The exhibits in this section show the physical state of the Chino Basin with respect to groundwater quality, using data from the Chino Basin groundwater quality monitoring programs.

Prior to OBMP implementation, historical water quality data were obtained from the California Department of Water Resources (DWR) and supplemented with data from some producers in the Appropriative Pool and data from the State of California Department of Public Health (CDPH) database. As part of the OBMP implementation *Program Element 1 – Develop and Implement a Comprehensive Monitoring Program,* Watermaster began conducting a more robust water quality monitoring program. The Groundwater Quality Monitoring Program relies on well owners or their consultants to sample for water quality and provide that data to Watermaster on a routine cooperative basis, and Watermaster than supplements with data obtained through their own sampling programs. Watermaster obtains groundwater quality in the Chino Basin through the following programs:

- **Annual Key Well Groundwater Quality Monitoring Program.** Historically, water quality data were very limited for the private wells in the southern portion of the Basin. 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 from 1999 to 2001, Watermaster sampled all available wells at least twice to develop a robust baseline dataset. This program has since been reduced to approximately 120 key wells, located predominantly in the southern portion of the Basin: 100 wells are sampled on a triennial basis, and 20 are sampled on an annual basis.

- **HCMP Sampling.** Watermaster collects groundwater quality samples from the nine nested HCMP monitoring wells to demonstrate whether Hydraulic Control is being achieved. Each nest contains up to three wells in the borehole. In addition, Watermaster collects monthly samples from four near-river wells to characterize the interaction of the Santa Ana River and groundwater. These shallow monitoring wells along the Santa Ana River consist of two former US Geological Survey (USGS) National Water Quality Assessment Program (NAWQA) wells (Archibald 1 and Archibald 2) and two Santa Ana River Water Company (SARWC) wells (well 9 and well 11).

- **Chino Basin Data Collection (CBDC)**. Watermaster routinely and proactively collects groundwater quality data from well owners, such as municipal producers and other government agencies. Water quality data are also obtained from special studies and monitoring that takes place under the orders of the RWQCB (landfills, groundwater quality investigations, *etc.*), the Department of Toxic Substances Control (DTSC) for the Stringfellow National Priorities List (NPL) site, the USGS, and others. These data are collected from the well owners and monitoring entities twice per year.

All groundwater quality data are checked by Watermaster staff and uploaded to a centralized database management system that can be accessed online through HydroDaVE^{SM}. Groundwater quality data collected by Watermaster are used for: this biennial State of the Basin report; the triennial ambient water quality update mandated by the Water Quality Control Plan for the Santa Ana River Basin (Region 8) (Basin Plan); the demonstration of Hydraulic Control—a maximum benefit commitment in the Basin Plan; and other uses. Data are also used for monitoring nonpoint source groundwater contamination and plumes associated with point source discharges and to assess the overall health of the groundwater basin. Groundwater quality data are also used in conjunction with numerical models to assist Watermaster and other parties in evaluating proposed groundwater remediation strategies.

Exhibit 31 shows all wells with groundwater quality monitoring results for the five-year period from July 2007 to June 2012—the period prior to the 2012 SOB analysis date of June 30, 2012. All available groundwater quality data for this period were analyzed synoptically and temporally at all the 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.

All groundwater quality data for the five-year period from July 2007 through June 2012 in the Chino Basin were analyzed for any exceedances of Primary or Secondary, Federal or State, Maximum Contaminant Levels (MCLs), or State Notification Levels (NLs). Wells with constituent concentrations greater than half the MCL represent areas that warrant concern and inclusion into a long-term monitoring program. Understanding the spatial distribution of wells with concentrations greater than regulatory standards is important because it indicates areas in the Basin where groundwater may be impaired from a beneficial use standpoint. Exhibits 32 through 43 show the areal distribution of constituents of potential concern (COPC) in the Chino Basin. The COPCs in the Chino Basin are defined as follows:

- Constituents associated with salt and nutrient management planning, which are primarily total dissolved solids (TDS), nitrate as nitrogen (NO_3-N).

- Other constituents where a primary MCL was exceeded in twenty or more wells from July 2007 to June 2012 and are not exclusive to one particular known-point source (*i.e.*, the Stringfellow National Priorities List [NPL or Superfund] Site), which include TDS, NO_3-N, perchlorate, total chromium, arsenic, trichloroethene (TCE), tetrachloroethene (PCE), *cis*-1,2-dichloroethene (*cis*-1,2DCE), and 1,1-dichloroethene (1,1-DCE).

- Constituents for which the CDPH is in the process of developing an MCL that may impact future beneficial use of groundwater, which include hexavalent chromium and 1,2,3-trichloropropane (1,2,3-TCP).

The water quality standards exceedances are noted on the exhibits, the maximum concentration value for each well is plotted. The following class interval convention is applied to each water quality map:

Symbol	Class Interval
○	Not Detected
●	<0.5x WQS[3], but detected
●	0.5x WQS to WQS
●	WQS to 2x WQS
●	2x WQS to 4x WQS
●	> 4x WQS

Exhibit 44 shows the locations of various known point-source discharges to groundwater and associated areas of degradation. Understanding point sources of concern in the Chino Basin is critical to the overall management of groundwater quality. To ensure that Chino Basin groundwater remains a sustainable resource,

[3] Where WQS is the appropriate water quality standard.

