

# Optimum Basin Management Program

## Staff Status Report 2015-1: January to June 2015



CHINO BASIN WATERMASTER

Optimum Basin Management Program

### Highlighted Activities

- As a requirement of Mitigation Measure 4.4-3 from the Peace II Subsequent Environmental Impact Report (SEIR), Watermaster, Inland Empire Utilities Agency (IEUA) and Orange County Water District (OCWD) continued to develop a Prado Basin Habitat Sustainability Program (PBHSP). Included within this program is the development of a Prado Basin Habitat Sustainability Adaptive Management Plan, the installation of 16 monitoring wells at nine sites, and vegetative monitoring. During this reporting period, property acquisition, permitting, and site evaluation for biological and anthropological resources was completed and the 16 monitoring wells were designed, constructed and developed. Additionally, a draft report documenting the well construction was prepared.
- Pursuant to the October 2013 Court Order authorizing Watermaster and IEUA to implement the 2013 Amendment to the 2010 Recharge Master Plan Update (2013 RMPU), Watermaster and IEUA have begun implementation. During the reporting period, Watermaster and IEUA continued a process to develop agreements to construct the storm and supplemental water recharge projects listed in Table 8-2c of the 2013 RMPU report, prioritize the construction of these projects relative to the availability of grant funding, and to plan subsequent implementation. In April, 2015, the Steering Committee and the IEUA/CBWM Joint Recharge Improvement Projects committee were combined to create the Recharge Investigations and Projects committee (RIPCom). The RIPCom meets monthly on the progress of implementing the 2013 RMPU Projects and other recharge-related projects.
- Watermaster and IEUA completed work on the Turner Basins/Guasti Park Recharge Expansion Project in Management Zone (MZ) 2 in February 2015. The expansion project is projected to recharge an additional 300 acre-feet of storm runoff annually.
- During the reporting period, approximately 2,761 acre-feet of stormwater, 6,059 acre-feet of recycled water, and no imported water were recharged in the Chino Basin.
- Development and planning continues between the Chino Desalter Authority (CDA) and Watermaster to expand the Chino Desalters to an ultimate production capacity of 40,000 acre-feet per year. Equipping of two wells in the Chino Creek Well Field (CCWF), wells I-20 and I-21, was initiated and the wells are planned to begin producing in 2015. Three additional wells are being planned for construction to provide raw water to the Chino I Desalter; these wells are required to meet the maximum-benefit commitment to produce a total 40,000 acre-feet per year from the combined desalter well fields. On June 30, 2015 the IEUA and Watermaster submitted a final plan and schedule for the construction and operation of the three new desalter wells. During this reporting period, construction began on two of the three wells; the location of the third well is still being evaluated.
- Pursuant to the MZ-1 Subsidence Management Plan (MZ-1 Plan), Watermaster's subsidence management plan, if data from existing monitoring efforts in the locations called Areas of Subsidence Concern indicate the potential for adverse impacts due to subsidence, Watermaster will revise the MZ-1 Plan. During this reporting period, Watermaster updated the MZ-1 Plan, now named to Chino Basin Subsidence Management Plan to incorporate the Work Plan to Develop the Subsidence Management Plan for the Northwest MZ-1 Area.
- Watermaster began its evaluation of the Safe Yield in 2013. Based on work performed by Watermaster staff, and discussions following a September 2014 Board workshop, the Watermaster Board directed the parties to enter into a facilitated process to develop an agreement to implement the recalculated Safe Yield. During this reporting period Watermaster parties met intensively in a facilitated process to develop an agreement regarding the implementation of the recalculated Safe Yield. Key principles of agreement were articulated during this reporting period, and drafting of the agreement continues into the next reporting period.

### Important Court Hearings and Orders

(THERE WERE NO HEARINGS OR ORDERS DURING THIS REPORTING PERIOD)

# Optimum Basin Management Program

## Program Element 1: Develop and Implement a Comprehensive Monitoring Program

### Groundwater Level Monitoring

Watermaster initiated a basin-wide groundwater-level monitoring program as part of the implementation of the Optimum Basin Management Program (OBMP). The monitoring program has been refined over time to satisfy the evolving needs of the Watermaster and IEUA, such as new regulatory requirements, and improved data coverage. The groundwater-level monitoring program supports many Watermaster functions, such as the periodic reassessment of Safe Yield, the monitoring and management of land subsidence, the analysis of desalter pumping impacts at private wells and on riparian habitat, the triennial re-computation of ambient water quality mandated by the Water Quality Control Plan for the Santa Ana River Basin (Basin Plan), and the assessment of hydraulic control—a maximum-benefit commitment in the Basin Plan. The data are also used to update and re-calibrate Watermaster's computer-simulation groundwater-flow model, to understand directions of groundwater flow, to compute storage changes, to interpret water quality data, and to identify areas of the basin where recharge and discharge are not in balance.

