Weststeyn, Freida
Weststeyn, Pete
Whitehurst, Louis G.
Whitehurst, Pearl L.
Whitmore, David L.
Whitmore, Mary A.
Whitney, Adolph M.
Wiersema, Harm
Wiersema, Harry
Wiersma, Ellen H.
Wiersma, Gladys J.
Wiersma, Jake
Wiersma, Otto
Wiersma, Pete
Winchell, Verne H., Trustee
Wind, Frank
Wind, Fred
Wind, Hilda
Wind, Johanna
Woo, Frank
Woo, Sem Gee
Wybenga, Clarence
Wybenga, Gus
Wybenga, Gus K.
Wybenga, Sylvia
Wynja, Andy
Wynja, Iona F.
Yellis, Mildred
Yellis, Thomas E.
Ykema-Harmsen Dairy
Ykema, Floris
Ykema, Harriet
Yokley, Betty Jo
Yokley, Darrell A.
Zak, Zan
Zivelonghi, George
Zivelonghi, Margaret
Zwaagstra, Jake
Zwaagstra, Jessie M.
Zwart, Case

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NON-PRODUCER WATER DISTRICTS

Chino Basin Municipal Water District

Chino Basin Water Conservation District

Pomona Valley Municipal Water District

Western Municipal Water District of Riverside County

EXHIBIT "C"

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DEFAULTING OVERLYING AGRICULTURAL PRODUCERS

Cheryl L. Bain
Warren Bain
John M. Barcelona
Letty Bassler
John Brazil
John S. Briano
Lupe Briano
Paul A. Briano
Tillie Briano
Arnie B. Carlson
John Henry Fikse
Phyllis S. Fikse
Lewellyn Flory
Mary I. Flory
L. H. Glazer
Dorothy Goodman
Sidney D. Goodman
Frank Grossi
Harada Brothers
Ellen Hettinga
Hein Hettinga
Dick Hofstra, Jr.
Benjamin M. Hughey
Frieda L. Hughey
Guillaume Indart
Ellwood B. Johnston, Trustee
Perry Kruckenberg, Jr.
Roy W. Lantis
Sharon I. Lantis
Frank Lorenz
Dagney H. MacDonald
Frank E. Martin
Ruth C. Martin
Connie S. Mello
Naldiro J. Mello
Felice Miller
Ted Miller
Masao Nerio
Tom K. Nerio
Toyo Nerio
Yuriko Nerio
Harold L. Rees
Alden G. Rose
Claude Rouleau, Jr.
Patricia M. Rouleau
Schultz Enterprises
Albert Shaw
Lila Shaw
Cathy M. Stewart
Marvin C. Stewart
Betty Ann Stone
John B. Stone
Vantoll Cattle Co., Inc.
Catherene Verburg

EXHIBIT "C"

Martin Verburg

Donna Vincent

Larry Vincent

Cliff Wolfe & Associates

Ada M. Woll

Zarubica Co.

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EXHIBIT "D"

OVERLYING NON-AGRICULTURAL RIGHTS

Party	Total Overlying Non-Agricultural Rights (Acre Feet)	Share of Safe Yield (Acre Feet)
Ameron Steel Producers, Inc.	125	97.858
County of San Bernardino	171	133.870
Conrock Company	406	317.844
Kaiser Steel Corporation	3,743	2,930.274
Red Star Fertilizer	20	15.657
Southern California Edison Co.	1,255	982.499
Space Center, Mira Loma	133	104.121
Southern Service Co., dba Blue Seal Linen	24	18.789
Sunkist, Orange Products Division	2,393	1,873.402
Carlsberg Mobile Home Properties, Ltd. '73	593	464.240
Union Carbide Corporation	546	427.446
Quaker Chemical Co.	0	0
Totals	9,409	7,366.000

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EXHIBIT "E"
APPROPRIATIVE RIGHTS

Party	Appropriative Right (Acre Feet)	Share of Initial Operating Safe Yield (Acre Feet)	Share of Operating Safe Yield (Percent)
City of Chino	5,271.7	3,670.067	6.693
City of Norco	289.5	201.545	0.368
City of Ontario	16,337.4	11,373.816	20.742
City of Pomona	16,110.5	11,215.852	20.454
City of Upland	4,097.2	2,852.401	5.202
Cucamonga County Water District	4,431.0	3,084.786	5.626
Jurupa Community Services District	1,104.1	768.655	1.402
Monte Vista County Water District	5,958.7	4,148.344	7.565
West San Bernardino County Water District	925.5	644.317	1.175
Etiwanda Water Company	768.0	534.668	0.975
Felspar Gardens Mutual Water Company	68.3	47.549	0.087
Fontana Union Water Co.	9,188.3	6,396.736	11.666
Marygold Mutual Water Co.	941.3	655.317	1.195
Mira Loma Water Co.	1,116.0	776.940	1.417
Monta Vista Irr. Co.	972.1	676.759	1.234
Mutual Water Company of Glen Avon Heights	672.2	467.974	0.853
Park Water Company	236.1	164.369	0.300
Pomona Valley Water Co.	3,106.3	2,162.553	3.944
San Antonio Water Co.	2,164.5	1,506.888	2.748
Santa Ana River Water Company	1,869.3	1,301.374	2.373
Southern California Water Company	1,774.5	1,235.376	2.253
West End Consolidated Water Company	1,361.3	947.714	1.728
TOTAL	78,763.8	54,834.000	100.000

EXHIBIT "F"
OVERLYING (AGRICULTURAL) POOL
POOLING PLAN

1. Membership in Pool. The State of California and all producers listed in Exhibit "C" shall be the initial members of this pool, which shall include all producers of water for overlying uses other than industrial or commercial purposes.

2. Pool Meetings. The members of the pool shall meet annually, in person or by proxy, at a place and time to be designated by Watermaster for purposes of electing members of the Pool Committee and conducting any other business of the pool. Special meetings of the membership of the pool may be called and held as provided in the rules of the pool.

3. Voting. All voting at meetings of pool members shall be on the basis of one vote for each 100 acre feet or any portion thereof of production from Chino Basin during the preceding year, as shown by the records of Watermaster.

4. Pool Committee. The Pool Committee for this pool shall consist of not less than nine (9) representatives selected at large by members of the pool. The exact number of members of the Pool Committee in any year shall be as determined by majority vote of the voting power of members of the pool in attendance at the annual pool meeting. Each member of the Pool Committee shall have one vote and shall serve for a two-year term. The members first elected shall classify themselves by lot so that approximately one-half serve an initial one-year term. Vacancies during any term shall be filled by a majority of the remaining members of the Pool Committee.

5. Advisory Committee Representatives. The number of

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representatives of the Pool Committee on the Advisory Committee shall be as provided in the rules of the pool from time to time but not exceeding ten (10). The voting power of the pool on the Advisory Committee shall be apportioned and exercised as determined from time to time by the Pool Committee.

6. Replenishment Obligation. The pool shall provide funds for replenishment of any production by persons other than members of the Overlying (Non-agricultural) Pool or Appropriator Pool, in excess of the pool's share of Safe Yield. During the first five (5) years of operations of the Physical Solution, reasonable efforts shall be made by the Pool Committee to equalize annual assessments.

7. Assessments. All assessments in this pool (whether for replenishment water cost or for pool administration or the allocated share of Watermaster administration) shall be in an amount uniformly applicable to all production in the pool during the preceding year or calendar quarter. Provided, however, that the Agricultural Pool Committee, may recommend to the Court modification of the method of assessing pool members, inter se, if the same is necessary to attain legitimate basin management objectives, including water conservation and avoidance of undesirable socio-economic consequences. Any such modification shall be initiated and ratified by one of the following methods:

(a) Excess Production. In the event total pool production exceeds 100,000 acre feet in any year, the Pool Committee shall call and hold a meeting, after notice to all pool members, to consider remedial modification of the assessment formula.

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(b) Producer Petition. At any time after the fifth full year of operation under the Physical Solution, a petition by ten percent (10%) of the voting power or membership of the Pool shall compel the holding of a noticed meeting to consider revision of said formula of assessment for replenishment water.

In either event, a majority action of the voting power in attendance at such pool members' meeting shall be binding on the Pool Committee.

8. Rules. The Pool Committee shall adopt rules for conducting meetings and affairs of the committee and for administering its program and in amplification of the provisions, but not inconsistent with, this pooling plan.

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EXHIBIT "G"
OVERLYING (NON-AGRICULTURAL) POOL
POOLING PLAN

1. Membership in Pool. The initial members of the pool, together with the decreed share of the Safe Yield of each, are listed in Exhibit "D". Said pool includes producers of water for overlying industrial or commercial (non-agricultural) purposes, or such producers within the Pool who may hereafter take water pursuant to Paragraph 8 hereof.

2. Pool Committee. The Pool Committee for this pool shall consist of one representative designated by each member of the pool. Voting on the committee shall be on the basis of one vote for each member, unless a volume vote is demanded, in which case votes shall be allocated as follows:

> The volume voting power on the Pool Committee shall be 1,484 votes. Of these, 742 votes shall be allocated on the basis of one vote for each ten (10) acre feet or fraction thereof of decreed shares in Safe Yield. (See Exhibit "D".) The remaining 742 votes shall be allocated proportionally on the basis of assessments paid to Watermaster during the preceding year.*

3. Advisory Committee Representatives. At least three (3) members of the Pool Committee shall be designated by said committee to serve on the Advisory Committee. The exact number of such representatives at any time shall be as determined by the Pool Committee. The voting power of the pool shall be exercised in the

*Or production assessments paid under Water Code Section 72140 et seq., as to years prior to the second year of operation under the Physical Solution hereunder.

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Advisory Committee as a unit, based upon the vote of a majority of said representatives.

4. Replenishment Obligation. The pool shall provide funds for replenishment of any production in excess of the pool's share of Safe Yield in the preceding year.

5. Assessment. Each member of this pool shall pay an assessment equal to the cost of replenishment water times the number of acre feet of production by such producer during the preceding year in excess of (a) his decreed share of the Safe Yield, plus (b) any carry-over credit under Paragraph 7 hereof. In addition, the cost of the allocated share of Watermaster administration expense shall be recovered on an equal assessment against each acre foot of production in the pool during such preceding fiscal year or calendar quarter; and in the case of Pool members who take substitute ground water as set forth in Paragraph 8 hereof, such producer shall be liable for its share of administration assessment, as if the water so taken were produced, up to the limit of its decreed share of Safe Yield.

6. Assignment. Rights herein decreed are appurtenant to the land and are only assignable with the land for overlying use thereon; provided, however, that any appropriator who may, directly or indirectly, undertake to provide water service to such overlying lands may, by an appropriate agency agreement on a form approved by Watermaster, exercise said overlying right to the extent, but only to the extent necessary to provide water service to said overlying lands.

7. Carry-over. Any member of the pool who produces less than its assigned water share of Safe Yield may carry such unexercised

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right forward for exercise in subsequent years. The first water produced during any such subsequent year shall be deemed to be an exercise of such carry-over right. In the event the aggregate carry-over by any pool member exceeds its share of Safe Yield, such member shall, as a condition of preserving such surplus carry-over, execute a storage agreement with Watermaster.

8. Substitute Supplies. To the extent that any Pool member, at the request of Watermaster and with the consent of the Advisory Committee, takes substitute surface water in lieu of producing ground water otherwise subject to production as an allocated share of Safe Yield, said party shall nonetheless remain a member of this Pool.

9. Rules. The Pool Committee shall adopt rules for administering its program and in amplification of the provisions, but not inconsistent with, this pooling plan.

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EXHIBIT "H"
APPROPRIATIVE POOL
POOLING PLAN

1. Qualification for Pool. Any city, district or other public entity and public utility -- either regulated under Public Utilities Commission jurisdiction, or exempt therefrom as a non-profit mutual water company (other than those assigned to the Overlying [Agricultural] Pool) -- shall be a member of this pool. All initial members of the pool are listed in Exhibit "E", together with their respective appropriative rights and acre foot allocation and percentage shares of the initial and subsequent Operating Safe Yield.

2. Pool Committee. The Pool Committee shall consist of one (1) representative appointed by each member of the Pool.

3. Voting. The total voting power on the Pool Committee shall be 1,000 votes. Of these, 500 votes shall be allocated in proportion to decreed percentage shares in Operating Safe Yield. The remaining 500 votes shall be allocated proportionally on the basis of assessments paid to Watermaster during the preceding year.* Routine business of the Pool Committee may be conducted on the basis of one vote per member, but upon demand of any member a weighted vote shall be taken. Affirmative action of the Committee shall require a majority of the voting power of members in attendance, provided that it includes concurrence by at least one-third of its total members.

4. Advisory Committee Representatives. Ten (10) members of

*Or production assessments paid under Water Code Section 72140 et seq., as to years prior to the second year of operation under the Physical Solution hereunder.

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the Pool Committee shall be designated to represent this pool on the Advisory Committee. Each major appropriator, i.e., the owner of an adjudicated appropriative right in excess of 3,000 acre feet, shall be entitled to one representative. The remaining members representing the Appropriative Pool on the Advisory Committee shall be elected at large by the remaining members of the pool. The voting power of the Appropriative Pool on the Advisory Committee shall be apportioned between the major appropriator representatives in proportion to their respective voting power in the Pool Committee. The remaining two representatives shall exercise equally the voting power proportional to the Pool Committee voting power of all remaining appropriators; provided, however, that if any representative fails to attend an Advisory Committee meeting, the voting power of that representative shall be allocated among the representatives of the Appropriator Pool in attendance in the same proportion as their own respective voting powers.

5. Replenishment Obligation. The pool shall provide funds for purchase of replenishment water to replace any production by the pool in excess of Operating Safe Yield during the preceding year.

6. Administrative Assessment. Costs of administration of this pool and its share of general Watermaster expense shall be recovered by a uniform assessment applicable to all production during the preceding year.

7. Replenishment Assessment. The cost of replenishment water required to replace production from Chino Basin in excess of Operating Safe Yield in the preceding year shall be allocated and recovered as follows:

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(a) For production, other than for increased export, within CBMWD or WMWD:

(1) Gross Assessment. 15% of such replenishment water costs shall be recovered by a uniform assessment against all production of each appropriator producing in said area during the preceding year.

(2) Net Assessment. The remaining 85% of said costs shall be recovered by a uniform assessment on each acre foot of production from said area by each such appropriator in excess of his allocated share of Operating Safe Yield during said preceding year.

(b) For production which is exported for use outside Chino Basin in excess of maximum export in any year through 1976, such increased export production shall be assessed against the exporting appropriator in an amount sufficient to purchase replenishment water from CBMWD or WMWD in the amount of such excess.

(c) For production within SBVMWD or PVMWD:

By an assessment on all production in excess of an appropriator's share of Operating Safe Yield in an amount sufficient to purchase replenishment water through SBVMWD or MWD in the amount of such excess.

8. Socio-Economic Impact Review. The parties have conducted certain preliminary socio-economic impact studies. Further and more detailed socio-economic impact studies of the assessment formula and its possible modification shall be undertaken for the Appropriator Pool by Watermaster no later than ten (10) years from the effective date of this Physical Solution, or whenever total

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production by this pool has increased by 30% or more over the decreed appropriative rights, whichever is first.

9. Facilities Equity Assessment. Watermaster may, upon recommendation of the Pool Committee, institute proceedings for levy and collection of a Facilities Equity Assessment for the purposes and in accordance with the procedures which follow:

(a) Implementing Circumstances. There exist several sources of supplemental water available to Chino Basin, each of which has a differential cost and quantity available. The optimum management of the entire Chino Basin water resource favors the maximum use of the lowest cost supplemental water to balance the supplies of the Basin, in accordance with the Physical Solution. The varying sources of supplemental water include importations from MWD and SBVMWD, importation of surface and ground water supplies from other basins in the immediate vicinity of Chino Basin, and utilization of reclaimed water. In order to fully utilize any of such alternate sources of supply, it will be essential for particular appropriators having access to one or more of such supplies to have invested, or in the future to invest, directly or indirectly, substantial funds in facilities to obtain and deliver such water to an appropriate point of use. To the extent that the use of less expensive alternate sources of supplemental water can be maximized by the inducement of a Facilities Equity Assessment, as herein provided, it is to the long-term benefit of the entire basin that such assessment be authorized and levied by Watermaster.