Watermaster must closely monitor point-source discharges and emerging contaminates of concern. Watermaster works closely with the RWQCB and the potentially responsible parties (PRPs) within the Chino Basin. The following is a summary of all the regulatory and voluntary contamination monitoring in the Chino Basin that are currently known to Watermaster:

- **Plume:** Alumax Aluminum Recycling Facility
  Constituents of Concern: TDS, sulfate, nitrate, chloride
  Order: RWQCB Cleanup and Abatement Order 99-38

- **Plume:** Archibald South Plume – South of Ontario Airport
  Constituents of Concern: volatile organic chemicals (VOCs)
  Order: This plume is currently being voluntarily investigated by a group of potentially responsible parties per seven Draft Cleanup and Abatement Orders

- **Plume:** Chino Airport
  Constituents of Concern: VOCs
  Order: RWQCB Cleanup and Abatement Order 90-134

- **Plume:** California Institute for Men (No Further Action status, as of 2/17/2009)
  Constituents of Concern: VOCs
  Order: Voluntary Cleanup and Monitoring

- **Plume:** Former Crown Coach International Facility
  Constituents of Concern: VOCs and Solvents
  Order: Voluntary Cleanup and Monitoring

- **Plume:** General Electric Flatiron Facility
  Constituents of Concern: VOCs and hexavalent chromium
  Order: Voluntary Cleanup and Monitoring

- **Plume:** General Electric Test Cell Facility
  Constituents of Concern: VOCs
  Order: Voluntary Cleanup and Monitoring

- **Plume:** Former Kaiser Steel Mill
  Constituents of Concern: TDS, total organic carbon (TOC), VOCs
  Order: RWQCB Order No. 91-40 Closed. Kaiser granted capacity in the Chino II Desalter to remediate.

- **Plume:** Former Kaiser Steel Mill – CCG Property
  Constituents of Concern: chromium, hexavalent chromium, other metals, VOCs
  Order: DTSC Consent Order 00/01-001

- **Plume:** Milliken Sanitary Landfill
  Constituents of Concern: VOCs
  Order: RWQCB Order No. 81-003

- **Plume:** Upland Sanitary Landfill
  Constituents of Concern: VOCs
  Order RWQCB Order No 98-99-07

- **Plume:** Stringfellow National Priorities List (NPL) Site
  Constituents of Concern: VOCs, perchlorate, N-nitrosodimethylamine (NDMA), trace 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.

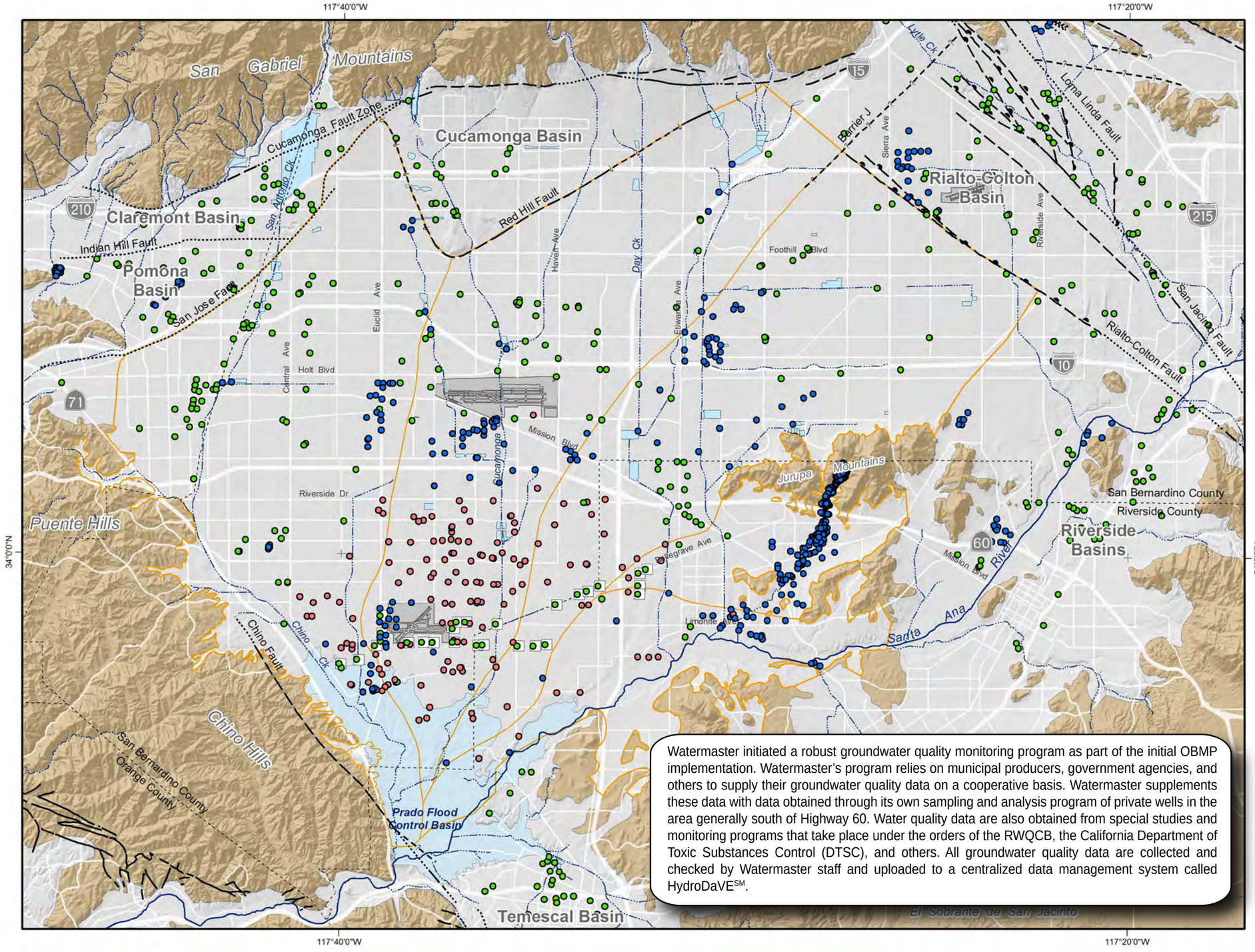
- **Plume:** Alger Manufacturing Co.
  Constituents of Concern: VOCs
  Order: Voluntary Cleanup and Monitoring

Groundwater quality data collected from Watermaster's sampling programs, from other special studies, and from monitoring in the Basin under the orders of the RWQCB or DTSC are used by Watermaster to delineate plumes associated with VOC contamination every two years. Exhibit 44 shows the extent of contamination associated with the VOC plumes as of July 2012. The VOC plumes illustrate the estimated spatial extent of TCE or PCE, depending on the main constituent of concern. The methods employed to create these depictions are described on each exhibit. Exhibits 45 and 46 show more detailed delineations of the Chino Airport plume and the Archibald South plume, respectively. Because the extensive multi-depth groundwater quality monitoring completed over the last five years in the Chino Airport region, Exhibit 45 shows Chino Airport plume delineation in the shallow and deep aquifers.