The current groundwater-level monitoring program is comprised of about 1,180 wells. At about 950 of these wells, water levels are measured by well owners, which include municipal water agencies, the California Department of Toxic Substances Control (DTSC), the Counties, and various private consulting firms. Watermaster collects these water level data at least semi-annually. At the remaining 230 wells, water levels are measured by Watermaster staff using manual methods once per month or by using pressure transducers that record data once every 15 minutes. These wells are mainly Agricultural Pool wells or dedicated monitoring wells located south of the 60 freeway.



Monitoring Well with a Transducer

### Groundwater Quality Monitoring

Watermaster initiated a comprehensive groundwater-quality monitoring program as part of the implementation of the OBMP. The monitoring program has been refined over time to satisfy the evolving needs of the Watermaster and IEUA, such as new regulatory requirements, and improved data coverage. The groundwater-quality monitoring program consists of the following four components:

1. An Annual Key-Well Water-Quality Monitoring Program consisting of about 110 wells, which are mostly privately-owned agricultural wells in the southern portion of Chino Basin that are otherwise not included in an established sampling program. Twenty of these wells are sampled every year, and the remaining wells are sampled once every three years. The wells sampled annually are for the continuous monitoring of areas of concern associated with the southern edge of the South Archibald Plume, the southern region of the Chino Airport Plume, and the Kaiser Steel Mill Plume, and includes two multi-port MZ-3 monitoring wells.
2. Annual sampling at nine HCMP multi-port monitoring wells strategically placed between the Chino Desalter well fields and the Santa Ana River. Results of the annual sampling are used to analyze the effect of desalter pumping over time on hydraulic control, by comparing water quality of the native groundwater and the Santa Ana River.
3. Quarterly sampling at four near-river wells to characterize the interaction between the Santa Ana River and nearby groundwater. These shallow monitoring wells along the Santa Ana River consist of two former US Geological Survey (USGS) National Water Quality Assessment Program wells (Archibald 1 and Archibald 2), and two wells (Well 9 and Well 11) owned by the Santa Ana River Water Company.
4. A cooperative basin-wide data-collection effort known as the Chino Basin Data Collection program, which relies on municipal producers and other government agencies to supply groundwater-quality data on a cooperative basis. These sources include the Chino Basin Appropriators, DTSC, Regional Water Quality Control Board (Regional Board), the USGS, the Counties, and other cooperators.

All groundwater-quality data are checked by Watermaster staff and uploaded to a centralized database management system that can be accessed online through HydroDaVE<sup>SM</sup>. Groundwater-quality data are used by Watermaster for: the biennial State of the Basin report; the triennial ambient water quality update mandated by the Basin Plan; and the demonstration of hydraulic control—a maximum benefit commitment in the Basin Plan. 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.

# Optimum Basin Management Program

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## Program Element 1: Develop and Implement a Comprehensive Monitoring Program (Continued)

### Groundwater Production Monitoring

All active wells (except for minimum user wells) are now metered. Watermaster reads the agricultural production data from the meters on a quarterly basis and enters these data into Watermaster's relational database.

### Surface Water Monitoring

**Water Quality and Quantity in Recharge Basins.** Watermaster and IEUA measure the quantity of storm and supplemental water that enters into 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 Metropolitan Water District of Southern California (MWDSC) and recycled water quality data for the RP-1 and RP-4 treatment plant effluents are obtained from IEUA. 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 measures selected water quality parameters quarterly at two sites along the Santa Ana River (Santa Ana River at River Road and Santa Ana River at Etiwanda). Along with data collected at four near-river wells, these data are used to characterize the interaction between the Santa Ana River and nearby groundwater.

### Hydraulic Control

In January 2004, the Regional Board amended the Basin Plan to incorporate an updated total dissolved solids (TDS) and nitrogen (N) management plan. The Basin Plan amendment includes both "antidegradation" and "maximum benefit" objectives for TDS and nitrate-N for the Chino-North and Cucamonga groundwater management zones. The maximum benefit objectives allow for the reuse and recharge of recycled water, and imported water recharge without mitigation; these are an integral part of the OBMP. The application of the maximum-benefit objectives is contingent on Watermaster and the IEUA's implementation of specific projects and requirements termed the maximum-benefit commitments.