(b) Study and Report. At the request of the Pool

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Committee, Watermaster shall undertake a survey study of the utilization of alternate supplemental supplies by members of the Appropriative Pool which would not otherwise be utilized and shall prepare a report setting forth the amount of such alternative supplies being currently utilized, the amount of such supplies which could be generated by activity within the pool, and the level of cost required to increase such uses and to optimize the total supplies available to the basin. Said report shall contain an analysis and recommendation for the levy of a necessary Facilities Equity Assessment to accomplish said purpose.

(c) Hearing. If the said report by Watermaster contains a recommendation for imposition of a Facilities Equity Assessment, and the Pool Committee so requests, Watermaster shall notice and hold a hearing not less than 60 days after distribution of a copy of said report to each member of the pool, together with a notice of the hearing date. At such hearing, evidence shall be taken with regard to the necessity and propriety of the levy of a Facilities Equity Assessment and full findings and decision shall be issued by Watermaster.

(d) Operation of Assessment. If Watermaster determines that it is appropriate that a Facilities Equity Assessment be levied in a particular year, the amount of additional supplemental supplies which should be generated by such assessment shall be estimated. The cost of obtaining such supplies, taking into consideration the investment in necessary facilities shall then be determined and spread equitably among the producers within the pool in a manner so that those

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producers not providing such additional lower cost supplemental water, and to whom a financial benefit will result, may bear a proportionate share of said costs, not exceeding said benefit; provided that any producer furnishing such supplemental water shall not thereby have its average cost of water in such year reduced below such producer's average cost of pumping from the Basin. In so doing, Watermaster shall establish a percentage of the total production by each party which may be produced without imposition of a Facilities Equity Assessment. Any member of the pool producing more water than said percentage shall pay such Facilities Equity Assessment on any such excess production. Watermaster is authorized to transmit and pay the proceeds of such Facilities Equity Assessment to those producers who take less than their share of Basin water by reason of furnishing a higher percentage of their requirements through use of supplemental water.

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

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

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

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

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

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

(1) Record of Land Use Conversion. Any appropriator who undertakes, directly or indirectly, during any year, to permanently provide water service to lands which during the immediate preceding five (5) consecutive years was devoted to irrigated agriculture may report such change in land use or water service to Watermaster. Watermaster shall thereupon verify such change in water service and shall maintain a record and account for each appropriator of the total acreage involved and the average annual water use during said five-year period.

(2) Establishment of Allocation Percentage. In any year in which unallocated Safe Yield water from the Overlying (Agricultural) Pool is available for such conversion claims, Watermaster shall establish allocable percentages for each appropriator based upon the total of such converted acreage recorded to each such appropriator's account.

(3) Allocation and Notice. Watermaster shall thereafter apply the allocated percentage to the total unallocated Safe Yield water available for special allocation to derive the amount thereof allocable to

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each appropriator; provided that in no event shall the allocation to any appropriator as a result of such conversion claim exceed 50% of the average annual amount of water actually applied to the areas converted by such appropriator prior to such conversion. Any excess water by reason of such limitation on any appropriator's right shall be added to Operating Safe Yield. Notice of such special allocation shall be given to each appropriator and shall be treated for purposes of this Physical Solution as an addition to such appropriator's share of the Operating Safe Yield for the particular year only.

(4) Administrative Costs. Any costs of Watermaster attributable to administration of such special allocations and conversion claims shall be assessed against appropriators participating in such reporting.

11. In Lieu Procedures. There are, or may develop, certain areas within Chino Basin where good management practices dictate that recharge of the basin be accomplished, to the extent practical, by taking surface supplies of supplemental water in lieu of ground water otherwise subject to production as an allocated share of Operating Safe Yield.

(a) Method of Operation. Any appropriator producing water within such designated in lieu area who is willing to abstain for any reason from producing any portion of such producer's share of Operating Safe Yield in any year may offer such unpumped water to Watermaster. In such event, Watermaster shall purchase said water in place, in lieu of spreading replenishment water, which is otherwise required to

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make up for over production. The purchase price for in lieu water shall be the lesser of:

(1) Watermaster's current cost of replenishment water, whether or not replenishment water is currently then obtainable, plus the cost of spreading; or

(2) The cost of supplemental surface supplies to the appropriator, less

a. said appropriator's average cost of ground water production, and

b. the applicable production assessment were the water produced.

Where supplemental surface supplies consist of MWD or SBVMWD supplies, the cost of treated, filtered State water from such source shall be deemed the cost of supplemental surface supplies to the appropriator for purposes of such calculation.

In any given year in which payments may be made pursuant to a Facilities Equity Assessment, as to any given quantity of water the party will be entitled to payment under this section or pursuant to the Facilities Equity Assessment, as the party elects, but not under both.

(b) Designation of In Lieu Areas. The first in lieu area is designated as the "In Lieu Area No. 1" and consists of an area wherein nitrate levels in the ground water generally exceed 45 mg/l, and is shown on Exhibit "J" hereto. Other in lieu areas may be designated by subsequent order of Watermaster upon recommendation or approval by Advisory Committee. Said in lieu areas may be enlarged, reduced or

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eliminated by subsequent orders; provided, however, that designation of In Lieu Areas shall be for a minimum fixed term sufficient to justify necessary capital investment. In Lieu Area No. 1 may be enlarged, reduced or eliminated in the same manner, except that any reduction of its original size or elimination thereof shall require the prior order of Court.

12. Carry-over. Any appropriator who produces less than his assigned share of Operating Safe Yield may carry such unexercised right forward for exercise in subsequent years. The first water produced during any such subsequent year shall be deemed to be an exercise of such carry-over right. In the event the aggregate carry-over by any appropriator exceeds its share of Operating Safe Yield, such appropriator shall, as a condition of preserving such surplus carry-over, execute a storage agreement with Watermaster. Such appropriator shall have the option to pay the gross assessment applicable to such carry-over in the year in which it accrued.

13. Assignment, Transfer and Lease. Appropriative rights, and corresponding shares of Operating Safe Yield, may be assigned or may be leased or licensed to another appropriator for exercise in a given year. Any transfer, lease or license shall be ineffective until written notice thereof is furnished to and approved as to form by Watermaster, in compliance with applicable Watermaster rules. Watermaster shall not approve transfer, lease or license of a right for exercise in an area or under conditions where such production would be contrary to sound basin management or detrimental to the rights or operations of other producers.

14. Rules. The Pool Committee shall adopt rules for

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administering its program and in amplification of the provisions, but not inconsistent with, this pooling plan.

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EXHIBIT "I"

ENGINEERING APPENDIX

1. Basin Management Parameters. In the process of implementing the physical solution for Chino Basin, Watermaster shall consider the following parameters:

(a) Pumping Patterns. Chino Basin is a common supply for all persons and agencies utilizing its waters. It is an objective in management of the Basin's waters that no producer be deprived of access to said waters by reason of unreasonable pumping patterns, nor by regional or localized recharge of replenishment water, insofar as such result may be practically avoided.

(b) Water Quality. Maintenance and improvement of water quality is a prime consideration and function of management decisions by Watermaster.

(c) Economic Considerations. Financial feasibility, ecnomic impact and the cost and optimum utilization of the Basin's resources and the physical facilities of the parties are objectives and concerns equal in importance to water quantity and quality parameters.

2. Operating Safe Yield. Operating Safe Yield in any year shall consist of the Appropriative Pool's share of Safe Yield of the Basin, plus any controlled overdraft of the Basin which Watermaster may authorize. In adopting the Operating Safe Yield for any year, Watermaster shall be limited as follows:

(a) Accumulated Overdraft. During the operation of this Judgment and Physical Solution, the overdraft accumulated from and after the effective date of the Physical

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Solution and resulting from an excess of Operating Safe Yield over Safe Yield shall not exceed 200,000 acre feet.

(b) Quantitative Limits. In no event shall Operating Safe Yield in any year be less than the Appropriative Pool's share of Safe Yield, nor shall it exceed such share of Safe Yield by more than 10,000 acre feet. The initial Operating Safe Yield is hereby set at 54,834 acre feet per year. Operating Safe Yield shall not be changed upon less than five (5) years' notice by Watermaster.

Nothing contained in this paragraph shall be deemed to authorize, directly or indirectly, any modification of the allocation of shares in Safe Yield to the overlying pools, as set forth in Paragraph 44 of the Judgment.

3. Ground Water Storage Agreements. Any agreements authorized by Watermaster for storage of supplemental water in the available ground water storage capacity of Chino Basin shall include, but not be limited to:

(a) The quantities and term of the storage right.

(b) A statement of the priority or relation of said right, as against overlying or Safe Yield uses, and other storage rights.

(c) The procedure for establishing delivery rates, schedules and procedures which may include

[1] spreading or injection, or

[2] in lieu deliveries of supplemental water for direct use.

(d) The procedures for calculation of losses and annual accounting for water in storage by Watermaster.

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(e) The procedures for establishment and administration of withdrawal schedules, locations and methods.

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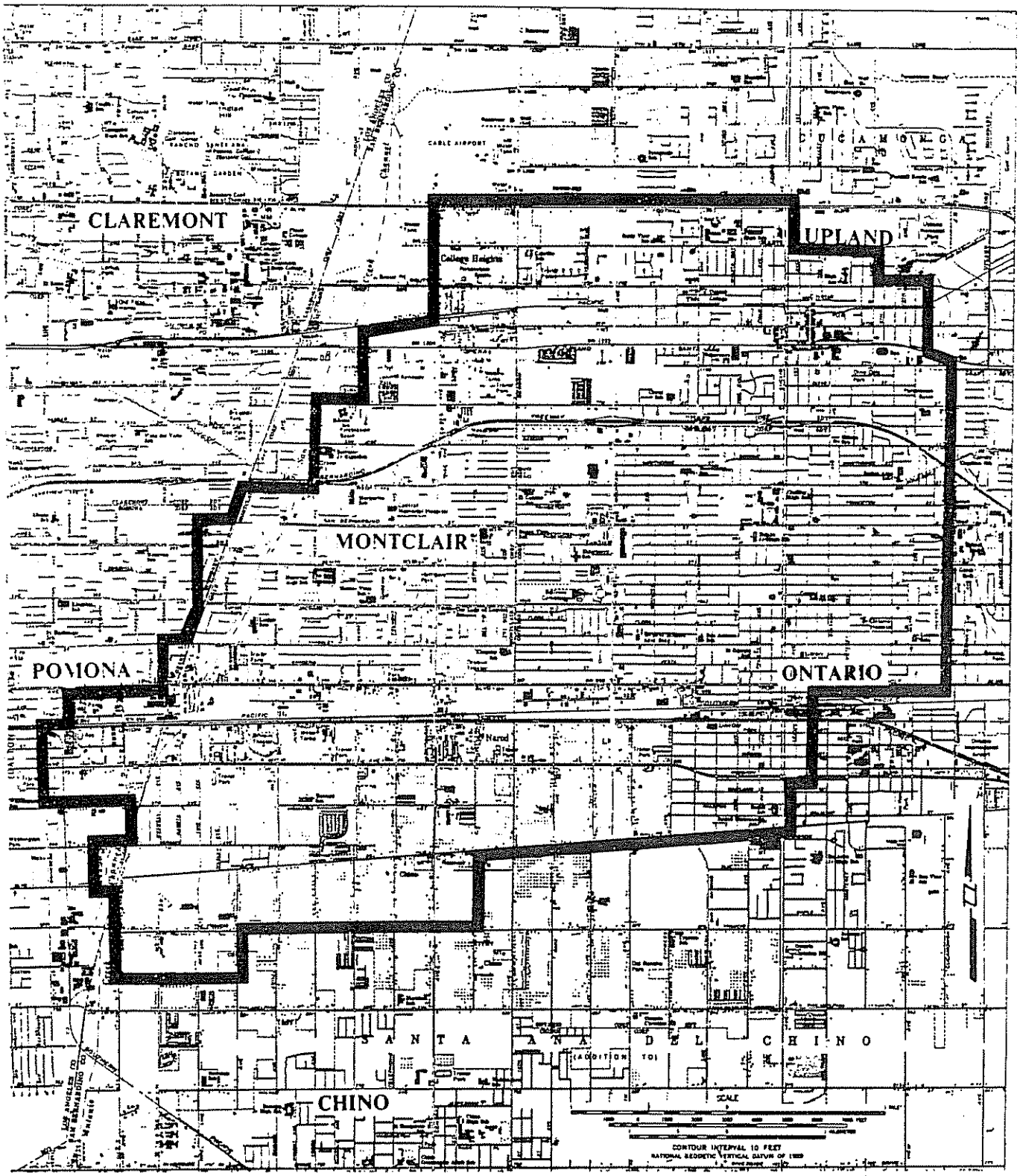


CHINO BASIN

IN LIEU AREA NO. 1

EXHIBIT "J"

LEGAL DESCRIPTION

OF CHINO BASIN

Preamble

All of the townships and ranges referred to in the following legal description are the San Bernardino Base and Meridian. Certain designated sections are implied as the System of Government Surveys may be extended where not established. Said sections are identified as follows:

Section 20, T1N, R8W is extended across Rancho Cucamonga;

Section 36, T1N, R8W is extended across the City of Upland;

Sections 2, 3, and 4, T1S, R7W are extended across Rancho Cucamonga;

Section 10, T1S, R8W is extended across the City of Claremont;

Sections 19, 20, 21, 30, 31 and 32, T1S, R8W are extended across the City of Pomona;

Sections 4, 5, and 28, T2S, R8W are extended across Rancho Santa Ana Del Chino;

Sections 15 and 16, T3S, R7W are extended across Rancho La Sierra; and

Sections 17 and 20, T3S, R7W are extended across Rancho El Rincon.