Exhibit 47 shows the VOC plumes and features pie charts that display the relative percent of TCE, PCE, and other VOCs detected at groundwater wells within the plume impacted areas. The pie charts demonstrate the chemical differentiation between the VOC plumes in the southern portion of Chino Basin.

The remaining exhibits in this section display the overall state of groundwater quality in the Basin with respect to TDS and nitrate concentrations. Exhibits 48 and 49 show trends in the ambient water quality determinations for TDS and NO_3-N by management zone and the associated anti-degradation and maximum benefit water quality objectives. The maximum benefit objectives established in the 2004 Basin Plan Amendment (RWQCB, 2004) raised the TDS and NO_3-N objectives for the Chino-North Management Zone (combined MZ1, MZ2, and MZ3). These "maximum benefit" water quality objectives were based on the additional consideration of factors specified in California Water Code Section 13241 and the requirements of the State's Antidegradation Policy (SWRCB Resolution No. 68-16), which requires a demonstration that the change in the objective will be "[…] consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies." The application of the maximum-benefit objectives is contingent upon the implementation of specific projects and programs by Watermaster and IEUA. These projects and programs, termed the "Chino Basin maximum-benefit commitments," are described in the Maximum Benefit Implementation Plan for Salt Management in the Basin Plan. The maximum benefit objectives have allowed for more efficient and pragmatic water supply planning and salt/nutrient management.

Exhibits 50 through Exhibit 57 show TDS and NO_3-N time histories for selected wells from 1970 to 2012. These time histories illustrate water quality variations and trends within each management zone and the current state of water quality compared to those historical trends. The wells were selected based on location, length of record, quality of data, geographical distribution, and screened intervals. Wells are identified by their local name (usually owner abbreviation and well number) or X Reference ID (XRef) if privately owned. The time histories also display the CDPH MCL.



Watermaster initiated a robust groundwater quality monitoring program as part of the initial OBMP implementation. Watermaster's program relies on municipal producers, government agencies, and others 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 Highway 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. All groundwater quality data are collected and checked by Watermaster staff and uploaded to a centralized data management system called HydroDaVE^{SM}.

- Monitoring Wells
- Municipal Wells
- Private Wells
- Chino Desalter Wells
- OBMP Management Zones
- 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
- Approximate Location of Groundwater Barrier
- Location Concealed
- Location Uncertain

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Lake Forest, CA 92630
949.420.3030
www.wildermuthenvironmental.com

Author: VMW
Date: 20121004
File: Exhibit_31.mxd

0 1 2 3 4 5 Miles

0 2 4 6 8 KM

2012 State of the Basin
Groundwater Quality

Wells with Groundwater Quality Data

July 2007 to June 2012

Exhibit 31

117°40'0"W

117°20'0"W

34°0'0"N

San Gabriel Mountains

Cucamonga Fault Zone

Cucamonga Basin

Claremont Basin

Pomona Basin

Rialto-Colton Basin

Indian Hill Fault

San Jose Fault

Red Hill Fault

Barrier J

Loma Linda Fault

Rialto-Colton Fault

San Jacinto Fault

Puente Hills

Chino Hills

Chino Fault

Prado Flood Control Basin

Temescal Basin

Jurupa Mountains

Riverside Basins

San Bernardino County

Riverside County

Orange County

Foothill Blvd

Holt Blvd

Riverside Dr

Mission Blvd

Limonite Ave

Santa Ana River

San Antonio Ck

Day Ck

Cucamonga Ck

Chino Ck

Lytle Ck

Sierra Ave

Haven Ave

Euclid Ave

Central Ave

Etiwanda Ave

Riverside Ave

Van Buren Blvd

15 | 210 | 215 | 10 | 71 | 60

TDS is regulated as a secondary contaminant. The California secondary drinking water MCL for TDS is 500 milligrams per liter (mg/L). This map shows the areal distribution of the maximum TDS concentration observed at wells in Chino Basin for the five-year period from July 2007 through June 2012. During this time period, 295 out of the 530 wells sampled for TDS in the Chino Basin (56%) exceeded the Secondary US EPA MCL. The highest concentrations of TDS are mostly located south of Highway 60. The maximum TDS concentrations ranged from 116 mg/L to 8,600 mg/L with average and median concentrations of approximately 773 mg/L and 588 mg/L, respectively.

Total Dissolved Solids (TDS) (mg/L)

- < 125
- 125 - 250
- 250 - 500
- 500 - 1,000
- 1,000 - 2,000
- > 2,000

Secondary US EPA MCL = 500 mg/L

OBMP 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
- Approximate Location of Groundwater Barrier
- Location Concealed
- Location Uncertain

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949.420.3030
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0 1 2 3 4 5 Miles

0 2 4 6 8 KM

2012 State of the Basin
Groundwater Quality

Total Dissolved Solids (TDS) in Groundwater

Maximum Concentration (July 2007 to June 2012)

Exhibit 32

117°40'0"W

117°20'0"W

34°0'0"N

San Gabriel Mountains

Cucamonga Fault Zone

Cucamonga Basin

Claremont Basin

Pomona Basin

Rialto-Colton Basin

Red Hill Fault

Indian Hill Fault

San Jose Fault

Rialto-Colton Fault

San Jacinto Fault

Loma Linda Fault

Barrier J

Lytle Ck

San Antonio Ck

Day Ck

Cucamonga Ck

Chino Ck

Santa Ana River

Foothill Blvd

Holt Blvd

Mission Blvd

Riverside Dr

Jurupa Mountains

San Bernardino County

Riverside County

Riverside Basins

Puente Hills

Chino Fault

Chino Hills

San Bernardino County

Orange County

Prado Flood Control Basin

Temescal Basin

15 210 215 10 71 60

Nitrate-Nitrogen (NO_3-N) (mg/L)

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

Primary US EPA MCL = 10 mg/L
Primary CA MCL = 10 mg/L

OBMP 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
- Approximate Location of Groundwater Barrier
- Location Concealed
- Location Uncertain

The Federal and California Primary MCL for nitrate as nitrogen (NO_3-N) in drinking water is 10 mg/L. By convention, all nitrate values are expressed in this report as NO_3-N. This map displays the areal distribution of maximum NO_3-N concentration observed at wells in the Chino Basin for the five-year period from July 2007 through June 2012. During this time period, 649 out of the 850 wells sampled for NO_3-N in the Chino Basin (77%) exceeded the Primary MCL. The highest concentrations of NO_3-N are predominantly located south of Highway 60, where the concentration frequently exceed the Primary MCL, and often exceed 40 mg/L (4 times the MCL).