One of the main maximum-benefit commitments is to achieve and maintain "hydraulic control" of the Chino Basin so that downstream beneficial uses of the Santa Ana River are protected. Hydraulic control is defined by the Basin Plan as the elimination of groundwater discharge from the Chino-North groundwater management zone (Chino-North) to the Santa Ana River or its reduction to a de minimus level. In October 2011, the Regional Board indicated that groundwater discharge from the Chino-North to the Prado Basin surface water management zone in an amount less than 1,000 acre-feet per year would be considered de minimus by the Regional Board.

Two of the maximum-benefit commitments are to implement Surface Water Monitoring Program and Groundwater Monitoring Program. On April 15, 2005, the Regional Board adopted resolution R8-2005-0064, thus approving a Surface Water Monitoring Program and Groundwater Monitoring Program. These monitoring programs were conducted until 2012, when the Basin Plan was amended to remove all references to the specific monitoring locations and sampling frequencies required for groundwater and surface water monitoring, thus allowing the program to be modified over time, with approval of the Executive Officer of the Regional Board. The Basin Plan amendment was approved by the Regional Board on February 12, 2012 and by the State Office of Administrative Law on December 6, 2012. This amendment was adopted based on demonstrations made by Watermaster and the IEUA showing that the surface water monitoring program, as included in the Basin Plan, was not meaningfully adding to the body of evidence required to demonstrate hydraulic control. In the place of specific monitoring requirements, the Basin Plan required that Watermaster and the IEUA submit for approval by the Executive Officer a new surface water monitoring program work plan by February 25, 2012 and a new groundwater monitoring program work plan by December 31, 2013. In February 2012, Watermaster and the IEUA submitted, and the Regional Board approved, a new surface water monitoring program that reduced the 2005 monitoring program from bi-weekly surface water quality measurements at 17 sites and direct discharge measurements at six sites, to quarterly surface water quality sampling at two sites. The new work plan including these changes was adopted by the Regional Board in March 2012.

In December 2013, Watermaster and the IEUA submitted an updated *Maximum Benefit Monitoring Program Work Plan and Proposed Schedule for Achieving Hydraulic Control* to the Regional Board. The updated Work Plan states that Watermaster and the IEUA will recalibrate the Chino Basin groundwater model every five years and use the model to estimate groundwater discharge from Chino-North to the Santa Ana River (i.e. annual underflow past the CCWF) and determine whether hydraulic control has been achieved. The new Maximum Benefit Monitoring Program Work Plan was adopted by the Regional Board in April 2014.

# Optimum Basin Management Program

## Program Element 1: Develop and Implement a Comprehensive Monitoring Program (Continued)

In January 2014, in a letter to the IEUA and Watermaster, the Regional Board confirmed that the model results indicated that hydraulic control would be achieved under the projected range of CCWF pumping. The Regional Board also requested that the IEUA and Watermaster submit a plan and schedule to increase desalter production capacity from 32,000 to 40,000 acre-feet per year by May 31, 2014. The IEUA and Watermaster submitted the plan and schedule to the Regional Board on May 30, 2014 to install three new desalter wells—with the location of one well being provisional. On June 30, 2015 the IEUA and Watermaster submitted a final plan and schedule for the construction and operation of the three new desalter wells including the final well locations.

During this reporting period, Watermaster measured 508 manual water levels at 80 private wells throughout the Chino Basin, conducted two quarterly downloads at about a 100 wells containing pressure transducers, and collected 46 groundwater-quality samples, and four surface-water quality samples. This includes groundwater quality sampling and transducer measured water levels at the newly constructed PBHSP monitoring wells. Watermaster and the IEUA submitted the 2014 Maximum Benefit Annual Report to the Regional Board on April 15, 2015.