Description

Chino Basin is included within portions of the Counties of San Bernardino, Riverside and Los Angeles, State of California, bounded by a continuous line described as follows:

BEGINNING at the Southwest corner of Lot 241 as shown on Map of Ontario Colony Lands, recorded in Map Book 11, page 6, Office of the County Recorder of San Bernardino County, said corner being the Point of Beginning;

1. Thence Southeasterly to the Southeast corner

of Lot 419 of said Ontario Colony Lands;

2. Thence Southeasterly to a point 1300 feet North of the South line and 1300 feet East of the West line of Section 4, T1S, R7W;

3. Thence Easterly to a point on the East line of Section 4, 1800 feet North of the Southeast corner of said Section 4;

4. Thence Easterly to the Southeast corner of the Southwest quarter of the Northeast quarter of Section 3, T1S, R7W;

5. Thence Northeasterly to a point on the North line of Section 2, T1S, R7W, 1400 feet East of the West line of said Section 2;

6. Thence Northeasterly to the Southwest corner of Section 18, T1N, R6W;

7. Thence Northerly to the Northwest corner of said Section 18;

8. Thence Easterly to the Northeast corner of said Section 18;

9. Thence Northerly to the Northwest corner of the Southwest quarter of Section 8, T1N, R6W;

10. Thence Easterly to the Northeast corner of said Southwest quarter of said Section 8;

11. Thence Southerly to the Southeast corner of said Southwest quarter of said Section 8;

12. Thence Easterly to the Northeast corner of Section 17, T1N, R6W;

13. Thence Easterly to the Northeast corner of Section 16, T1N, R6W;

14. Thence Southeasterly to the Northwest corner of the Southeast quarter of Section 15, T1N, R6W;

15. Thence Easterly to the Northeast corner of said Southeast quarter of said Section 15;

16. Thence Southeasterly to the Northwest corner of the Northeast quarter of Section 23, T1N, R6W;

17. Thence Southeasterly to the Northwest corner

of Section 25, T1N, R6W;

18. Thence Southeasterly to the Northwest corner of the Northeast quarter of Section 31, T1N, R5W;

19. Thence Southeasterly to the Northeast corner of the Northwest quarter of Section 5, T1S, R5W;

20. Thence Southeasterly to the Southeast corner of Section 4, T1S, R5W;

21. Thence Southeasterly to the Southeast corner of the Southwest quarter of Section 11, T1S, R5W;

22. Thence Southwesterly to the Southwest corner of Section 14, T1S, R5W;

23. Thence Southwest to the Southwest corner of Section 22, T1S, R5W;

24. Thence Southwesterly to the Southwest corner of the Northeast quarter of Section 6, T2S, R5W;

25. Thence Southeasterly to the Northeast corner of Section 18 T2S, R5W;

26. Thence Southwesterly to the Southwest corner of the Southeast quarter of Section 13, T2S, R6W;

27. Thence Southwesterly to the Southwest corner of the Northeast quarter of Section 26, T2S, R6W;

28. Thence Westerly to the Southwest corner of the Northwest quarter of said Section 26;

29. Thence Northerly to the Northwest corner of said Section 26;

30. Thence Westerly to the Southwest corner of Section 21, T2S, R6w:

31. Thence Southerly to the Southeast corner of Section 29, T2S, R6W;

32. Thence Westerly to the Southeast corner of Section 30, T2S, R6W;

33. Thence Southwesterly to the Southwest corner of Section 36, T 2 S, R 7 W;

34. Thence Southwesterly to the Southeast corner

of Section 3, T3S, R7W;

35. Thence Southwesterly to the Southwest corner of the Northeast quarter of Section 10, T3S, R7W;

36. Thence Southerly to the Northeast corner of the Northwest quarter of Section 15, T3S, R7W;

37. Thence Southwesterly to the Southeast corner of the Northeast quarter of Section 16, T3S, R7W;

38. Thence Southwesterly to the Southwest corner of said Section 16;

39. Thence Southwesterly to the Southwest corner of the Northeast quarter of Section 20, T3S, R7W;

40. Thence Westerly to the Southwest corner of the Northwest quarter of said Section 20;

41. Thence Northerly to the Northwest corner of Section 17, T3S, R7W;

42. Thence Westerly to the Southwest corner of Section 7, T3S, R7W;

43. Thence Northerly to the Southwest corner of Section 6, T3S, R7W;

44. Thence Westerly to the Southwest corner of Section 1, T3S, R8W;

45. Thence Northerly to the Southeast corner of Section 35, T2S, R8W;

46. Thence Northwesterly to the Northwest corner of said Section 35;

47. Thence Northerly to the Southeast corner of Lot 33, as shown on Map of Tract 3193, recorded in Map Book 43, pages 46 and 47, Office of the County Recorder of San Bernardino County;

48. Thence Westerly to the Northwest corner of the Southwest quarter of Section 28, T2S, R8W;

49. Thence Northerly to the Southwest corner of Section 4, T2S, R8W;

50. Thence Westerly to the Southwest corner of Section 5, T2S, R8W;

51. Thence Northerly to the Southwest corner of Section 32, T1S, R8W;

52. Thence Westerly to the Southwest corner of Section 31, T1S, R8W;

53. Thence Northerly to the Southwest corner of Section 30, T1S, R8W;

54. Thence Northeasterly to the Southwest corner of Section 20, T1S, R8W;

55. Thence Northerly to the Northwest corner of the Southwest quarter of the Southwest quarter of said Section 20;

56. Thence Northwesterly to the Northeast corner of the Southeast quarter of the Southeast quarter of the Northwest quarter of Section 19, T1S, R8W;

57. Thence Easterly to the Northwest corner of Section 21, T1S, R8W;

58. Thence Northeasterly to the Southeast corner of the Southwest quarter of the Southwest quarter of Section 10, T1S, R8W;

59. Thence Northeasterly to the Southwest corner of Section 2, T1S, R8W;

60. Thence Northeasterly to the Southeast corner of the Northwest quarter of the Northwest quarter of Section 1, T1S, R8W;

61. Thence Northerly to the Northeast corner of the Northwest quarter of the Northeast quarter of Section 36, T1N, R8W;

62. Thence Northerly to the Southeast corner of Section 24, T1N, R8W;

63. Thence Northeasterly to the Southeast corner of the Northwest quarter of the Northwest quarter of Section 20, T1N, R7W; and

64. Thence Southerly to the Point of Beginning.

Sections Included

Said perimeter description includes all or portions of the following Townships, Ranges and Sections of San Bernardino Base and Meridian:

T1N, R5W - Sections:	30, 31 and 32
T1N, R6W - Sections:	8, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36
T1N, R7W - Sections:	19, 20, 24, 25, 26, 29, 30, 31, 32, 35 and 36
T1N, R8W - Sections:	25 and 36
T1S, R5W - Sections:	4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 28, 29, 30, 31 and 32.
T1S, R6W - Sections:	1 through 36, inclusive
T1S, R7W - Sections:	1 through 36, inclusive
T1S, R8W - Sections:	1, 2, 10, 11, 12, 13, 14, 15, 16, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36
T2S, R5W - Sections:	6, 7 and 18
T2S, R6W - Sections:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 29, 30 and 31
T2S, R7W - Sections:	1 through 36, inclusive
T2S, R8W - Sections:	1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, 35 and 36
T3S, R7W - Sections:	2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 16, 17 and 20
T3S, R8W - Section:	1.

THE DOCUMENT TO WHICH THIS CERTIFICATION IS ATTACHED IS A FULL, TRUE AND CORRECT COPY OF THE ORIGINAL ON FILE AND OF RECORD IN MY OFFICE.

ATTEST OCT 2 9 2002

Clerk of the Superior Court of the State of California, in and for the County of San Bernardino

By _____ Deputy

Terry Wittenborn

92 pages

Appendix E

Ordinance No. 2907 – Emergency Water Conservation Plan

ORDINANCE NO. 2907

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF ONTARIO, CALIFORNIA, PRESCRIBING WATER CONSERVATION RULES AND REGULATIONS, AMENDING CHAPTER 8A (EMERGENCY WATER CONSERVATION PLAN) OF THE ONTARIO MUNICIPAL CODE

WHEREAS, California Constitution Article X, Section 2 and California Water Code Section 100 provide that because of conditions prevailing in the state of California (the "State"), it is the declared policy of the State that the general welfare requires that the water resources of the State shall be put to beneficial use to the fullest extent of which they are capable, the waste or unreasonable use of water shall be prevented, and the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and the public welfare; and

WHEREAS, pursuant to California Water Code Section 106, it is the declared policy of the State that the use of water for domestic use is the highest use of water and that the next highest use is for irrigation; and

WHEREAS, pursuant to California Water Code Section 375, the City of Ontario (the "City") is authorized to adopt and enforce a water conservation program to reduce the quantity of water used by persons within its jurisdiction for the purpose of conserving the water supplies of the City; and

WHEREAS, on June 4, 2008, the Governor of the State proclaimed a condition of statewide drought and strongly encouraged local agencies to take aggressive, immediate action to reduce water consumption locally and regionally for the remainder of 2008 and prepare for potentially worsening conditions in 2009; and

WHEREAS, because of the prevailing conditions in the State, the current statewide drought, and the declared policy of the State, the City hereby finds and determines that it is necessary and appropriate for the City to adopt, implement, and enforce a water conservation program to reduce the quantity of water used by consumers within the City to ensure that there is sufficient water for human consumption, sanitation, and fire protection; and

WHEREAS, pursuant to California Water Code Section 350 the City Council is authorized to declare a water shortage emergency to prevail within its jurisdiction when it finds and determines that the City will not be able to or cannot satisfy the ordinary demands and requirements of water consumers without depleting the water supply of the City to the extent that there would be insufficient water for human consumption, sanitation, and fire protection, and as more fully set forth in this Chapter; and

WHEREAS, in the event the City determines that it is necessary to declare that a water shortage emergency exists, the City will be authorized pursuant to this Chapter to implement certain drought response measures and a water conservation and regulatory program to regulate water consumption activities within the City and ensure that the water delivered in the City is put to beneficial use for the greatest public benefit, with particular regard to domestic use, including human consumption, sanitation, and fire protection, and that the waste or unreasonable use of water is prevented; and

WHEREAS, the City is authorized to prescribe and define by ordinance restrictions, prohibitions, and exclusions for the use of water during a threatened or existing water shortage and adopt and enforce a water conservation and regulatory program to: (i) prohibit the wastage of City water or the use of City water during such period; (ii) prohibit use of water during such periods for specific uses which the City may from time to time find nonessential; and (iii) reduce and restrict the quantity of water used by those persons within the City for the purpose of conserving the water supplies of the City; and

WHEREAS, the City hereby finds and determines that pursuant to the provisions of Title 4, Chapter 8A of the City of Ontario Municipal Code, as hereby amended, the City shall: (i) implement water conservation and drought response measures; (ii) regulate the water consumption activities of persons within the City for the purposes of conserving and protecting the City's water supplies, reducing the quantity of water consumed, and deterring and preventing the waste or unreasonable use or unreasonable method of use of valuable water resources; and (iii) establish and collect regulatory fees and impose fines and penalties as set forth herein to accomplish these purposes and recover the costs of the City's water conservation and regulatory program; and

WHEREAS, the City Council hereby finds and determines that it is desirable to codify the rules and regulations governing its actions, and the actions of persons using and consuming water within the City, particularly during declared water shortages and water shortage emergencies, to protect the general welfare and the City's water supplies, and to reduce water consumption in accordance with the declared policies and laws of the State.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF ONTARIO DOES ORDAIN AS FOLLOWS:

SECTION 1. The City hereby finds and determines that the above recitals are true and correct and incorporated herein.

SECTION 2. Chapter 8A of the Ontario Municipal Code is hereby amended in its entirety to read as follows:

CHAPTER 8A: WATER CONSERVATION PLAN

Section 6-8.20. Scope and Title. This Chapter shall be known as "The Water Conservation Plan of the City of Ontario."

Section 6-8.21. Statement of Policy and Declaration of Purpose.

(a) Because of the water supply conditions prevailing in the City and/or the area from which the City obtains a portion of its supply, the general welfare requires that the water resources available to the City of Ontario be put to the maximum beneficial use to the extent to which they are capable, and that the waste or unreasonable use, or unreasonable method of use of water be prevented and that the conservation of such water be practiced with a view to that reasonable and beneficial use thereof in the interest of the people of the City.

(b) The purpose of this Chapter is to minimize the potential for water shortage through the practice of water conservation, and to minimize the effect of a shortage of water supplies on the water customers of the City. It is furthermore the intent of this Chapter to adopt provisions that will significantly reduce the inefficient consumption of water, thereby extending the available water resources necessary for the domestic, sanitation, and fire protection of the community to the greatest extent possible.

(c) This Chapter shall be applicable to all water customers. For the purposes of this Chapter, any person, business, corporation, or association to whom the city supplies water shall be considered a water customer.

Section 6-8.22. Authorization.

(a) The City Council may declare a water shortage based on a determination by Metropolitan Water District or the Inland Empire Utilities Agency, or based upon any interruption in water supply or delivery that the City Council determines in its sole discretion necessitates water conservation pursuant to this Chapter.

(b) In the event of an unplanned interruption of water supply causing a water shortage, the City Manager or his/her designee is authorized to restrict water use and apportion the available supply of water among its Customers in the most equitable manner possible to continue service fairly and without discrimination, except that preference shall be given to such service as is essential to the public interest and to the preservation of life and health.

(c) A notice of a water shortage shall be published in a daily newspaper of general circulation within the City. Any restrictions on the use of water shall become effective immediately upon such publication.

Section 6-8.23. General prohibitions.

(a) The following are prohibited in new connections:

(1) Non-recycling decorative fountains;

(2) Single-pass cooling systems; and

(3) Conveyor and in-bay vehicle wash and commercial laundry systems which do not reuse water.

(b) No water customer of the City shall make, cause, use, or permit the use of water from the City in a manner contrary to any provision of this Chapter or in an amount in excess of the use permitted by any restriction provisions then in effect pursuant to the provisions of this Chapter.

Section 6-8.24. Exceptions.

(a) The prohibited uses of water and water use restrictions provided within this Chapter are not applicable for the use of recycled water or the use of potable water necessary to public health and safety or for essential government services such as police, fire and other similar services.

(b) Nothing contained within this Chapter shall be construed to require the city to curtail the supply of water necessary for the health, safety, and welfare of any customer.

Section 6-8.25. Voluntary Conservation.

(a) Water customers are encouraged to voluntarily limit the amount of water used to the amount absolutely necessary for health, business, and irrigation. The following elements of conservation apply at all times on a voluntary basis:

(1) Avoid hose washing of sidewalks, walkways, driveways, parking areas or other paved surfaces, except as required for sanitary purposes.

(2) Wash motor vehicles, trailers, boats and other types of mobile equipment using a hand-held bucket or a hose equipped with a positive shutoff nozzle for quick rinses, or at the immediate premises of a commercial car wash or with recycled wastewater for approved uses.

(3) Avoid using water to clean, fill or maintain levels in decorative fountains, ponds, lakes or other similar aesthetic structures unless such water is part of a recycling system.

(4) Encourage restaurants, hotels, cafés, cafeterias or other public places where food is sold, served or offered for sale, to serve drinking water only to those customers expressly requesting water.

(5) Promptly repair all leaks from indoor and outdoor plumbing fixtures.

(6) Avoid watering lawn, landscape or other turf area more often than every other day and during the hours between 6:00 a.m. and 6:00 p.m.

(7) Avoid causing or allowing the water to run off landscape areas into adjoining streets, sidewalks or other paved areas due to incorrectly directed or maintained sprinklers or excessive watering.

Section 6-8.26. Stage 1 Water Shortage—Water Supply Reduced by up to Ten Percent (10%).

(a) The following restrictions on the use of potable water shall be applicable when the City Council determines that the City's water conservation goals are not being met by voluntary water conservation measures, or that the City's water supplies are likely to be reduced by up to Ten Percent (10%).

(1) There shall be no hose washing of sidewalks, walkways, driveways, parking areas or other paved surfaces, except as required for sanitary purposes.

(2) Washing of motor vehicles, trailers, boats and other types of mobile equipment shall be done only with a hand-held bucket or a hose equipped with a positive shutoff nozzle for quick rinses, except that washing may be done at the immediate premises of a commercial car wash or with reclaimed wastewater.

(3) No water shall be used to clean, fill or maintain levels in decorative fountains, ponds, lakes or other similar aesthetic structures unless such water is part of a recycling system.

(4) No restaurant, hotel, café, cafeteria or other public place where food is sold, served or offered for sale, shall serve drinking water to any customer unless expressly requested.

(5) All water customers of the City shall promptly repair all leaks from indoor and outdoor plumbing fixtures. Such leak shall be repaired in a timely manner after notification by the city, but in no case after notification in excess of seventy-two (72) hours for the first violation and then every seventy-two (72) hours thereafter for the second and third violations.

(6) No person shall sprinkle, water, or irrigate any shrubbery, trees, lawns, grass, groundcovers, plants, vines, gardens, vegetables, flowers, or any other landscaped or vegetated areas between the hours of 9:00 a.m. and 4:00 p.m. In any event, such watering shall not be in excess of needs nor be of a manner that allows water to flow onto streets. The above mentioned plants may be watered by a hand-held hose equipped with a shut-off nozzle at any time of the day. This provision shall not apply to commercial nurseries, golf courses and other water- dependent industries.

(7) No water customer of the City shall cause or allow the water to run off landscape areas into adjoining streets, sidewalks or other paved areas due to incorrectly directed or maintained sprinkler or excessive watering.

(8) The use of water from fire hydrants shall be limited to fire fighting and related activities necessary to maintain the public health, safety, and welfare. An exception may be made for construction use through a proper city-designated meter. The use of potable water for construction activities shall be restricted in areas where recycled water is available for such use.

Section 6-8.27. Stage 2 Water Shortage—Water Supply Reduced by Ten Percent (10%) to Twenty Percent (20%).

(a) The following restrictions on the use of potable water shall be applicable when the City Council determines that it is likely that the City will suffer a reduction of more than Ten Percent (10%) but less than Twenty Percent (20%) in its water supplies.

(1) All prohibitions and restrictions in Section 6-8.26 shall be in effect provided that more restrictive measures noted in this Section shall take precedence.