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Lake Forest, CA 92630
949.420.3030
www.wildermuthenvironmental.com

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Date: 20121005
File: Exhibit_33.mxd

0 1 2 3 4 5 Miles

0 2 4 6 8 KM

2012 State of the Basin
Groundwater Quality

Nitrate as Nitrogen in Groundwater

Maximum Concentration (July 2007 to June 2012)

Exhibit 33

117°40'0"W

117°20'0"W

34°0'0"N

San Gabriel Mountains

Cucamonga Fault Zone

Cucamonga Basin

Claremont Basin

Pomona Basin

Rialto-Colton Basin

Puente Hills

Chino Hills

Temescal Basin

Prado Flood Control Basin

Jurupa Mountains

Riverside Basins

San Bernardino County

Riverside County

Orange County

Indian Hill Fault

San Jose Fault

Red Hill Fault

Chino Fault

Rialto-Colton Fault

Loma Linda Fault

San Jacinto Fault

Barrier J

Lytle Ck

San Antonio Ck

Day Ck

Cucamonga Ck

Chino Ck

Santa Ana River

Foothill Blvd

Holt Blvd

Mission Blvd

Riverside Dr

Limonite Ave

Bellegrave Ave

Euclid Ave

Central Ave

Haven Ave

Etiwanda Ave

Sierra Ave

Riverside Ave

15

210

71

10

215

60

Perchlorate (ug/L)

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

CA Primary MCL = 6 ug/L

OBMP 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
- Approximate Location of Groundwater Barrier
- Location Concealed
- Location Uncertain

Perchlorate is a regulated drinking water contaminant in California with a Primary MCL of 6 micrograms per liter (µg/L). This map displays the areal distribution of maximum perchlorate concentration observed at wells in the Chino Basin from July 2007 through June 2012. During this time period, 409 out of the 848 wells sampled for perchlorate in the Chino Basin (48%) exceeded the Primary CA EPA MCL. The majority of the wells where perchlorate concentrations are above the MCL are monitoring wells associated with Stringfellow site where there is a perchlorate plume of synthetic nature originating from the Jurupa Mountains and extending downgradient to about Limonite Avenue. Perchlorate sources in groundwater can include synthetic perchlorate, such as ammonium perchlorate used in the manufacturing of solid propellants used for rockets, missiles, and fireworks; and natural perchlorate, such as that derived from Chilean caliche that was used as a fertilizer. It is known that Chilean nitrate fertilizer was imported into the Chino Basin in the early 1900s for the citrus industry, which covered the north, west, and central portions of the Basin. A perchlorate isotope study in 2006 confirmed that most of the perchlorate in the west and central portions of the Chino Basin was derived from Chilean nitrate fertilizer.

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0 1 2 3 4 5 Miles

0 2 4 6 8 KM

2012 State of the Basin
Groundwater Quality

Perchlorate in Groundwater

Maximum Concentration (July 2007 to June 2012)

Exhibit 34

117°40'0"W

117°20'0"W

34°0'0"N

San Gabriel Mountains

Cucamonga Fault Zone

Cucamonga Basin

Claremont Basin

Pomona Basin

Rialto-Colton Basin

Indian Hill Fault

San Jose Fault

Red Hill Fault

Barrier J

Lytle Ck

Loma Linda Fault

San Jacinto Fault

Rialto-Colton Fault

San Antonio Ck

Euclid Ave

Central Ave

Haven Ave

Day Ck

Etiwanda Ave

Sierra Ave

Riverside Ave

Foothill Blvd

Holt Blvd

Mission Blvd

Riverside Dr

Jurupa Mountains

San Bernardino County

Riverside County

Riverside Basins

Pedley Ave

Limonite Ave

Santa Ana River

Puente Hills

Chino Fault

Chino Ck

Chino Hills

San Bernardino County

Orange County

Prado Flood Control Basin

Temescal Basin

El Sobrante de San Jacinto

15

210

71

10

60

215

Chromium is a regulated drinking water contaminant in California with a Primary MCL of 50 µg/L. This map displays the areal distribution of maximum chromium concentration observed at wells in the Chino Basin from July 2007 through June 2012. During this time period, 106 out of the 629 wells sampled for chromium in the Chino Basin (6%) exceeded the Primary CA EPA MCL. The majority of these wells are associated with monitoring at the GE Flat Iron Plume, the Stringfellow Plume, the Former Kaiser Steel Plant, and the Milliken Sanitary Landfill. The remaining wells include isolated wells near the Jurupa Mountains, the southern Chino Basin, and the City of Pomona. Chromium in groundwater results from both natural and anthropogenic sources.

Total Chromium (ug/L)

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

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

OBMP 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
- Approximate Location of Groundwater Barrier
- Location Concealed
- Location Uncertain

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Date: 20121005

File: Exhibit_35.mxd

0 1 2 3 4 5 Miles

0 2 4 6 8 KM

2012 State of the Basin
Groundwater Quality

Total Chromium in Groundwater

Maximum Concentration (July 2007 to June 2012)

Exhibit 35

117°40'0"W

117°20'0"W

34°0'0"N

San Gabriel Mountains

Cucamonga Fault Zone

Cucamonga Basin

Claremont Basin

Pomona Basin

Indian Hill Fault

San Jose Fault

Red Hill Fault

Barrier J

Lytle Ck

Loma Linda Fault

Rialto-Colton Basin

San Antonio Ck

Haven Ave

Day Ck

Sierra Ave

Foothill Blvd

Euclid Ave

Central Ave

Holt Blvd

Etiwanda Ave

Mission Blvd

Cucamonga Ck

Riverside Dr

Jurupa Mountains

Puente Hills

Chino Fault

Chino Ck

Limonite Ave

Chino Hills

San Bernardino County

Orange County

Prado Flood Control Basin

La Sierra Hills

Van Buren Blvd

Arlington Basin

Temescal Basin

El Sobrante de San Jacinto

15

210

71

91

Currently there are no Federal or California drinking water standards specific to hexavalent chromium. Hexavalent chromium is regulated under the Primary MCL established for total chromium (California MCL of 50 µg/L and Federal MCL of 100 µg/L). In 1999, the CDPH determined that hexavalent chromium needed an individual MCL as concerns grew over its carcinogenicity in drinking water. In 2001, hexavalent chromium was included on the State of California's Unregulated Chemicals that Require Monitoring (UCMR) list to be sampled by 2002 (Title 22 of the CCR, §66450). Furthermore, the California Health and Safety Codes (§116365.5 and §1163659a) compelled CDPH to adopt an MCL for hexavalent chromium, and required it to be as close as practicable to the Public Health Goal (PHG) established by Office of Environmental Health Hazard Assessment (OEHHA). A PHG of 0.02 µg/L was established by OEHHA on July 27, 2011, and the CDPH is in the process of adopting an MCL. A final ruling on the MCL could be made as early as 2015.

This map displays the areal distribution of maximum hexavalent chromium concentrations observed at wells in the Chino Basin from July 2007 through June 2012. Concentrations are plotted graphically based on a class interval representative of the median of the maximum concentrations at wells in the Chino Basin for this period (3 µg/L). The highest observed concentrations of hexavalent chromium are at wells associated with the GE Flat Iron Plume, the Stringfellow Plume, the Former Kaiser Steel Plant, and the Milliken Sanitary Landfill.

At present, hexavalent chromium sampling is not required by CDPH. In May 2012, the EPA released UCMR 3, which requires sampling for hexavalent chromium between 2013 to 2015 using an analytical method with a detection limit equal to the PHG of 0.02 µg/L. The results of this monitoring will help understand the occurrence and magnitude of hexavalent chromium in groundwater and aid in the CDPH's determination of an enforceable regulatory limit.

Hexavalent Chromium (ug/L)

- ND
- < 1
- 2 - 3
- 3 - 6
- 6 - 12
- 12 - 24
- > 24

Median Detected Concentration in Chino Basin = 3 ug/L.

Currently there is no US or CA EPA MCL; hexavalent Chromium is regulated as total chromium which has a CA EPA MCL of 50 ug/L

A CA Public Health Goal of 0.02 ug/L was established in July 2011.

OBMP 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
- Approximate Location of Groundwater Barrier
- Location Concealed
- Location Uncertain

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Lake Forest, CA 92630
949.420.3030
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Author: VMW

Date: 20121005

File: Exhibit_36.mxd

0 1 2 3 4 5 Miles

0 2 4 6 8 KM

2012 State of the Basin
Groundwater Quality

Hexavalent Chromium in Groundwater

Maximum Concentration (July 2007 to June 2012)

Exhibit 36

117°40'0"W

117°20'0"W

34°0'0"N

San Gabriel Mountains

Cucamonga Fault Zone

Cucamonga Basin

Claremont Basin

Pomona Basin

Rialto-Colton Basin

Indian Hill Fault

San Jose Fault

Red Hill Fault

Barrier J

Lytle Ck

Loma Linda Fault

San Jacinto Fault

Rialto-Colton Fault

San Antonio Ck

Day Ck

Cucamonga Ck

Chino Ck

Santa Ana River

Sierra Ave

Haven Ave

Euclid Ave

Central Ave

Etiwanda Ave

Riverside Ave

Foothill Blvd

Holt Blvd

Mission Blvd

Riverside Dr

Bellegrave Ave

Limonite Ave

Jurupa Mountains

Puente Hills

Chino Hills

Chino Fault

San Bernardino County

Orange County

Riverside County

Riverside Basins

Prado Flood Control Basin

Temescal Basin

15 · 210 · 71 · 10 · 215 · 60

Arsenic (ug/L)

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

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

OBMP 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
- Approximate Location of Groundwater Barrier
- Location Concealed
- Location Uncertain

Arsenic is a regulated drinking water contaminant in California with a Primary MCL of 10 µg/L. Arsenic in groundwater is from both natural and anthropogenic sources. 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. This map displays the areal distribution of the maximum arsenic concentration observed at wells in the Chino Basin from July 2007 through June 2012. During this time period, 59 out of the 534 wells sampled for arsenic in the Chino Basin (11%) exceeded the Primary MCL. Some of these wells are associated with the Stringfellow Plume, the Chino Airport Plume, and the Milliken Landfill. Higher concentrations of arsenic are found in the Chino/Chino Hills area in the lower aquifer at depths greater than about 350 ft-bgs – these occurrences of higher arsenic are thought to be of geologic origin.

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Lake Forest, CA 92630
949.420.3030
www.wildermuthenvironmental.com

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Date: 20121005
File: Exhibit_37.mxd

0 1 2 3 4 5 Miles

0 2 4 6 8 KM

2012 State of the Basin
Groundwater Quality

Arsenic in Groundwater

Maximum Concentration (July 2007 to June 2012)