(2) Commercial nurseries, golf courses, and other water dependent industries shall be prohibited from watering lawn, landscape, or other turf areas more than every other day. Irrigation shall occur between the hours of 6:00 p.m. and 6:00 a.m. only.

(3) All water customers other than commercial nurseries, golf courses, and other water dependent industries shall be limited in the use of outdoor watering for sprinkling, watering, or irrigating any shrubbery, trees, lawns, grass, groundcovers, plants, vines, gardens, vegetables, flowers, or any other landscaped or vegetated areas to a two day per week schedule between the hours of 4:00 p.m. and 9:00 a.m. based on street address.

(i) All locations ending in an odd number shall have outdoor water scheduled on Mondays and Thursdays.

(ii) All locations ending in an even number shall have outdoor water scheduled on Wednesdays and Saturdays.

(iii) There shall be no outdoor watering on Tuesdays, Fridays, or Sundays.

(iv) The use of a hand-held hose with shut-off valve shall be permitted at any time.

(v) The replenishment of swimming pools shall be limited to the same days as other outdoor watering.

(4) Filling or refilling empty swimming pools shall not occur without permission from the City Manager or his/her designee.

Section 6-8.28. Stage 3 Water Shortage—Water Supply Reduced by more than Twenty Percent (20%).

(a) The following restrictions on the use of potable water shall be applicable when the City Council determines that it is likely that the City will suffer a reduction of more than Twenty Percent (20%) in its water supplies.

(b) All the prohibitions and restrictions in Section 6-8.27 shall be in effect provided that the more restrictive measures noted in this section shall take precedence.

(c) Commercial nurseries, golf courses and other water dependent industries shall be prohibited from watering lawn, landscaping and other turf areas more often than every third day. Irrigation shall occur between the hours of 6:00 p.m. and 6:00 a.m. only. There shall be no restriction on watering utilizing recycled water.

(d) The use of water from fire hydrants shall be limited to fire fighting and related activities and other uses of water for municipal purposes shall be limited to activities necessary to maintain the public health, safety and welfare. The use of potable water for construction activities shall be prohibited.

Section 6-8.29. Stage Four Water Shortage—Emergency Interruption in Water Supply.

(a) The following restrictions on the use of potable water shall be applicable during an emergency water shortage which may be declared in the event of a major earthquake, large-scale fire, or other so called "Act of God" which could have serious impacts on the city's total available water supply.

(1) All the prohibitions and restrictions in Section 6-8.28 shall be in effect provided that the more restrictive measures noted in this section shall take precedence.

(2) There shall be no use of outdoor water at any time except the minimal amount by hand-held hose equipped with a shut-off nozzle.

(3) Commercial nurseries, golf courses, and other water dependent industries shall be prohibited from the use of outside water except by a hand-held hose equipped with a shut-off nozzle.

(4) All nonessential uses of water shall be prohibited including the filling, cycling, filtering, or refilling swimming pools, spas, Jacuzzis, fountains or other like devices.

Section 6-8.30. Relief from Compliance.

(a) A water customer of the City may file a written application for relief in whole or in part, from the water use restriction provisions of this Chapter. The City Manager or his/her designee shall review the request for a variance and take such steps as he or she deems reasonable to resolve the application for relief. The decision of the City Manager shall be final.

(b) A relief may be granted if the water customer shows that he or she has achieved the maximum practical reduction in water consumption other than in the specific areas in which relief is being sought. No relief shall be granted to any water customer who, when requested by the City Manager, fails to provide any information necessary for resolution of the customer's application for relief.

Section 6-8.31. Failure to Comply.

(a) Violations of the provisions of this Chapter:

(1) First violation. For a first violation, the City shall issue a written warning to the water customer.

(2) Second violation. For a second violation, the City shall impose a surcharge in an amount of One Hundred Dollars ($100.00) added to the water customer's water bill.

(3) Third violation. For a third violation, the City shall impose a surcharge in an amount of Two Hundred Dollars ($200.00) added to the water customer's water bill.

(4) Subsequent Violations. For the fourth and any subsequent violation during, the City shall impose a surcharge in an amount of Five Hundred Dollars ($500.00) added to the water customer's water bill. In addition to the surcharge, the City may also install a flow restricting device on the service of the customer at the premises at which the violation occurred for a period of not less than forty-eight (48) hours. The City shall charge the water customer the reasonable costs incurred for installing and for removing the flow-restricting devices and for restoration of normal service. The charge shall be paid before normal service can be restored.

(b) The City shall give notice of violation to the water customer committing the violation as follows:

(1) First notice of violation shall be given in writing by regular mail to the address at which the water customer is normally billed.

(2) Notice of second or subsequent violations shall be given in writing by certified mail to the address at which the water customer is normally billed.

Section 6-8.32. Hearing Regarding Violations.

(a) Any water customer receiving notice of a violation of Sections 6-8.23, 6-8.26, 6-8.27, 6-8.28, or 6-8.29, which includes the imposition of a surcharge shall have a right to a hearing by the City Manager or his/her designee within fifteen (15) days of mailing or other delivery of the notice of violation.

(b) The water customer's timely written request for a hearing shall automatically stay installation of flow-restricting device on the customer's premises until after the City Manager or his/her designee renders his or her decision.

(c) The water customer's timely written request for a hearing shall not stay the imposition of a surcharge unless within the time period to request a hearing, the water customer deposits with the City money in the amount of any unpaid surcharge due. If it is determined that the surcharge was wrongly assessed, the City will refund any money deposited to the water customer.

(d) The decision of the City Manager or his/her designee shall be final except for judicial review.

SECTION 3. The Mayor shall sign this Ordinance and the City Clerk shall attest thereto, and pursuant to California Water Code Section 376, this Ordinance shall be effective immediately upon its adoption. Within ten (10) days after its adoption, the City Clerk shall cause this Ordinance to be published once pursuant to California Government Code Section 6061 and California Water Code Section 376 in full in a newspaper of general circulation which is printed, published, and circulated in the city. If there is no such newspaper, the Ordinance shall be posted with the City after its adoption in three public places.

APPROVED AND ADOPTED this 16th day of June, 2009, by the following votes:

AYES: Mayor P. Leon, Council Members J. Bowman, A. Wapner, S. Mautz and D. Dorst-Porada.

NOES: None.

ABSTAIN: None.

ABSENT: None.

Paul S. Leon, Mayor

ATTEST:

City Clerk

APPROVED AS TO FORM:

City Attorney

Appendix F

2009 Water Quality Report

Ontario Municipal Utilities Company Water Quality Report 2009

The Ontario Municipal Utilities Company is pleased to report that during the past year, water delivered to your home or business complied with all State and Federal drinking water requirements.

Water is a precious resource that is limited in supply, and we must use it as efficiently as possible. Many Ontario residents are converting their landscapes to drought-tolerant, "California-Friendly" designs like the one shown above. Installing efficient irrigation systems can reduce both water consumption and maintenance time. The "Be Water Wise" website at www.bewaterwise.com has a "Garden Spot" link, which includes tips on how to get started. Rebates are available for the purchase of indoor and outdoor water-conserving devices, such as rotating sprinkler nozzles, landscape irrigation timers, and high-efficiency clothes washers. Rebates are available while funding lasts, and Information is available at www.socalwatersmart.com.

For more information about this report, or for questions relating to drinking water quality or water use efficiency, please call Alisa Hasbrouck, Environmental Programs Manager, at (909) 395-2678.

20—30% Post-Consumer Fiber. Please Recycle.

Water Quality Report 2009

To ensure safe drinking water, public water systems must comply with Federal and State drinking water standards. Trained City personnel collect thousands of water samples that are delivered to a State certified laboratory for analysis. The Ontario Municipal Utilities Company is pleased to report there were no water quality violations during 2009.

The public is encouraged to participate on issues concerning the City's water. Meetings of the Ontario City Council are scheduled on the first and third Tuesday of each month beginning at 6:30 p.m. at the Ontario Senior Center, 225 East "B" Street in Ontario, California. Check the City's website at www.ci.ontario.ca.us or call (909) 395-2000 for more information.

Este informe contiene informacion muy importante sobre su agua potable. Traduzcalo o hable con alguien que lo intienda bien. Para asegurar el agua potable segura, sistemas públicos de agua deben conformarse con estándares federales y del estado del agua potable. Los personales entrenados de la ciudad recogen miles de muestras de agua que son entregadas a un laboratorio certificado del estado para el análisis. La ciudad de Ontario es complacida en informar que no había violaciones de la calidad de agua durante 2009.

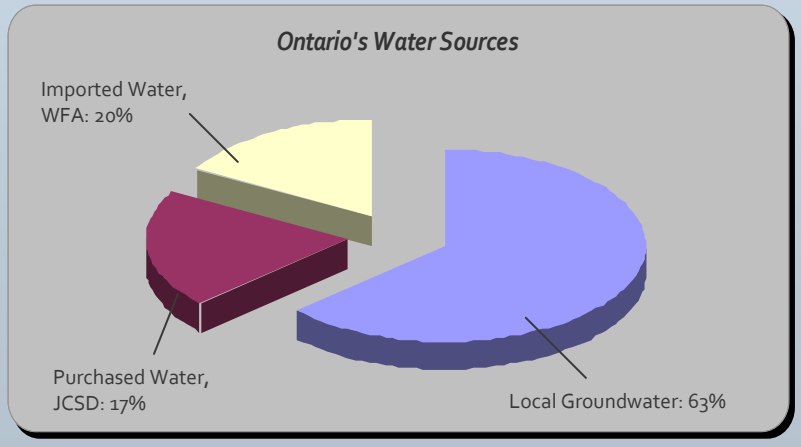
El público es alentado a participar en asuntos con respecto al agua de la Ciudad. Las reuniones del establecimiento de Ontario se programan el primer y tercer martes de cada mes a las 6:30 P.M., por la calle 303 "B" Street, Ontario. Para más información, vaya al Web site de la Ciudad www.ci.ontario.ca.us o llame (909) 395-2000.

Ontario's Water Sources

63% percent of Ontario's water comes from pumping local wells. Water from two of the wells is treated using ion exchange. The water is disinfected and put into pipes for delivery to Ontario homes and businesses.

20% percent of Ontario's water is surface water delivered through the State Water Project and processed at the Aqua de Lejos Treatment Plant.

17% percent of Ontario's water supply is pumped groundwater treated at the Chino Basin desalters using reverse osmosis and ion exchange, then transferred to the Jurupa Community Services District for delivery to Ontario.



Sampling Results

Last year we conducted thousands of tests for more than 144 constituents, and detected only 38 of those constituents. For your information, the following tables have been compiled to show what substances were detected in the City's drinking water during 2009.

Important Health Information

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline at (800)426-4791. Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline at (800) 426-4791.

Substances That Might be in Drinking Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

- Microbial contaminants, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- Inorganic contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- Pesticides and herbicides, that may come from a variety of sources such as

agriculture, urban stormwater runoff, and residential uses.

- Organic chemical contaminants, including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application and septic systems.

- Radioactive contaminants, that can be naturally occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, U.S. Environmental Protection Agency (USEPA) and the California Department of Public Health (CDPH) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. CDPH regulations also establish limits for contaminants in bottled water that must provide the same protection for public health.

Source Water Assessment

An assessment of the drinking water sources for the Ontario Municipal Utilities Company was completed in May 2002. The sources are considered most vulnerable to the following activities associated with contaminants detected in the water supply: high-density housing, sewer collection systems, parks, golf courses, the application of fertilizers, pesticides, and herbicides, metal plating, finishing, and fabricating, wood pulp processing and paper mills, and recreational use of surface water sources. A copy of the complete Assessment is available at the Ontario Municipal Utilities Company located at 1425 S. Bon View Avenue, or at the California Department of Public Health's San Bernardino District Offices located at 464 West 4th Street, Suite 437 in San Bernardino. You may request a summary of the Assessment by contacting the CDPH District Engineer at (909) 383-4328.

Nitrate

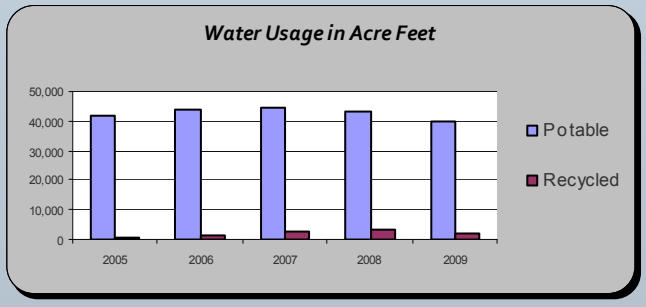
Nitrate in drinking water at levels above 45 mg/L is a health risk for infants of less than six months of age. Such nitrate levels in drinking water can interfere with the capacity of the infant's blood to carry oxygen, resulting in a serious illness; symptoms include shortness of breath and blueness of the skin. Nitrate levels above 45 mg/L may also affect the ability of the blood to carry oxygen in other individuals, such as pregnant women and those with certain specific enzyme deficiencies.

Lead

Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing. If you are concerned about elevated lead levels in your home's water, you may wish to have your water tested and/or flush your tap for 30 seconds to 2 minutes before using tap water. Additional information is available from the USEPA Safe Drinking Water Hotline at (800) 426-4791.

Table Definitions

AL (Action Level): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.
CDA: Chino Basin Desalter Authority
Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste and appearance of drinking water.
Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency.
Maximum Residual Disinfection Level (MRDL): The level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
NA: Not Applicable
ND: Not Detected
NL (Notification Level): Used to provide information to public water systems and others about certain non-regulated chemicals in drinking water that lack maximum contaminant levels (MCLs).
NP: Not Provided
NTU (Nephelometric Turbidity Units): Turbidity is a measure of the cloudiness of the water. Turbidity is monitored because it is a good indicator of the effectiveness of a filtration system.
pCi/L (picocuries per liter): A measure of radioactivity.
PHG (Public Health Goal): The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.
ppb (parts per billion): One part substance per billion parts water (or micrograms per liter).
ppm (parts per million): One part substance per million parts water (or milligrams per liter).
Primary Drinking Water Standard (PDWS): MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.
T.O.N. (threshold odor number): A measure of odor.
TT (Treatment Technique): A required process intended to reduce the level of a contaminant in drinking water.
µmhos/cm (micromhos per centimeter): A measure of electrical conductance.
WFA: Water Facilities Authority



Primary Drinking Water Standards	MCL (AL) [MRDL]	PHG (MCLG) [MRDLG]	Local Ground Water		Imported Water, WFA		CD
			Average	Range	Average	Range	Average
Aluminum (ppm)	1	0.6	ND	ND	0.11	0.071 - 0.19	NP
Arsenic (ppb)	10	0.004	ND	ND	1.3	ND - 2.8	NP
Barium (ppm)	1	2	0.007	ND - 0.13	NP	NP	NP
Chlorine, free (ppm)	[4]	[4]	0.63	0 - 1.89	NP	NP	NP
Chlorine, total (ppm)	[4]	[4]	0.72	0.01 - 1.99	1.3	0.4 - 2.7	NP
Chromium, Total (ppb)	50	(100)	8.2	3.6 - 12	NP	NP	3.9
Combined Filter Effluent Turbidity (NTU)	TT	NA	NA	NA	0.03	0.01 - 0.12	NA
Copper (ppm) (measured at consumer's tap)	1.3 (Action Level)	0.3	90th percentile: 0.22	**0 of 50 samples exceeded AL**	NA	NA	NA
Dibromochloropropane (ppt)	200	1.7	34	58 - 180	NP	NP	NP
Fluoride (ppm)	2	1	0.2	0.1 - 0.3	0.15	0.12—0.20	0.2
Gross Alpha Particle Activity (pCi/L)	15	(0)	1.19	1 - 1.37	3.5	ND - 6.4	ND
Gross Beta Particle Activity (pCi/L)	50	(0)	NA	NA	4.2	ND - 7.0	NP
Haloacetic Acids [HAA5] (ppb)	60	NA	6	ND - 20	10.4	6.2 - 15.9	NA
Lead (ppb) (measured at consumer's tap)	15 (Action Level)	0.2	90th percentile: ND	**4 of 59 samples exceeded AL**	NA	NA	NA
Nitrate [as nitrate] (ppm)	45	45	13	4 - 35	NP	NP	14
Nitrate [as nitrogen] (ppm)	10	10	2.8	1.1 - 6.2	0.46	ND - 0.77	NP
Nitrate and Nitrite [as nitrogen] (ppm)	10	10	NA	NA	0.46	ND - 0.77	NP
Perchlorate (ppb)	6	6	0.58	ND - 4.5	NP	NP	ND

Purchased Water, JCSD					
DA1	CDA2		IXP		
Range	Average	Range	Average	Range	Typical Source
NP	NP	NP	NP	NP	Erosion of natural deposits; residue from some surface water treatment processes.
NP	NP	NP	NP	NP	Erosion of natural deposits; runoff from orchards; glass and electronic production wastes.
NP	NP	NP	NP	NP	Discharges of oil drilling wastes and from metal refineries; erosion of natural deposits.
NP	NP	NP	NP	NP	Drinking water disinfectant added for treatment.
NP	NP	NP	NP	NP	Drinking water disinfectant added for treatment.
3.9	3.2	3 - 6	6	2.6 - 8.5	Discharge from steel and pulp mills and chrome plating; erosion of natural deposits.
NA	NA	NA	NA	NA	Soil runoff.
NA	NA	NA	NA	NA	Internal corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives.
NP	NP	NP	NP	NP	Banned nematocide that still may be present in soils due to runoff/leaching from former use on soybeans, cotton, vineyards, tomatoes, and tree fruit.
0.2	ND	ND - 0.2	0.1	0.1 - 0.2	Erosion of natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories.
ND	ND	ND	ND	ND - 6.7	Erosion of natural deposits.
NP	NP	NP	NP	NP	Decay of natural and man-made deposits.
NA	ND	ND - 7.5	ND	ND	Byproduct of drinking water disinfection.
NA	NA	NA	NA	NA	Internal corrosion of household water plumbing systems; discharges from industrial manufacturers; erosion of natural deposits.
9.0 - 20	14	3 - 22	28	9 - 34	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits.
NP	NP	NP	NP	NP	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits.
NP	NP	NP	NP	NP	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits.
ND	ND	ND	ND	ND - 4.7	Perchlorate is an inorganic chemical used in solid rocket propellant, fireworks, explosives, flares, matches, and a variety of industries. It usually gets into drinking water as a result of environmental contamination from historic aerospace or other industrial operations that used or use, store, or dispose of perchlorate and its salts.