Exhibit 37

117°40'0"W

117°20'0"W

34°0'0"N

San Gabriel Mountains

Cucamonga Fault Zone

Cucamonga Basin

Claremont Basin

Pomona Basin

Rialto-Colton Basin

Indian Hill Fault

San Jose Fault

Red Hill Fault

Barrier J

Lytle Ck

Loma Linda Fault

San Jacinto Fault

Rialto-Colton Fault

San Antonio Ck

Day Ck

Euclid Ave

Central Ave

Haven Ave

Etiwanda Ave

Sierra Ave

Riverside Ave

Foothill Blvd

Holt Blvd

Mission Blvd

Riverside Dr

Bellegrave Ave

Limonite Ave

Jurupa Mountains

San Bernardino County

Riverside County

Riverside Basins

Santa Ana River

Puente Hills

Chino Fault

Chino Ck

Chino Hills

San Bernardino County

Orange County

Prado Flood Control Basin

Temescal Basin

El Sobrante de San Jacinto

15 210 71 10 215 60

TCE is a regulated drinking water contaminant in California with a Primary MCL of 5 µg/L. TCE along with PCE, are and were industrial solvents widely used as metal degreasers in the aviation, automotive, and other metal working industries. This map displays the areal distribution of the maximum TCE concentration observed at wells in the Chino Basin from July 2007 through June 2012. During this time period, 266 out of the 912 wells sampled for TCE in the Chino Basin (29%) exceeded the Primary MCL. Wells with detectable levels of TCE occur predominantly in well clusters associated with known VOC contamination sources such as the Milliken Landfill, GE Flat Iron plume, GE Test Cell plume, Archibald South Plume, Chino Airport Plume, and the Stringfellow plume. Exhibit 44 shows the location of the various plumes in the Chino Basin.

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

OBMP 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
- Approximate Location of Groundwater Barrier
- Location Concealed
- Location Uncertain

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Lake Forest, CA 92630
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www.wildermuthenvironmental.com

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Date: 20121005
File: Exhibit_38.mxd

0 1 2 3 4 5 Miles

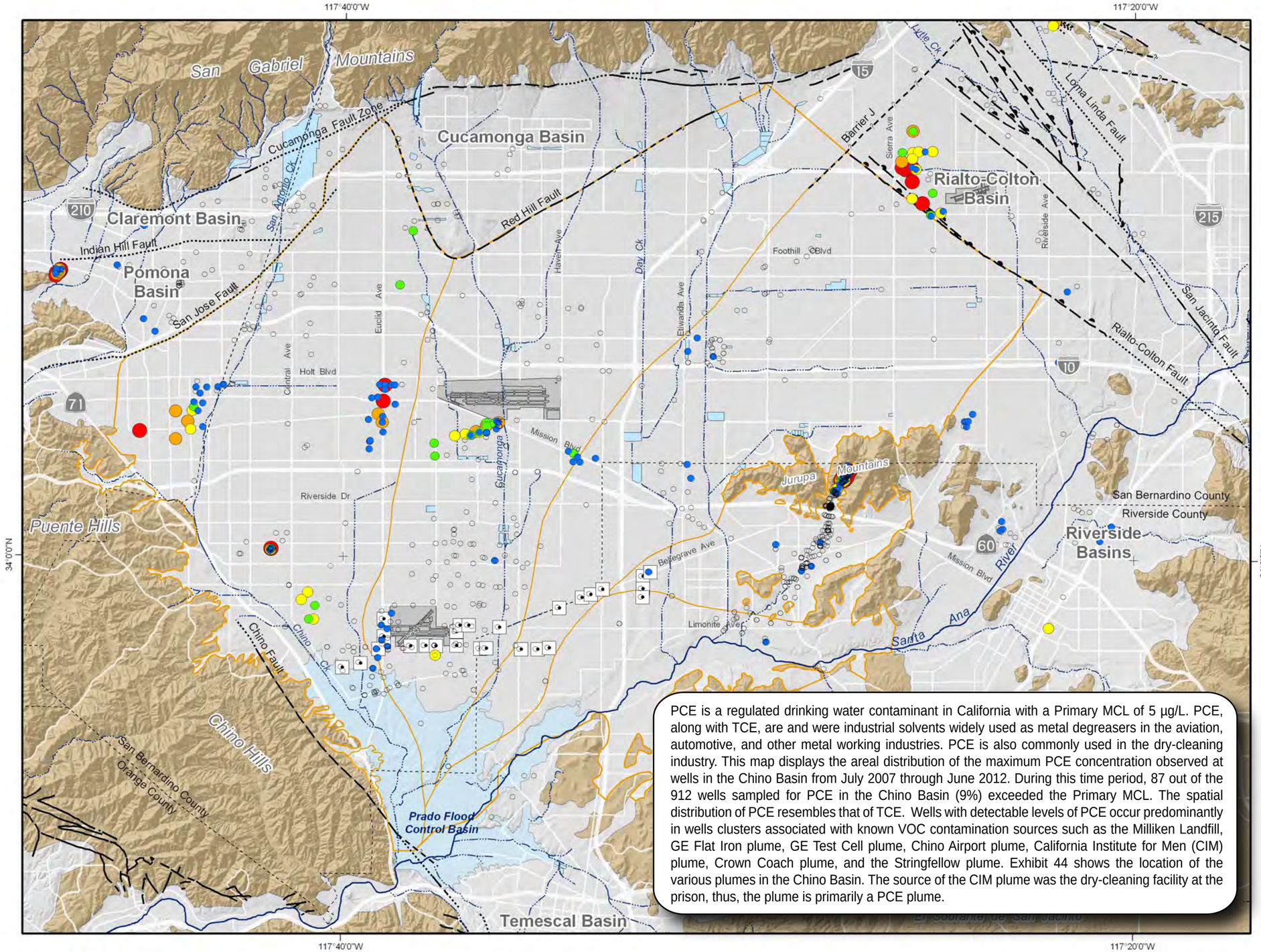
0 2 4 6 8 KM

2012 State of the Basin
Groundwater Quality

Trichloroethene (TCE) in Groundwater

Maximum Concentration (July 2007 to June 2012)

Exhibit 38



PCE is a regulated drinking water contaminant in California with a Primary MCL of 5 µg/L. PCE, along with TCE, are and were industrial solvents widely used as metal degreasers in the aviation, automotive, and other metal working industries. PCE is also commonly used in the dry-cleaning industry. This map displays the areal distribution of the maximum PCE concentration observed at wells in the Chino Basin from July 2007 through June 2012. During this time period, 87 out of the 912 wells sampled for PCE in the Chino Basin (9%) exceeded the Primary MCL. The spatial distribution of PCE resembles that of TCE. Wells with detectable levels of PCE occur predominantly in wells clusters associated with known VOC contamination sources such as the Milliken Landfill, GE Flat Iron plume, GE Test Cell plume, Chino Airport plume, California Institute for Men (CIM) plume, Crown Coach plume, and the Stringfellow plume. Exhibit 44 shows the location of the various plumes in the Chino Basin. The source of the CIM plume was the dry-cleaning facility at the prison, thus, the plume is primarily a PCE plume.

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

OBMP 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
- Approximate Location of Groundwater Barrier
- Location Concealed
- Location Uncertain

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949.420.3030
www.wildermuthenvironmental.com

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0 1 2 3 4 5 Miles

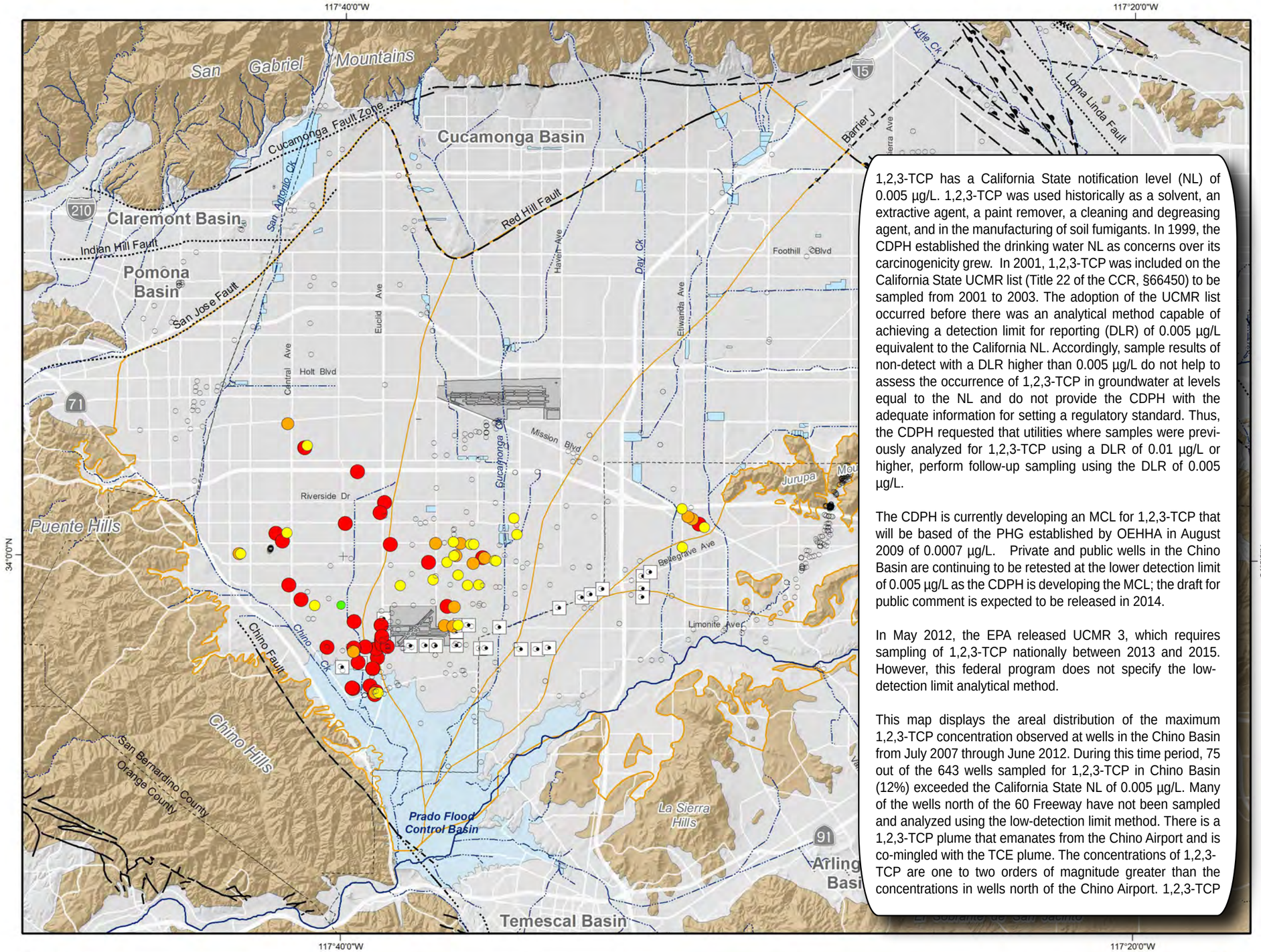
0 2 4 6 8 KM

2012 State of the Basin
Groundwater Quality

Tetrachloroethene (PCE) in Groundwater

Maximum Concentration (July 2007 to June 2012)

Exhibit 39



1,2,3-TCP has a California State notification level (NL) of 0.005 µg/L. 1,2,3-TCP was used historically as a solvent, an extractive agent, a paint remover, a cleaning and degreasing agent, and in the manufacturing of soil fumigants. In 1999, the CDPH established the drinking water NL as concerns over its carcinogenicity grew. In 2001, 1,2,3-TCP was included on the California State UCMR list (Title 22 of the CCR, §66450) to be sampled from 2001 to 2003. The adoption of the UCMR list occurred before there was an analytical method capable of achieving a detection limit for reporting (DLR) of 0.005 µg/L equivalent to the California NL. Accordingly, sample results of non-detect with a DLR higher than 0.005 µg/L do not help to assess the occurrence of 1,2,3-TCP in groundwater at levels equal to the NL and do not provide the CDPH with the adequate information for setting a regulatory standard. Thus, the CDPH requested that utilities where samples were previously analyzed for 1,2,3-TCP using a DLR of 0.01 µg/L or higher, perform follow-up sampling using the DLR of 0.005 µg/L.

The CDPH is currently developing an MCL for 1,2,3-TCP that will be based of the PHG established by OEHHA in August 2009 of 0.0007 µg/L. Private and public wells in the Chino Basin are continuing to be retested at the lower detection limit of 0.005 µg/L as the CDPH is developing the MCL; the draft for public comment is expected to be released in 2014.

In May 2012, the EPA released UCMR 3, which requires sampling of 1,2,3-TCP nationally between 2013 and 2015. However, this federal program does not specify the low-detection limit analytical method.