Primary Drinking Water Standards (continued)	MCL (AL) [MRDL]	PHG (MCLG) [MRDLG]	Local Ground Water		Imported Water, WFA		CD
			Average	Range	Average	Range	Average
Tetrachloroethylene [PCE] (ug/L)	5	0.06	ND	ND	NP	NP	ND
Total Coliforms (% positive)	5	0	0.1	0 - 0.56	0	0	0
Total Trihalomethanes [TTHM] (ppb) *	80	NA	13.1	ND - 99	56.6	30.1 - 72.1	ND
Trichloroethylene [TCE] (ppb)	5	1.7	ND	ND	NP	NP	ND
Uranium (pCi/L)	20	0.43	NA	NA	2.7	2.4 - 3.2	NA

Secondary Drinking Water Standards, Sodium and Hardness	MCL (AL) [MRDL]	PHG (MCLG) [MRDLG]	Average	Range	Average	Range	Average
Aluminum (ppb)	200	600	ND	ND	110	71 - 190	NP
Chloride (ppm)	500	NA	11	3 - 65	83	73 - 92	86
Color (Color Units)	15	NA	0.01	ND - 3	NP	NP	ND
Copper (ppm)	1	NA	0.002	ND - 0.18	NP	NP	NP
Total Hardness [CaCO3] (ppm)	NA	NA	149	86 - 260	113	100 - 130	190
MBAS (ppb)	500	NA	10	ND - 90	NP	NP	NP
Odor (T.O.N.)	3	NA	ND	ND	1	1	NP
Sodium (ppm)	NA	NA	20	12 - 35	69	67 - 72	32
Specific Conductance (µS/cm)	1600	NA	389	300 - 670	555	520 - 610	548
Sulfate (ppm)	500	NA	18.8	5 - 72	49	35 - 58	10
Total Dissolved Solids (ppm)	1000	NA	249	160 - 450	330	300 - 370	344
Turbidity (Units)	5	NA	0.07	ND - 0.9	0.09	0.05 - 0.33	NP

Unregulated Contaminants	Notification Level	Average	Range	Average	Range	Average
Boron (ppb)	1,000	NA	NA	178	130 - 250	120
Chromium VI (ppb)	NA	NA	NA	0.34	0.24 - 0.58	NA
Trichloropropane [1,2,3-TCP] (ppb)	0.005	ND	ND	NP	NP	0.017
Vanadium (ppb)	50	NA	NA	6.9	6.2 - 8.2	NP

Purchased Water, JCSD					
DA1	CDA2		IXP		
Range	Average	Range	Average	Range	Typical Source
ND	ND	ND	ND	ND - 0.92	Discharge from factories, dry cleaners, and auto shops (metal degreaser).
0	0	0	0	0	Naturally present in the environment.
ND	0.8	ND - 1	4.5	4.3 - 4.7	Byproduct of drinking water disinfection.
ND	ND	ND	ND	ND - 0.99	Discharge from metal degreasing sites and other factories.
NA	ND	ND	ND	ND - 5.8	Erosion of natural deposits.

Range	Average	Range	Average	Range	Typical Source
NP	NP	NP	NP	NP	Erosion of natural deposits; residual from some surface water treatment processes.
86	78	12 - 120	98	16 - 170	Runoff/leaching from natural deposits; seawater influence.
ND	3.4	2.9 - 5.6	4.5	3.3 - 5.7	Naturally-occurring organic materials.
NP	NP	NP	NP	NP	Internal corrosion of household plumbing system; erosion of natural deposits; leaching from wood preservatives.
190	159	91 - 190	235	150 - 290	"Hardness" is the sum of polyvalent cations present in the water, generally magnesium and calcium. The cations are usually naturally occurring.
NP	NP	NP	NP	NP	Municipal and industrial waste discharges.
NP	NP	NP	NP	NP	Naturally-occurring organic materials.
32	24	16 - 30	31	23 - 38	"Sodium" refers to the salt present in the water and is generally naturally occurring.
530 - 595	476	320 - 600	685	420 - 1,000	Substances that form ions when in water; seawater influence.
10	7	ND - 17	20	12 - 36	Runoff/leaching from natural deposits; industrial wastes.
284 - 408	311	160 - 480	465	240 - 640	Runoff/leaching from natural deposits.
NP	NP	NP	NP	NP	Soil runoff.

Range	Average	Range	Average	Range
120	ND	ND	ND	ND
NA	1	0.7 - 3.7	4.5	1.3 - 6.9
0.013 - 0.021	ND	ND	0.006	ND - 0.035
NP	NP	NP	NP	NP

John Galvin Ion Exchange Treatment Plant Placed into Service in October 2009

Ontario Municipal Utilities Company
1425 South Bon View Avenue
Ontario, CA 91761

Presort STD
U.S. Postage
PAID
Permit No. 254
Ontario, CA
91761

ECR WSS

Postal Patron

ONTARIO MUNICIPAL UTILITIES COMPANY WATER QUALITY REPORT 2009

CITY OFFICIALS

Paul S. Leon
Mayor

Alan D. Wapner
Mayor pro Tem

Sheila Mautz
Jim W. Bowman
Debra Dorst-Porada
Council Members

Chris Hughes
City Manager

Mohamed El-Amamy
Utilities General Manager

Appendix G

CUWCC Reporting

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

Agency: Ontario Municipal Utilities Company **District Name:** Ontario Municipal Utilities Company **CUWCC Unit #:** 6299
Retail

Primary Contact Alisa Hasbrouck **Telephone** (909) 395-2661 **Email:** ahasbrouck@ci.ontario.ca.us

Compliance Option Chosen By Reporting Agency:
(Traditional, Flex Track or GPCD)
GPCD if used:

GPCD in 2010	**185**
GPCD Target for 2018	218

Year	Report	Target		Highest Acceptable Bound	
		% Base	GPCD	% Base	GPCD
2010	1	96.4%	257	100%	266
2012	2	92.8%	247	96%	257
2014	3	89.2%	237	93%	247
2016	4	85.6%	228	89%	237
2018	5	82.0%	218	82%	218

Not on Track if 2010 GPCD is > than target

GPCD in 2010	**185**
Highest Acceptable GPCD for 2010	**266**

On Track

Agency: Ontario Municipal Utilities Company **District Name:** Ontario Municipal Utilities Company **CUWCC Unit #:** 6299
Retail

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

Foundational BMPs

BMP 1.1 Operational Practices

Conservation Coordinator provided with necessary resources to implement BMPs?

		2009	2010
1.Conservation Coordinator provided with necessary resources to implement BMPs?	Name	Alisa Hasbrouck	Alisa Hasbrouck
	Title	Environmental Programs Manager	Environmental Programs Manager
	Email	ahasbrouck@ci.ontario.ca.us	ahasbrouck@ci.ontario.ca.us
		On Track	**On Track**

2. Water waste prevention documentation

Descriptive File		
Descriptive File 2010		On Track if any one of the 6 ordinance actions done, plus documentation or links provided
URL	http://www.ci.ontario.ca.us/index.cfm/33992	
URL 2010		http://www.ci.ontario.ca.us/index.cfm/33992
Describe Ordinance Terms	See OMC Title 6, Chapter 8A.	
Describe Ordinance Terms 2010		See OMC Title 6, chapter 8A
	On Track	**On Track**

Agency: Ontario Municipal Utilities Company | District Name: Ontario Municipal Utilities Company | CUWCC Unit #: 6299
Retail

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

BMP 1.2 Water Loss Control

	2009		
Complete a prescreening Audit	yes	On Track	On Track if Yes
Metered Sales	39,058		
Verifiable Other Uses	534		
Total Supply	42,689		
(Metered Sales + System uses)/ Total Supply >0.89	0.93	On Track	On Track if =>.89, Not on Track if No
If ratio is less than 0.9, complete a full scale Audit in 2009?	Yes	On Track	On Track if Yes
Verify Data with Records on File?	Yes	On Track	On Track if Yes
Operate a system Leak Detection Program?	Yes	On Track	On Track if Yes

		2010		
Compile Standard Water Audit using AWWA Software?		Yes	On Track	On Track if Yes, Not on Track if No
AWWA file provided to CUWCC?	1) AWWA Water Audit-Water Loss Control FY 08-09 2)AWWA Water Audit-Water Loss Control FY 09-10		On Track	On Track if Yes, Not on Track if No
AWWA Water Audit Validity Score?		81		Info only until 2012
Completed Training in AWWA Audit Method?		yes		
Completed Training in Component Analysis Process?		No		Info only until 2012
Complete Component Analysis?		No		Info only until 2012
Repaired all leaks and breaks to the extent cost effective?		Yes	On Track	On Track if Yes, Not on Track if No
Locate and repair unreported leaks to the extent cost effective.		Yes	On Track	On Track if Yes, Not on Track if No
Maintain a record-keeping system for the repair of reported leaks, including time of report, leak location, type of leaking pipe segment or fitting, and leak running time from report to repair.				Info only until 2012
Provided 7 types of Water Loss Control Info				Info only until 2012

Leaks Repaired	Value Real Losses	Value Apparent Losses	Miles Surveyed	Press Reduction	Cost of Interventions	Water Saved
0	$ -	$ -	0	Off	$ -	0

Agency: Ontario Municipal Utilities Company | District Name: Ontario Municipal Utilities Company | CUWCC Unit #: 6299

Retail

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

1.3 METERING WITH COMMODITY RATES FOR ALL NEW CONNECTIONS AND RETROFIT OF EXISTING CONNECTIONS

If signed MOU prior to 31 Dec 1997, On Track if all connections metered; If signed after 31 Dec 1997, complete meter installations by 1 July 2012 or within 6 yrs of signing and 20% biannual reduction of unmetered connections.

	2009		2010		
Exemption or 'At least as Effective As' accepted by CUWCC					
Numbered Unmetered Accounts	0	On Track	0	On Track	On Track if no unmetered accounts
Metered Accounts billed by volume of use	Yes	On Track	Yes	On Track	Volumetric billing required for all connections on same schedule as metering
Number of CII accounts with Mixed Use meters	3,926		3,565		Info only
Conducted a feasibility study to assess merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	Yes	On Track	Yes	On Track	On Track if Yes, Not on Track if No
Feasibility Study provided to CUWCC?	Yes	On Track	Yes	On Track	On Track if Yes, Not on Track if No
Completed a written plan, policy or program to test, repair and replace meters	Yes	On Track	Yes	On Track	On Track if Yes, Not on Track if No

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

Agency: **Ontario Municipal Utilities Company** **District Name:** **Ontario Municipal Utilities Company** **CUWCC Unit #:** **6299**

Retail Coverage Report Date: June 9, 2011

Primary Contact Alisa Hasbrouck **Email:** ahasbrouck@ci.ontario.ca.us

1.4 Retail Conservation Pricing

Metered Water Rate Structure

Date 2009 data received June 24, 2011
Date 2010 data received May 26, 2011

On Track if: Increasing Block, Uniform, Allocation, Standby Service; Not on Track if otherwise

Customer Class	2009 Rate Type	Conserving Rate?	Customer Class	2010 Rate Type	Conserving Rate?
Single-Family	Increasing Block	Yes	Single-Family	Increasing Block	Yes
Multi-Family	Increasing Block	Yes	Multi-Family	Increasing Block	Yes
Industrial	Increasing Block	Yes	Industrial	Increasing Block	Yes
Commercial	Increasing Block	Yes	Commercial	Increasing Block	Yes
Dedicated Irrigation	Increasing Block	Yes	Dedicated Irrigation	Increasing Block	Yes
	On Track			On Track	

Year Volumetric Rates began for Agencies with some Unmetered Accounts

Info only

Agencies with Partially Metered Service Areas: If signed MOU prior to 31 Dec. 1997, implementation starts no later than 1July 2010. If signed MOU after 31 Dec. 1997, implementation starts no later than 1July 2013, or within seven years of signing the MOU,

Agency: Ontario Municipal Utilities Company **District Name:** Ontario Municipal Utilities Company **CUWCC Unit #:** 6299
Retail Coverage Report Date: June 9, 2011

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

Adequacy of Volumetric Rates) for Agencies with No Unmetered Accounts

Customer Class	2009 Rate Type	2009 Volumetric Revenues $1000s	2010 Rate Type	2010 Volumetric Revenues $1000s
Single-Family	Increasing Block	$ 4,924	Single-Family	$ 5,807
Multi-Family	Increasing Block	$ 4,236	Multi-Family	$ 4,728
Industrial	Increasing Block	$ 1,670	Industrial	$ 1,948
Commercial	Increasing Block	$ 6,120	Commercial	$ 6,214
Dedicated Irrigation	Increasing Block	$ 5,412	Dedicated Irrigation	$ 5,169
Institutional		$ 647		$ 646
Dedicated Irrigation		$ 418		$ 715
Total Revenue Commodity Charges (V):		$ 23,426		$ 25,228
Total Revenue Fixed Charges (M):		$ 7,392		$ 8,867
Calculate: V / (V + M):		76%		74%
		On Track		On Track

Agency Choices for rates:

A) Agencies signing MOU prior to 13 June2007, implementation starts 1 July2007: On Track if (V / (V + M) ≥ 70% x .8 = **56% for 2009** and 70%x0.90 = **63% for 2010**; Not on track if (V / (V + M)) < 70%;

B) Use Canadian model. Agencies signing MOU after 13June2007, implementation starts July 1 of year following signing.

Canadian Water & Wastewater Rate Design Model Used and Provided to CUWCC	**No**	**No**
	On Track	On Track
If Canadian Model is used, was 1 year or 3 year period applied?		