This map displays the areal distribution of the maximum 1,2,3-TCP concentration observed at wells in the Chino Basin from July 2007 through June 2012. During this time period, 75 out of the 643 wells sampled for 1,2,3-TCP in Chino Basin (12%) exceeded the California State NL of 0.005 µg/L. Many of the wells north of the 60 Freeway have not been sampled and analyzed using the low-detection limit method. There is a 1,2,3-TCP plume that emanates from the Chino Airport and is co-mingled with the TCE plume. The concentrations of 1,2,3-TCP are one to two orders of magnitude greater than the concentrations in wells north of the Chino Airport. 1,2,3-TCP

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

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

California Notification Level = 0.005 ug/L

OBMP 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
- Approximate Location of Groundwater Barrier
- Location Concealed
- Location Uncertain

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23692 Birtcher Drive
Lake Forest, CA 92630
949.420.3030
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Author: VMW

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0 1 2 3 4 5 Miles

0 2 4 6 8 KM

2012 State of the Basin
Groundwater Quality

1,2,3-Trichloropropane (1,2,3-TCP) in Groundwater

Maximum Concentration (July 2007 to June 2012)

Exhibit 40

117°40'0"W

117°20'0"W

34°0'0"N

San Gabriel Mountains

Cucamonga Fault Zone

Cucamonga Basin

Claremont Basin

Pomona Basin

Rialto-Colton Basin

Riverside Basins

Jurupa Mountains

Puente Hills

Chino Hills

Prado Flood Control Basin

Temescal Basin

Indian Hill Fault

San Jose Fault

Red Hill Fault

Chino Fault

Rialto-Colton Fault

San Jacinto Fault

Loma Linda Fault

Barrier J

San Antonio Ck

Day Ck

Chino Ck

Santa Ana River

Lytle Ck

Sierra Ave

Haven Ave

Euclid Ave

Central Ave

Etiwanda Ave

Riverside Ave

Foothill Blvd

Holt Blvd

Mission Blvd

Riverside Dr

Beleqrave Ave

Limonite Ave

Cucamonga

San Bernardino County

Orange County

Riverside County

15

10

60

71

210

215

cis-1,2-Dichloroethene (cis-1,2-DCE) is a regulated drinking water contaminant in California with a Primary MCL of 6 µg/L. This map displays the areal distribution of the maximum *cis*-1,2-DCE concentration observed at wells in the Chino Basin from July 2007 through June 2012. During this time period, 48 out of the 910 wells sampled for *cis*-1,2-DCE in the Chino Basin (5%) exceeded the Primary CA EPA MCL. *cis*-1,2-DCE is a degradation by-product of PCE and TCE that is formed by reductive dehalogenation. *cis*-1,2-DCE has not been detected in the majority of wells throughout the Chino Basin, and is only found in wells associated with known VOC contamination sources. *cis*-1,2-DCE is detected in wells near the Milliken Landfill, the GE Test Cell plume, the GE Flat Iron plume, the former Crown Coach Facility, Upland Sanitary Landfill, the Chino Airport plume, and the Stringfellow plume. Exhibit 44 shows the location of the various plumes in the Chino Basin.

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

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

Primary US EPA MCL = 70 ug/L
Primary CA MCL = 6 ug/L

OBMP 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
- Approximate Location of Groundwater Barrier
- Location Concealed
- Location Uncertain

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Lake Forest, CA 92630
949.420.3030
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Author: VMW

Date: 20121005

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0 1 2 3 4 5 Miles

0 2 4 6 8 KM

2012 State of the Basin
Groundwater Quality

cis-1,2-Dichloroethene in Groundwater

Maximum Concentration (July 2007 to June 2012)

Exhibit 41

117°40'0"W

117°20'0"W

34°0'0"N

San Gabriel Mountains

Cucamonga Fault Zone

Cucamonga Basin

Claremont Basin

Pomona Basin

Rialto-Colton Basin

Puente Hills

Chino Hills

Temescal Basin

Prado Flood Control Basin

Jurupa Mountains

Riverside Basins

San Bernardino County

Riverside County

Orange County

Indian Hill Fault

San Jose Fault

Red Hill Fault

Barrier J

Loma Linda Fault

Rialto-Colton Fault

San Jacinto Fault

Chino Fault

San Antonio Ck

Day Ck

Chino Ck

Santa Ana River

Lytle Ck

Sierra Ave

Haven Ave

Euclid Ave

Central Ave

Etiwanda Ave

Rivérside Ave

Foothill Blvd

Holt Blvd

Mission Blvd

Riverside Dr

Limonite Ave

Beregrave Ave

15

210

215

10

71

60

1,1-Dichloroethene (ug/L)

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

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

OBMP 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
- Approximate Location of Groundwater Barrier
- Location Concealed
- Location Uncertain

1,1-Dichloroethene (1,1-DCE) is a regulated drinking water contaminant in California with a Primary MCL of 6 µg/L. This map displays the areal distribution of the maximum 1,1-DCE concentration observed at wells in the Chino Basin from July 2007 through June 2012. During this time period, 20 out of the 910 wells sampled for 1,1-DCE in the Chino Basin (2%) exceeded the Primary CA EPA MCL. 1,1-DCE is a degradation by-product of PCE, TCE, and 1,1,1-trichloroethane that is formed by reductive dehalogenation. 1,1-DCE has not been detected in the majority of wells throughout the Chino Basin. 1,1-DCE is detected in some wells in the City of Pomona; and at point-source contamination monitoring wells associated with the Milliken Landfill, GE Test Cell plume, the former Kaiser Steal Facility the former Crown Coach Facility, Upland Sanitary Landfill, the Chino Airport plume, and the Stringfellow plume. Exhibit 44 shows the location of the various plumes in the Chino Basin.

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Lake Forest, CA 92630
949.420.3030
www.wildermuthenvironmental.com

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0 1 2 3 4 5 Miles

0 2 4 6 8 KM

2012 State of the Basin
Groundwater Quality

1,1-Dichloroethene in Groundwater

Maximum Concentration (July 2007 to June 2012)

Exhibit 42