Wastewater Rates

	2009		2010
Does Agency Provide Sewer Service?	**Yes**	If 'No', then wastewater rate info not required.	**Yes**

Customer Class	2009 Rate Type	Conserving Rate?	Customer Class	2010 Rate Type	Conserving Rate?
Single-Family	Non-Volumetric Flat Rate	No	Single-Family	Non-Volumetric Flat Rate	No
Multi-Family	Non-Volumetric Flat Rate	No	Multi-Family	Non-Volumetric Flat Rate	No
Commercial	Uniform	Yes	Commercial	Uniform	Yes
Industrial	Uniform	Yes	Industrial	Uniform	Yes
	On Track			On Track	

On Track if: 'Increasing Block', 'Uniform', 'based on long term marginal cost' or 'next unit of capacity'

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

BMP 2. EDUCATION PROGRAMS

BMP 2.1 Public Outreach Actions Implemented and Reported to CUWCC

	2009	2010	
Does a wholesale agency implement Public Outrach Programs for this unility's benefit?	Yes	**Yes**	Yes/No
Names of Wholesale Agencies	**Inland Empire Utilities Agency**	**Inland Empire Utilities Agency**	
1) Contacts with the public (minimum = 4 times per year)	211	219	
2) Water supplier contacts with media (minimum = 4 times per year, i.e., at least quarterly).	Yes	Yes	
3) An actively maintained website that is updated regularly (minimum = 4 times per year, i.e., at least quarterly).	Yes	Yes	All 6 action types implemented and reported to CUWCC to be 'On Track')
4) Description of materials used to meet minimum requirement.	Newsletter articles on conservation Website Flyers and/or brochures (total copies), bill stuffer General water conservation information	Newsletter articles on conservation Website Flyers and/or brochures (total copies), bill General water conservation information	
5) Annual budget for public outreach program.	$ 200,000	$ 300,000	
6) Description of all other outreach programs	Description is too large for text area. Data will be stored in the BMP Reporting database when online.	Description is too large for text area. Data will be stored in the BMP Reporting database when online.	
	On Track	**On Track**	

Comments:
Although no budget is reflected, conservation programs are funded through monies contributed by the Ontario Municipal Utilities Company to the Inland Empire Utilities Agency (our wholesaler) as a surcharge on imported water purchases.

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

2.2 School Education Programs Implemented and Reported to CUWCC

	2009	2010	
Does a wholesale agency implement School Education Programs for this unility's benefit?	Yes	Yes	
Name of Wholesale Supplier?	Inland Empire Utilities Agency	Inland Empire Utilities Agency	
1) Curriculum materials developed and/or provided by agency	1) Garden in Every School Information 2) National Theatre for Children information. 3) Project WET Information. 4) PSA Contest Information 5) Edu-Grant Information.	1)Garden in Every School Information 2)National Theatre for Children Information 3)Project WET Information 4)PSA Contest Information 5)Edu-Grant Information	Yes/ No
2) Materials meet state education framework requirements and are grade-level appropriate?	Yes	Yes	All 5 actions types implemented and reported to CUWCC to be 'On
3) Materials Distributed to K-6?	Yes	Yes	
Describe K-6 Materials	See Above	See Above	Describe materials to meet minimum requirements
Materials distributed to 7-12 students?	Yes	Yes	Info Only
4) Annual budget for school education program.	$ -	$ -	
5) Description of all other water supplier education programs	Education programs funded through regional programs.	Funded through regional programs	
	See Wholesale Report 0 On Track	See Wholesale Report 0 On Track	

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

Reporting unit name (District name): Ontario Municipal Utilities Company

Reporting unit number: 6299

Primary contact:

First name: Alisa

Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

You must enter the re w agency. Click here to open a table to obtain this number.

Submit Form

Base Year Data

Link to FAQs

Reporting Unit Base Year

What is your reporting period? Calendar

Base Year 2008

BMP 1.3 Metering

Number of unmetered accounts in Base Year 0

BMP 3.1 & BMP 3.2 & BMP 3.3 Residential Programs

Number of Single Family Customers in Base Year 29,224

Number of Multi Family Units in Base Year 2,053

BMP 3.4 WaterSense Specification (WSS) Toilets

Number of Single Family Housing Units constructed prior to 1992

Number of Multi Family Units prior to 1992

Average number of toilets per single family household 2.47

Average number of toilets per multi family household 2.47

Five year average resale rate of single family households 6.03 %

Five-year average resale rate of multi family households 10.19 %

Average number of persons per single family household 3.6

Average number of persons per multi family household 3.6

BMP 4.0 & BMP 5.0 CII & Landscape

Total water use (in Acre Feet) by CII accounts 12,087.40

Number of accounts with dedicated irrigation meters 1,303

Number of CII accounts without meters or with Mixed Use Meters 2,588

Number of CII accounts 3,868

Comments:

version 1.0

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

Division name (Reporting unit): Ontario Municipal Utilities Company

Reporting unit number: 6299

Primary contact:

First name: Alisa

Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

Submit Form

CUWCC

WATER SOURCES

2009

Service Area Population: 172908

Potable Water

Own Supply Source Name	AF/YEAR	Water Supply Type	Water Supply Description
Groundwater	28,996.00	Groundwater	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	

Imported Supply Source Name	AF/YEAR	Water Supply Type	Water Supply Description
JCSD/CDA	7,047.38	Other	
WFA	3,493.79	Surface	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	

Exported Water Name	AF/YEAR	Where Exported?

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

Division name (Reporting unit): Ontario Municipal Utilities Company

Reporting unit number: 6299

Primary contact:

First name: Alisa

Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

Submit Form

2009

Service Area Population: 172908

Non- Potable Water

If you select Other for type, enter

Own Supply Source Name	AF/YEAR	Water Supply Type	Water Supply Description
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	

Imported Supply Source Name	AF/YEAR	Water Supply Type	Water Supply Description
IEUA	1,825.00	Recycled Non Potable	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	

Exported Water Name	AF/YEAR	Where Exported? such as groundwater recharge, retail,

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

Division name (Reporting unit): Ontario Municipal Utilities Company

Reporting unit number: 6299

Primary contact:

First name: Alisa

Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

Submit Form

Water Uses 2009

Potable Water Billed

Make sure to enter numbers in AF/Year.

Customer Type	Meter Accounts	Metered Water Delivered	Un-metered Accounts	Un-metered Water Delivered	Description
Single-Family	29,878.00	6,533.13			
Multi-Family	2,102.00	5,260.55			
Industrial	287.00	2,049.48			
Commercial	3,322.00	7,580.79			
Dedicated Irrigation	1,295.00	6,665.43			
Other	317.00	800.97			City of Ontario facilities
Other	144.00	149.36			Hydrants
Other					
Other					
Other					
Other					
Other					
Other					

Potable Water Un-Billed

Customer Type	Meter Accounts	Metered Water Delivered	Un-metered Accounts	Un-metered Water Delivered	Description
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

Division name (Reporting unit): Ontario Municipal Utilities Company

Reporting unit number: 6299

Primary contact:

First name: Alisa

Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

Submit Form

Water Uses

2009

Non-Potable Billed

Customer Type	Meter Accounts	Metered Water Delivered	Un-metered Accounts	Un-metered Water Delivered	Description
Dedicated Irrigation	156.00	1,012.17			
Other	12.00	147.89			City of Ontario facilities
Other	3.00	12.18			Recylced Water Hydrants
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					

Non-Potable Un-Billed

Customer Type	Meter Accounts	Metered Water Delivered	Un-metered Accounts	Un-metered Water Delivered	Description
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

Reporting unit name (District name): Ontario Municipal Utilities Company

Reporting unit number: 6299

Primary contact:

First name: Alisa

Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

You must enter the reporting unit numbe we have on record fo agency. Click here to open a table to obtain this number.

Submit Form

Link to FAQs

2009

BMP 1.1 Operations Practices

Comments:

See the complete MOU: View MOU

See the coverage requirements for this BMP:

Conservation Coordinator

Conservation Coordinator ◯ Yes ◯ No

Contact Information

First Name	Alisa
Last Name	Hasbrouck
Title	Environmental Programs Manager
Phone	(909) 395-2661
Email	ahasbrouck@ci.ontario.ca.us

Note that the contact information may be the same as the primary contact information at the top of the page. If this is your case, excuse the inconvenience but please enter the information again.

Water Waste Prevention

Water Agency shall do one or more of the following:

a. Enact and enforce an ordinance or establish terms of service that prohibit water waste
b. Enact and enforce an ordinance or establish terms of service for water efficient design in new development
c. Support legislation or regulations that prohibit water waste
d. Enact an ordinance or establish terms of service to facilitate implementation of water shortage response measures
e. Support local ordinances that prohibit water waste
f. Support local ordinances that establish permits requirements for water efficient design in new

To document this BMP, provide the following:

a. A description of, or electronic link to, any ordinances or terms of service
b. A description of, or electronic link to, any ordinances or requirements adopted by local jurisdictions or regulatory agencies with the water agency's service area.
c. A description of any water agency efforts to cooperate with other entities in the adoption or enforcement of local requirement
d. description of agency support positions with respect to adoption of legislation or regulations

You can show your documentation by providing files, links (web addresses), and/or entering a description.

File name(s): Email files to natalie@cuwcc.org

Web address(s) URL: comma-separated list

http://www.ci.ontario.ca.us.us/index.cfm/33992

Enter a description:

See OMC Title 6, Chapter 8A.

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

Reporting unit name (District name): Ontario Municipal Utilities Company

Reporting unit number: 6299

Primary contact:

First name: Alisa

Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

You must enter the repo we h agency. Click here to open a table to obtain this number.

Submit Form

Link to FAQs

View MOU

2009 BMP 1.2 Water Loss Control

Did your agency complete a pre-screening system audit in 2009? Yes ◉ No ○

If yes, answer the following:

Determine metered sales in AF: 39,058.14

Definition: other accountable uses not included in metered sales, such as unbilled water use, fire suppression, etc.

Determine system verifiable uses AF: 533.61

Determine total supply into the system in AF: 42,688.71

Does your agency keep necessary data on file to verify the answers above? Yes ◉ No ○

Did your agency complete a full-scale system water audit during 2009? Yes ○ No ◉

Does your agency maintain in-house records of audit results or the completed AWWA worksheet for the completed audit which could be forwarded to CUWCC? Yes ○ No ○

Did your agency operate a system leak detection program? Yes ○ No ◉

Comments:

version 1.0 2009

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

Reporting unit name (District name): Ontario Municipal Utilities Company

Reporting unit number: 6299

Primary contact:

First name: Alisa

Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

You must enter the reporting unit number

Submit Form

agency. Click here to open a table to obtain this number.

BMP 1.3 Metering with Commodity

Link to FAQs

See the complete MOU: View MOU

See the coverage requirements for this BMP:

Implementation

Does your agency have any unmetered service connections? Yes No

If YES, has your agency completed a meter retrofit plan? Yes No

Enter the number of previously unmetered accounts fitted with meters during reporting year:

Are all new service connections being metered? Yes No

Are all new service connections being billed volumetrically? Yes No

Has your agency completed and submitted electronically to the Council a written plan, policy or program to test, repair and replace meters? Yes No

Please Fill Out The Following Matrix

Account Type	# Metered Accounts	# Metered Accounts Read	# Metered Accounts Billed by Volume	Billing Frequency Per Year	# of estimated bills/yr
Single-Family	29,878	29,878	29,878	Monthly	0
Multi-Family	2,102	2,102	2,102	Monthly	0
Industrial	287	287	287	Monthly	0
Commericial	3,322	3,322	3,322	Monthly	0
Dedicated Irrigatio	1,295	1,295	1,295	Monthly	0
Institutional	317	317	317	Monthly	0
Dedicated Irrigatio	156	156	156	Monthly	0
Other	12	12	12	Other	0
Other	144	144	144	Other	
Other	3	3	3	Other	

Number of CII Accounts with Mixed-use Meters: 3,926

Number of CII Accounts with Mixed-use Meters Retrofitted with Dedicated Irrigation Meters during Reporting Period:

Feasibility Study

Has your agency conducted a feasibility study to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters? Yes No

If YES, please fill in the following information:

A. When was the Feasiblity Study conducted: 03/10/2011

B. Email or provide a link to the feasibility study (or description of):

File name(s): Email files to natalie@cuwcc.org: Ontario Municipal Utilities Company_Ontario Municipal Utilities

Web address(s) URL: comma-separated list:

General Comments about BMP 1.3:

Feasibility Study Examining Incentive Programs to
Move Landscape Water Uses on Mixed-Use Meters to Dedicated Landscape Meters
March 2011

To comply with BMP 1.3 of the California Urban Water Conservation Council's Memorandum of Understanding, signatories must conduct a feasibility study examining incentive programs to move landscape water uses on mixed-use meters to dedicated landscape meters. It is thought that being able to measure indoor and outdoor water use separately may enable customers and water agencies to better identify opportunities for water use reduction and measure the success of conservation programs. Different types of accounts have different billing structures and requirements. The costs of installing dedicated irrigation meters for each account type are estimated below.

I. Single-Family Residential Accounts

There are currently 29,746 single-family residential meters in Ontario.

A. Initial costs:
   1. Cost of new irrigation meter estimated at $225, based on 5/8" meter.
   2. Cost of re-plumbing and installation varies depending on site conditions. Estimated at $4,000 - $6,000.

B. Affect on customer's ongoing billing:
   1. Additional fixed meter fee (RTS): $253/year, based on 5/8" meter.
   2. Reduced water bill due to 1,500 cubic feet of existing water usage billed at baseline rate on second meter: a savings of $63/year in OMC, or $64/year in NMC.

Based on the above estimates, the initial cost of installing a dedicated irrigation meter could vary in the range of $4,225 -$6,225, with an ongoing net annual increase in the customer's utility bill in the range of $188 - $190.

II. Multi-Family Residential Accounts

There are currently 2,064 multi-family residential meters in Ontario. Current standards require the installation of separate irrigation meters for multi-family development; however, older developments built before these standards were in place do not have separate irrigation meters.

A. Initial costs:
   1. Cost of new irrigation meter varies depending on meter size. Estimated at $550, based on 2" meter.
   2. Cost of re-plumbing and installation varies depending on site conditions. Estimated at $5,000 - $15,000.

B. Affect on customer's ongoing billing:
   1. Additional fixed meter fee (RTS) varies: $1,434/year, based on 2" meter.
   2. Reduced water bill due to an additional 1,500 cubic feet of existing water usage billed at baseline rate on second meter: a savings of $63/year in OMC, or $64/year in NMC.

Based on the above estimates, the initial cost of installing a dedicated irrigation meter could vary in the range of $5,550-$15,550, with an ongoing net annual increase in the customer's utility bill in the range of $1,369 - $1,371.

III. Commercial/Industrial Accounts

There are currently 3,595 commercial/industrial meters in Ontario. Current standards require the installation of separate irrigation meters for commercial/industrial development; however, older facilities built before these standards were in place do not have separate irrigation meters. If an additional meter were installed at a commercial/industrial site, an additional backflow prevention device would be required.

A. Initial costs:
   1. Cost of new irrigation meter varies depending on meter size. Estimated at $550, based on 2" meter.
   2. Cost of re-plumbing and installation varies depending on site conditions. Estimated at $5,000 - $15,000.
   3. Cost of additional backflow device and installation varies depending size, and on site conditions. Estimated at $1,800 - $3,000, based on 2" RP.

B. Affect on customer's ongoing billing and costs:
   1. Additional fixed meter fee (RTS): $1,434/year, based on 2" meter.
   2. City fee for backflow device: $51/year.
   3. Annual testing of backflow prevention device varies: estimated at $50.
   4. Cost of maintaining/repairing backflow device as needed: varies, estimate unavailable.
   5. Reduced water bill due to an additional 1,500 cubic feet of existing water usage billed at baseline rate on second meter: in OMC, a savings of $63/year, or $64/year in NMC.
   6. Potential reduction of sewer bill – varies by site - estimate unavailable.

Based on the above estimates, the initial, one-time cost of installing a dedicated irrigation meter, along with a backflow prevention device, could vary somewhere in the range of $5,550-$15,550, with an ongoing net annual increase in the customer's utility bill and other fees in the range of $1,470 - $1,472.

IV. Conclusion

The costs of implementing incentive programs to move landscape water uses on mixed-use meters to dedicated landscape meters are high, and the potential benefits are not quantifiable; therefore, the Ontario Municipal Utilities Company will not move forward with such a program.

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

Reporting unit name (District name): Ontario Municipal Utilities Company

Reporting unit number: 6299

Primary contact:

First name: Alisa

Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

You must enter the reporting unit number

Submit Form

agency. Click here to open a table to obtain this number.

Link to FAQs

BMP 1.4 Retail Conservation Pricing

View MOU

If you are reporting more rate structures than this form allows, add the structures to a spreadsheet and send the file to natalie@cuwcc.org.

2009

Implementation (Water Rate Structure)

Enter the Water Rate Structures that are assigned to the majority of your customers, by customer class

Rate Structure	Customer Class	Total Revenue Commodity Charges	Total Revenue Customer Meter/Service (Fixed Charges)
Increasing Block		4,923,862.55	2,335,468.92
Increasing Block		4,235,867.45	1,205,642.73
Increasing Block		1,669,636.12	266,905.65
Increasing Block		6,120,119.42	2,205,783.12
Increasing Block		5,411,603.46	1,018,626.56
Increasing Block		646,828.22	282,458.16
Increasing Block		418,443.72	76,707.96

Implementation Option (Conservation Pricing Option)

- ○ Use Annual Revenue As Reported
- ○ Use Canadian Water & Wastewater Association Rate Design Model

If CWWA is select, enter the file name and email the spreadsheet to natalie@cuwcc.org

Retail Waste Water (Sewer) Rate Structure by Customer Class

Agency Provide Sewer Service ○ Yes ○ No

Select the Retail Waste Water(Sewer) Rate Structure assigned to the majority of your customers within a specific customer class.

Rate Structure	Customer Class	Total Revenue Commodity Charges	Total Revenue Customer Meter/Service (Fixed Charges)
Non-Volumetric Fla		0.00	180,743.98
Non-Volumetric Fla		0.00	1,980,963.28
Uniform		5,834,726.96	0.00
Uniform		478,818.58	0.00
Select a Rate Struc			
Select a Rate Struc			
Select a Rate Struc			

Comments:

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

Reporting unit name (District name): Ontario Municipal Utilities Company

Reporting unit number: 6299

Primary contact:

First name: Alisa

Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

Click here to open a table that displays your agenc reporting unit name reporting unit number. Please ensure that you enter the correct information.

Submit Form

Link to FAQs

2009

BMP 2.1 Public Outreach Cont'd

View MOU

Public Outreach Expenses

Enter expenses for public outreach programs. Please include the same kind of expenses you included in the question related to your budget (Section 2.1.7, above). For example, if you included personnel costs in the budget entered above, be sure to include them here as well.

Expense Category	Expense Amount	Personnel Costs Included?	
		☐	If yes, check the check box.
		☐	
		☐	
		☐	

Additional Public Information Program

Please report additional public information contacts. List these additional contacts in order of how your agency views their importance / effectiveness with respect to conserving water, with the most important/ effective listed first (where 1 = most important).

Were there additional Public Outreach efforts? ○ Yes ○ No

Public Outreach Additional Information

Public Information Programs	Importance	
"Go Green" Event at Citizens Business Bank Arena	$1	
Landscape Class at Ontario Senior Center	$1	
Environmental Presentation at Ontario Senior Center	$1	

Social Marketing Programs

Branding

Does your agency have a water conservation "brand," "theme" or mascot? ○ Yes ○ No

Describe the brand, theme or mascot.

Market Research

Have you sponsored or participated in market research to refine your message? ○ Yes ○ No

Market Research Topic	
Brand Message	
Brand Mission Statement	

Community Committees

Do you have a community conservation committee? ○ Yes ○ No

Enter the names of the community committees:

1. IEUA Regional Conservation Partnership 2. Water Education Water Awareness Committee

Training

Training Type	# of Trainings	# of Attendees	Description of Other
Landscape Class	1	67	

Social Marketing Expenditures

Public Outreach Social Marketing Expenses

Expense Category	Expense Amount	Description

Partnering Programs - Partners

Name	Type of Program
☐ CLCA?	
☐ Green Building Programs?	
☐ Master Gardeners?	
☐ Cooperative Extension?	
☐ Local Colleges?	
☐ Other	

☐ Retail and wholesale outlet; name(s) and type(s) of programs:

Partnering Programs - Newsletters

Number of newsletters per year: 4

Number of customers per year | $53,000

Partnering with Other Utilities

Describe other utilities your agency partners with, including electrical utilities

IEUA, and many others regionally.

Conservation Gardens

Describe water conservation gardens at your agency or other high traffic areas or new

Water Conservation Demonstration Garden at LA County Fair.

Landscape contests or awards

Describe water wise landscape contest or awards program conducted by your agency

Comments:

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

Reporting unit name (District name): Ontario Municipal Utilities Company

Reporting unit number: 6299

Primary contact:

First name: Alisa

Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

Click here to open a table that displays your agency name, reporting unit name and reporting unit number. Please ensure that you enter the correct information.

Submit Form

Link to FAQs

2009

BMP 2.1 Public Outreach - Retail Reporting

View MOU

Is a Wholesale Agency Performing Public Outreach?

Are there one or more wholesale agencies performing public outreach which can be counted to help your agency comply with the BMP? ○ Yes ○ No

Enter the name(s) of the wholesale agency (comma delimited): Inland Empire Utilities Agency

Is your agency performing public outreach?

Report a minimum of 4 water conservation related contacts your agency had with the public during the year.

Public Information Programs List

Did at least one contact take place during each quarter of the reporting year? ☑

Number of Public Contacts		Public Information Programs	
4			
1			
1			
200	Flyers and/or brochures (total copies), bill stuffers, messages printed on bill, information packets		
5	General water conservation information		

Contact with the Media

Are there one or more wholesale agencies performing media outreach which can be counted to help your agency comply with the BMP? ○ Yes ○ No

Enter the name(s) of the wholesale agency (comma delimited): Inland Empire Utilities Agency

OR Retail Agency (Contacts with the Media)

Did at least one contact take place during each quarter of the reporting year? ☐

Media Contacts List

Number of Media Contacts	Did at least one contact take place during each quarter of the reporting year?	Media Contact Types	
	Select a type of media contact		
	Select a type of media contact		
	Select a type of media contact		
	Select a type of media contact		
	Select a type of media contact		
	Select a type of media contact		

Is a Wholesale Agency Performing Website Updates?

Did one or more CUWCC wholesale agencies agree to assume your agency's responsibility for meeting the requirements of and for CUWCC reporting of this BMP? ○ Yes ○ No

Enter the name(s) of the wholesale agency (comma delimited)

Inland Empire Utilities Agency

Is Your Agency Performing Website Updates?

Enter your agency's URL (website address): www.ci.ontario.ca.us

Describe a minimum of four water conservation related updates to your agency's website that took place during the year:

Water Conservation tips were posted, and edited periodically.

Did at least one Website Update take place during each quarter of the reporting year? ○ Yes ○ No

Public Outreach Annual Budget

Enter budget for public outreach programs. You may enter total budget in a single line or brake the budget into discrete categories by entering many rows. Please indicate if personnel costs are included in the entry.

Category	Amount		Personnel Costs Included? If yes, check the box.	Comments	

Comments:

Although no budget is reflected, conservation programs are funded through monies contributed by the Ontario Municipal Utilities Company to the Inland Empire Utilities Agency (our wholesaler) as a surcharge on imported water purchases.

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

Reporting unit name (District name): Ontario Municipal Utilities Company

Reporting unit number: 6299

Primary contact:

First name: Alisa

Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

Click here to open a table that displays your agency n reporting unit name an reporting unit number. Please ensure that you enter the correct information.

Submit Form

Link to FAQs

2009

BMP 2.2 School Education Programs, Retail Agencies

View MOU

School Programs

Is your agency implementing school programs which can be counted to help another agency comply with this BMP? ○ Yes ○ No

Enter Wholesaler Names, separated by commas: Inland Empire Utilities Agency

☐ Materials meet state education framework requirements?

Description of Materials: 1) Garden in Every School Information 2) National Theatre for Children information. 3) Project WET Information. 4) PSA Contest Information 5) Edu-Grant Information.

☐ Materials distributed to K-6 Students?

Description of materials distributed to K-6 Students: See Above

Number of students reached:

☐ Materials distributed to 7-12 Students?

Description of materials distributed to 7-12 Students: PSA Contest Information.

Number of Distribution:

Annual budget for school education program: $0.00

Description of all other water supplier education programs: Education programs funded through regional programs.

School Program Activities

Classroom presentations:

Number of presentations: 4 Number of attendees:

Large group assemblies:

Number of presentations: 6 Number of attendees: 600

Children's water festivals or other events:

Number of presentations: 0 Number of attendees: N/A

Cooperative efforts with existing science/water education programs (various workshops, science fair awards or judging) and follow-up:

Number of presentations: 1 Number of attendees: 50

Other methods of disseminating information (i.e. themed age-appropriate classroom loaner kits):

Description: 1) Water Conservation/Water Quality 2) Handouts and give-aways provided to schools for Earth Day and other events.

Number distributed: 525

Staffing children's booths at events & festivals:

Number of booths: 0

Number of attendees: N/A

Water conservation contests such as poster and photo:

Description:

Number distributed: N/A

Offer monetary awards/funding or scholarships to students:

Number Offered: 21

Total Funding: Funded Regionally

Teacher training workshops:

Number of presentations: 1

Number of attendees: 20

Fund and/or staff student field trips to treatment facilities, recycling facilities, water conservation gardens, etc.:

Number of tours or field trips: 0

Number of participants: N/A

College internships in water conservation offered:

Number of internships: 0

Total funding: N/A

Career fairs/workshops:

Number of presentations: 0

Number of attendees: N/A

Additional program(s) supported by agency but not mentioned above:

Description:

Number of events (if applicable):

Number of participants:

Total reporting period budget expenditures for school education programs (include all agency costs): 0

Comments

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

Division name (Reporting unit): Ontario Municipal Utilities Company

Reporting unit number: 6299

Primary contact:

First name: Alisa

Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

Submit Form

CUWCC

WATER SOURCES

2010

Service Area Population: 172908

Potable Water

Own Supply Source Name	AF/YEAR	Water Supply Type	Water Supply Description
Groundwater	28,996.00	Groundwater	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	

Imported Supply Source Name	AF/YEAR	Water Supply Type	Water Supply Description
JCSD/CDA	7,047.38	Other	
WFA	3,493.79	Surface	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	
		Other	

Exported Water Name	AF/YEAR	Where Exported?

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

Division name (Reporting unit): Ontario Municipal Utilities Company

Reporting unit number: 6299

Primary contact:

First name: Alisa

Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

Submit Form

2010

Service Area Population: 172908

Non- Potable Water

If you select Other for type, enter

Own Supply Source Name	AF/YEAR	Water Supply Type	Water Supply Description
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	

Imported Supply Source Name	AF/YEAR	Water Supply Type	Water Supply Description
IEUA	1,825.00	Recycled Non Potable	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	
		Select a water type.	

Exported Water Name	AF/YEAR	Where Exported? such as groundwater recharge, retail,

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

Division name (Reporting unit): Ontario Municipal Utilities Company

Reporting unit number: 6299

Primary contact:

First name: Alisa

Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

Submit Form

Water Uses 2010

Potable Water Billed

Make sure to enter numbers in AF/Year.

Customer Type	Meter Accounts	Metered Water Delivered	Un-metered Accounts	Un-metered Water Delivered	Description
Single-Family	29,878.00	6,533.13			
Multi-Family	2,102.00	5,260.55			
Industrial	287.00	2,049.48			
Commercial	3,322.00	7,580.79			
Dedicated Irrigation	1,295.00	6,665.43			
Other	317.00	800.97			City of Ontario facilities
Other	144.00	149.36			Hydrants
Other					
Other					
Other					
Other					
Other					
Other					

Potable Water Un-Billed

Customer Type	Meter Accounts	Metered Water Delivered	Un-metered Accounts	Un-metered Water Delivered	Description
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					

The fields in red are required.

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Division name (Reporting unit): Ontario Municipal Utilities Company

Reporting unit number: 6299

Primary contact:

First name: Alisa

Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

Submit Form

Water Uses 2010

Non-Potable Billed

Customer Type	Meter Accounts	Metered Water Delivered	Un-metered Accounts	Un-metered Water Delivered	Description
Dedicated Irrigation	156.00	1,012.17			
Other	12.00	147.89			City of Ontario facilities
Other	3.00	12.18			Recylced Water Hydrants
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					

Non-Potable Un-Billed

Customer Type	Meter Accounts	Metered Water Delivered	Un-metered Accounts	Un-metered Water Delivered	Description
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Other					

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

Reporting unit name (District name): Ontario Municipal Utilities Company

Reporting unit number: 6299

Primary contact:

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Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

You must enter the reporting unit numbe we have on record fo agency. Click here to open a table to obtain this number.

Submit Form

Link to FAQs

2010

BMP 1.1 Operations Practices

Comments:

See the complete MOU: View MOU

See the coverage requirements for this BMP:

Conservation Coordinator

Conservation Coordinator ◯ Yes ◯ No

Contact Information

First Name	Alisa
Last Name	Hasbrouck
Title	Environmental Programs Manager
Phone	(909) 395-2661
Email	ahasbrouck@ci.ontario.ca.us

Note that the contact information may be the same as the primary contact information at the top of the page. If this is your case, excuse the inconvenience but please enter the information again.

Water Waste Prevention

Water Agency shall do one or more of the following:

a. Enact and enforce an ordinance or establish terms of service that prohibit water waste
b. Enact and enforce an ordinance or establish terms of service for water efficient design in new development
c. Support legislation or regulations that prohibit water waste
d. Enact an ordinance or establish terms of service to facilitate implementation of water shortage response measures
e. Support local ordinances that prohibit water waste
f. Support local ordinances that establish permits requirements for water efficient design in new

To document this BMP, provide the following:

a. A description of, or electronic link to, any ordinances or terms of service
b. A description of, or electronic link to, any ordinances or requirements adopted by local jurisdictions or regulatory agencies with the water agency's service area.
c. A description of any water agency efforts to cooperate with other entities in the adoption or enforcement of local requirement
d. description of agency support positions with respect to adoption of legislation or regulations

You can show your documentation by providing files, links (web addresses), and/or entering a description.

File name(s): Email files to natalie@cuwcc.org

Web address(s) URL: comma-separated list

http://www.ci.ontario.ca.us.us/index.cfm/33992

Enter a description:

See OMC Title 6, Chapter 8A.

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

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Reporting unit number: 6299

Primary contact:

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You must enter the r agency. Click here to open a table to obtain this number.

Submit Form

Link to FAQs

2010 BMP 1.2 Water Loss Control

View MOU

AWWA Water Audit

Agency to complete a Water Audit & Balance Using The AWWA Software ⦿ Yes ○ No

Email to natalie@cuwcc.org - Worksheets (AWWA Water Audit). Enter the name of the file below:

1) AWWA Water Audit-Water Loss Control FY 08-09 2)AWWA Water Audit-Water Loss Control FY 09-10

Water Audit Validity Score from AWWA spreadsheet: 81

Agency Completed Training In The AWWA Water Audit Method ⦿ Yes ○ No

Agency Completed Training In The Component Analysis Process ○ Yes ⦿ No

Completed/Updated the Component Analysis (at least every 4 years)? ○ Yes ⦿ No

Component Analysis Completed/Updated Date: N/A

Water Loss Performance

Agency Repaired All Reported Leaks & Breaks To The Extent Cost Effective ⦿ Yes ○ No

Recording Keeping Requirements:

Date/Time Leak Reported	Leak Location
Type of Leaking Pipe Segment or Fitting	Leak Running Time From Report to Repair
Leak Volume Estimate	Cost of Repair

Agency Located and Repaired Unreported Leaks to the Extent Cost Effective ○ Yes ⦿ No

Type of Program Activities Used to Detect Unreported Leaks

Annual Summary Information

Complete the following table with annual summary information (required for reporting years 2-5 only)

Total Leaks Repaired	Economic Value Of Real Loss	Economic Value Of Apparent Loss	Miles Of System Surveyed For Leaks	Pressure Reduction Undertaken for loss reduction	Cost Of Interventions	Water Saved (AF/Year)

Comments:

version 1.0

2009

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

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Reporting unit number: 6299

Primary contact:

First name: Alisa

Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

You must enter the reporting unit number

Submit Form

agency. Click here to open a table to obtain this number.

BMP 1.3 Metering with Commodity 2010

Link to FAQs

See the complete MOU: View MOU

See the coverage requirements for this BMP:

Implementation

Does your agency have any unmetered service connections? Yes No

If YES, has your agency completed a meter retrofit plan? Yes No

Enter the number of previously unmetered accounts fitted with meters during reporting year:

Are all new service connections being metered? Yes No

Are all new service connections being billed volumetrically? Yes No

Has your agency completed and submitted electronically to the Council a written plan, policy or program to test, repair and replace meters? Yes No

Please Fill Out The Following Matrix

Account Type	# Metered Accounts	# Metered Accounts Read	# Metered Accounts Billed by Volume	Billing Frequency Per Year	# of estimated bills/yr
Single-Family	29,878	29,878	29,878	Monthly	0
Multi-Family	2,102	2,102	2,102	Monthly	0
Industrial	287	287	287	Monthly	0
Commericial	3,322	3,322	3,322	Monthly	0
Dedicated Irrigatic	1,295	1,295	1,295	Monthly	0
Instiitional	317	317	317	Monthly	0
Dedicated Irrigatic	156	156	156	Monthly	0
Other	12	12	12	Other	0
Other	144	144	144	Other	
Other	3	3	3	Other	

Number of CII Accounts with Mixed-use Meters: 3,926

Number of CII Accounts with Mixed-use Meters Retrofitted with Dedicated Irrigation Meters during Reporting Period:

Feasibility Study

Has your agency conducted a feasibility study to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters? Yes No

If YES, please fill in the following information:

A. When was the Feasiblity Study conducted: 03/10/2011

B. Describe, upload or provide an electronic link to the Feasibility Study Upload File

File name(s): Email files to natalie@cuwcc.org: Ontario Municipal Utilities Company_Ontario Municipal Utilities

Web address(s) URL: comma-separated list:

Comments:

Feasibility Study Examining Incentive Programs to
Move Landscape Water Uses on Mixed-Use Meters to Dedicated Landscape Meters
March 2011

To comply with BMP 1.3 of the California Urban Water Conservation Council's Memorandum of Understanding, signatories must conduct a feasibility study examining incentive programs to move landscape water uses on mixed-use meters to dedicated landscape meters. It is thought that being able to measure indoor and outdoor water use separately may enable customers and water agencies to better identify opportunities for water use reduction and measure the success of conservation programs. Different types of accounts have different billing structures and requirements. The costs of installing dedicated irrigation meters for each account type are estimated below.

I. Single-Family Residential Accounts

There are currently 29,746 single-family residential meters in Ontario.

A. Initial costs:
   1. Cost of new irrigation meter estimated at $225, based on 5/8" meter.
   2. Cost of re-plumbing and installation varies depending on site conditions. Estimated at $4,000 - $6,000.

B. Affect on customer's ongoing billing:
   1. Additional fixed meter fee (RTS): $253/year, based on 5/8" meter.
   2. Reduced water bill due to 1,500 cubic feet of existing water usage billed at baseline rate on second meter: a savings of $63/year in OMC, or $64/year in NMC.

Based on the above estimates, the initial cost of installing a dedicated irrigation meter could vary in the range of $4,225 -$6,225, with an ongoing net annual increase in the customer's utility bill in the range of $188 - $190.

II. Multi-Family Residential Accounts

There are currently 2,064 multi-family residential meters in Ontario. Current standards require the installation of separate irrigation meters for multi-family development; however, older developments built before these standards were in place do not have separate irrigation meters.

A. Initial costs:
   1. Cost of new irrigation meter varies depending on meter size. Estimated at $550, based on 2" meter.
   2. Cost of re-plumbing and installation varies depending on site conditions. Estimated at $5,000 - $15,000.

B. Affect on customer's ongoing billing:
   1. Additional fixed meter fee (RTS) varies: $1,434/year, based on 2" meter.
   2. Reduced water bill due to an additional 1,500 cubic feet of existing water usage billed at baseline rate on second meter: a savings of $63/year in OMC, or $64/year in NMC.

Based on the above estimates, the initial cost of installing a dedicated irrigation meter could vary in the range of $5,550-$15,550, with an ongoing net annual increase in the customer's utility bill in the range of $1,369 - $1,371.

III. Commercial/Industrial Accounts

There are currently 3,595 commercial/industrial meters in Ontario. Current standards require the installation of separate irrigation meters for commercial/industrial development; however, older facilities built before these standards were in place do not have separate irrigation meters. If an additional meter were installed at a commercial/industrial site, an additional backflow prevention device would be required.

A. Initial costs:
   1. Cost of new irrigation meter varies depending on meter size. Estimated at $550, based on 2" meter.
   2. Cost of re-plumbing and installation varies depending on site conditions. Estimated at $5,000 - $15,000.
   3. Cost of additional backflow device and installation varies depending size, and on site conditions. Estimated at $1,800 - $3,000, based on 2" RP.

B. Affect on customer's ongoing billing and costs:
   1. Additional fixed meter fee (RTS): $1,434/year, based on 2" meter.
   2. City fee for backflow device: $51/year.
   3. Annual testing of backflow prevention device varies: estimated at $50.
   4. Cost of maintaining/repairing backflow device as needed: varies, estimate unavailable.
   5. Reduced water bill due to an additional 1,500 cubic feet of existing water usage billed at baseline rate on second meter: in OMC, a savings of $63/year, or $64/year in NMC.
   6. Potential reduction of sewer bill – varies by site - estimate unavailable.

Based on the above estimates, the initial, one-time cost of installing a dedicated irrigation meter, along with a backflow prevention device, could vary somewhere in the range of $5,550-$15,550, with an ongoing net annual increase in the customer's utility bill and other fees in the range of $1,470 - $1,472.

IV. Conclusion

The costs of implementing incentive programs to move landscape water uses on mixed-use meters to dedicated landscape meters are high, and the potential benefits are not quantifiable; therefore, the Ontario Municipal Utilities Company will not move forward with such a program.

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

Reporting unit name (District name): Ontario Municipal Utilities Company

Reporting unit number: 6299

Primary contact:

First name: Alisa

Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

You must enter the reporting unit number that we have on record for your agency. Click Submit Form to obtain this number.

Submit Form

CUWCC

2010

Link to FAQs

View MOU

BMP 1.4 Retail Conservation Pricing

If you are reporting more rate structures than this form allows, add the structures to a spreadsheet and send the file to natalie@cuwcc.org.

Implementation (Water Rate Structure)

Enter the Water Rate Structures that are assigned to the majority of your customers, by customer class

Rate Structure	Customer Class	Total Revenue Commodity Charges	Total Revenue Customer Meter/Service (Fixed Charges)
Increasing Block		4,923,862.55	2,335,468.92
Increasing Block		4,235,867.45	1,205,642.73
Increasing Block		1,669,636.12	266,905.65
Increasing Block		6,120,119.42	2,205,783.12
Increasing Block		5,411,603.46	1,018,626.56
Increasing Block		646,828.22	282,458.16
Increasing Block		418,443.72	76,707.96

Implementation Option (Conservation Pricing Option)

- ○ Use Annual Revenue As Reported
- ○ Use Canadian Water & Wastewater Association Rate Design Model

If CWWA is select, enter the file name and email the spreadsheet to natalie@cuwcc.org

Retail Waste Water (Sewer) Rate Structure by Customer Class

Agency Provide Sewer Service ○ Yes ○ No

Select the Retail Waste Water(Sewer) Rate Structure assigned to the majority of your customers within a specific customer class.

Rate Structure	Customer Class	Total Revenue Commodity Charges	Total Revenue Customer Meter/Service (Fixed Charges)
Non-Volumetric Fla		0.00	180,743.98
Non-Volumetric Fla		0.00	1,980,963.28
Uniform		5,834,726.96	0.00
Uniform		478,818.58	0.00
Select a Rate Struc			
Select a Rate Struc			
Select a Rate Struc			

Comments:

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

Reporting unit name (District name): Ontario Municipal Utilities Company

Reporting unit number: 6299

Primary contact:

First name: Alisa

Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

Click here to open a table that displays your agenc reporting unit name reporting unit number. Please ensure that you enter the correct information.

Submit Form

Link to FAQs

2010

BMP 2.1 Public Outreach Cont'd

View MOU

Public Outreach Expenses

Enter expenses for public outreach programs. Please include the same kind of expenses you included in the question related to your budget (Section 2.1.7, above). For example, if you included personnel costs in the budget entered above, be sure to include them here as well.

Expense Category	Expense Amount	Personnel Costs Included?	
		☐	If yes, check the check box.
		☐	
		☐	
		☐	

Additional Public Information Program

Please report additional public information contacts. List these additional contacts in order of how your agency views their importance / effectiveness with respect to conserving water, with the most important/ effective listed first (where 1 = most important).

Were there additional Public Outreach efforts? ○ Yes ○ No

Public Outreach Additional Information

Public Information Programs	Importance	
"Go Green" Event at Citizens Business Bank Arena	$1	
Landscape Class at Ontario Senior Center	$1	
Environmental Presentation at Ontario Senior Center	$1	

Social Marketing Programs

Branding

Does your agency have a water conservation "brand," "theme" or mascot? ○ Yes ○ No

Describe the brand, theme or mascot.

Market Research

Have you sponsored or participated in market research to refine your message? ○ Yes ○ No

Market Research Topic

Brand Message

Brand Mission Statement

Community Committees

Do you have a community conservation committee? ○ Yes ○ No

Enter the names of the community committees:

1. IEUA Regional Conservation Partnership 2. Water Education Water Aw

Training

Training Type	# of Trainings	# of Attendees	Description of Other
Landscape Class	1	67	

Social Marketing Expenditures

Public Outreach Social Marketing Expenses

Expense Category	Expense Amount	Description

Partnering Programs - Partners

Name	Type of Program
☐ CLCA?	
☐ Green Building Programs?	
☐ Master Gardeners?	
☐ Cooperative Extension?	
☐ Local Colleges?	
☐ Other	

☐ Retail and wholesale outlet; name(s) and type(s) of programs:

Partnering Programs - Newsletters

Number of newsletters per year 4

Number of customers per year	$53,000

Partnering with Other Utilities

Describe other utilities your agency partners with, including electrical utilities	IEUA, and many others regionally.

Conservation Gardens

Describe water conservation gardens at your agency or other high traffic areas or new	Water Conservation Demonstration Garden at LA County Fair.

Landscape contests or awards

Describe water wise landscape contest or awards program conducted by your agency	

Comments:

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

Reporting unit name (District name): Ontario Municipal Utilities Company

Reporting unit number: 6299

Primary contact:

First name: Alisa

Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

Click here to open a table that displays your agency name, reporting unit name and reporting unit number. Please ensure that you enter the correct information.

Submit Form

Link to FAQs

2010

BMP 2.1 Public Outreach - Retail Reporting

View MOU

Is a Wholesale Agency Performing Public Outreach?

Are there one or more wholesale agencies performing public outreach which can be counted to help your agency comply with the BMP? ○ Yes ○ No

Enter the name(s) of the wholesale agency (comma delimited): Inland Empire Utilities Agency

Is your agency performing public outreach?

Report a minimum of 4 water conservation related contacts your agency had with the public during the year.

Public Information Programs List

Did at least one contact take place during each quarter of the reporting year? ☑

Number of Public Contacts		Public Information Programs	
4			
1			
1			
200	Newsletter articles on conservation		
5	General water conservation information		

Contact with the Media

Are there one or more wholesale agencies performing media outreach which can be counted to help your agency comply with the BMP? ○ Yes ○ No

Enter the name(s) of the wholesale agency (comma delimited): Inland Empire Utilities Agency

OR Retail Agency (Contacts with the Media)

Did at least one contact take place during each quarter of the reporting year? ☐

Media Contacts List

Number of Media Contacts	Did at least one contact take place during each quarter of the reporting year?	Media Contact Types	
	Select a type of media contact		
	Select a type of media contact		
	Select a type of media contact		
	Select a type of media contact		
	Select a type of media contact		
	Select a type of media contact		

Is a Wholesale Agency Performing Website Updates?

Did one or more CUWCC wholesale agencies agree to assume your agency's responsibility for meeting the requirements of and for CUWCC reporting of this BMP? ○ Yes ○ No

Enter the name(s) of the wholesale agency (comma delimited)

Inland Empire Utilities Agency

Is Your Agency Performing Website Updates?

Enter your agency's URL (website address): www.ci.ontario.ca.us

Describe a minimum of four water conservation related updates to your agency's website that took place during the year:

Water Conservation tips were posted, and edited periodically.

Did at least one Website Update take place during each quarter of the reporting year? ○ Yes ○ No

Public Outreach Annual Budget

Enter budget for public outreach programs. You may enter total budget in a single line or brake the budget into discrete categories by entering many rows. Please indicate if personnel costs are included in the entry.

Category	Amount		Personnel Costs Included? If yes, check the box.	Comments	

Comments:

Although no budget is reflected, conservation programs are funded through monies contributed by the Ontario Municipal Utilities Company to the Inland Empire Utilities Agency (our wholesaler) as a surcharge on imported water purchases.

The fields in red are required.

Agency name: Ontario Municipal Utilites Company

Reporting unit name (District name): Ontario Municipal Utilities Company

Reporting unit number: 6299

Primary contact:

First name: Alisa

Last name: Hasbrouck

Email: ahasbrouck@ci.ontario.ca.us

Click here to open a table that displays your agency n reporting unit name an reporting unit number. Please ensure that you enter the correct information.

Submit Form

Link to FAQs

2010

BMP 2.2 School Education Programs, Retail Agencies

View MOU

School Programs

Is your agency implementing school programs which can be counted to help another agency comply with this BMP? ○ Yes ○ No

Enter Wholesaler Names, separated by commas: Inland Empire Utilities Agency

☐ Materials meet state education framework requirements?

Description of Materials: 1) Garden in Every School Information 2) National Theatre for Children information. 3) Project WET Information. 4) PSA Contest Information 5) Edu-Grant Information.

☐ Materials distributed to K-6 Students?

Description of materials distributed to K-6 Students: See Above

Number of students reached:

☐ Materials distributed to 7-12 Students?

Description of materials distributed to 7-12 Students: PSA Contest Information.

Number of Distribution:

Annual budget for school education program: $0.00

Description of all other water supplier education programs: Education programs funded through regional programs.

School Program Activities

Classroom presentations:

Number of presentations: 4 Number of attendees:

Large group assemblies:

Number of presentations: 6 Number of attendees: 600

Children's water festivals or other events:

Number of presentations: 0 Number of attendees: N/A

Cooperative efforts with existing science/water education programs (various workshops, science fair awards or judging) and follow-up:

Number of presentations: 1 Number of attendees: 50

Other methods of disseminating information (i.e. themed age-appropriate classroom loaner kits):

Description: 1) Water Conservation/Water Quality 2) Handouts and give-aways provided to schools for Earth Day and other events.

Number distributed: 525

Staffing children's booths at events & festivals:

Number of booths: 0

Number of attendees: N/A

Water conservation contests such as poster and photo:

Description:

Number distributed: N/A

Offer monetary awards/funding or scholarships to students:

Number Offered: 21

Total Funding: Funded Regionally

Teacher training workshops:

Number of presentations: 1

Number of attendees: 20

Fund and/or staff student field trips to treatment facilities, recycling facilities, water conservation gardens, etc.:

Number of tours or field trips: 0

Number of participants: N/A

College internships in water conservation offered:

Number of internships: 0

Total funding: N/A

Career fairs/workshops:

Number of presentations: 0

Number of attendees: N/A

Additional program(s) supported by agency but not mentioned above:

Description:

Number of events (if applicable):

Number of participants:

Total reporting period budget expenditures for school education programs (include all agency costs): 0

Comments