### *Prado Basin Habitat Sustainability Monitoring Program*

A requirement of Mitigation Measure 4.4-3 from the Peace II SEIR is for Watermaster, IEUA, and OCWD to develop an Adaptive Management Plan for the PBHSP. The objective of this plan is to ensure that the riparian habitat in Prado Basin is not adversely impacted by drawdown associated with the implementation of the Peace II activities. Sixteen monitoring wells at nine sites will be constructed as part of the monitoring program for the PBHSP. An Adaptive Management Plan will be developed which will describe an initial monitoring program and a process to modify the monitoring program and/or implement mitigation strategies, as necessary. During this reporting period, the PBHSP Committee:

- Was responsible for the following work to construct groundwater monitoring facilities adjacent to the Prado Basin riparian habitat:
  - continued property acquisition and permitting for the monitoring wells,
  - monitored the nine monitoring facility sites for biological and anthropological resources before and during well drilling and construction activities,
  - drilled pilot boreholes at nine sites to collect lithology samples from each site,
  - designed 16 monitoring wells based on the results of Cone Penetration Tests (CPTs) previously conducted at the sites, pilot hole drilling, and regional hydrogeologic information,
  - constructed and developed 16 monitoring wells, and
  - prepared the draft report Results of Drilling and Construction of the PBHSP Monitoring Wells to document the methods and results of the CPTs, borehole drilling and well construction and development.
- Reviewed and revised the draft Adaptive Management Plan.



PBHSP PB-4 Well Drilling

### *Chino Basin Groundwater Recharge Program*

Watermaster, IEUA, the Chino Basin Water Conservation District, and the San Bernardino County Flood Control District jointly sponsor the Chino Basin Groundwater Recharge Program. This is a comprehensive 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 storm water, imported water, and recycled water. The recharge program is regulated under RWQCB Order No. R8-2007-0039 and Monitoring and Reporting Program No. R8-2007-0039.

**Recharge Activities.** Ongoing recycled water recharge occurred in the Brooks, Turner, Victoria, Ely, Hickory, RP-3, and Banana Basins this reporting period. Stormwater was recharged at 15 recharge basins across all management zones of the Chino Basin during this reporting period. No imported water was recharged this reporting period.

# Optimum Basin Management Program

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## Program Element 1: Develop and Implement a Comprehensive Monitoring Program (Continued)

**Monitoring Activities.** Watermaster and IEUA collect weekly water quality samples from recharge basins that are actively recharging recycled water and from lysimeters installed within those recharge basins. During this reporting period, approximately 157 recharge basin and lysimeter samples were collected and 26 recycled water samples were collected for alternative monitoring plans that include the application of a correction factor for soil-aquifer treatment determined from each recharge basin's start-up period. Monitoring wells located down-gradient of the recharge basins were sampled quarterly at a minimum; however, some monitoring wells were sampled more frequently during the reporting period for a total of 95 samples.

**Reporting.** Watermaster and IEUA completed the following required reports concerning the recharge program during the reporting period:

- 4Q-2014 Quarterly Report, submitted to the RWQCB – February 2015
- 1Q-2015 Quarterly Report, submitted to the RWQCB – May 2015
- 2014 Annual Report, submitted to the RWQCB – May 2015

### Ground-Level Monitoring

In response to the occurrence of land subsidence in the City of Chino, the Watermaster prepared and submitted the MZ-1 Plan to the Court for approval and, in November 2007, the Court ordered its implementation (see Program Element 4: Develop and Implement a Comprehensive Groundwater Management Plan for Management Zone 1). The MZ-1 Plan calls for several monitoring and mitigation measures to minimize or abate the future occurrence of land subsidence and ground fissuring in the western Chino Basin. These measures and activities include:

- Continuing the scope and frequency of monitoring within the so-called Managed Area (southwest MZ-1) that was conducted during the period when the MZ-1 Plan was being developed.
- Expanding the monitoring of the aquifer system and land subsidence into other areas of MZ-1 and Chino Basin where the data indicate concern for future subsidence and ground fissuring.
- Monitoring of horizontal strain across the historical zone of ground fissuring.
- Evaluating the potential contribution of groundwater production in northern MZ-1 on conditions in southern MZ-1.
- Conducting additional testing and monitoring to refine the MZ-1 Guidance Criteria.
- Developing alternative pumping plans for the MZ-1 producers that are impacted by the MZ-1 Plan.
- Constructing and testing a lower-cost cable extensometer facility at Ayala Park.
- Evaluating and comparing ground-level surveying and Interferometric Synthetic Aperture Radar (InSAR), and recommending future monitoring protocols for both techniques.
- Conducting an aquifer storage recovery (ASR) feasibility study at a City of Chino Hills production well within the MZ-1 Managed Area (Well 16).
- Providing for recovery of groundwater levels in the MZ-1 Managed Area.

During the reporting period, Watermaster undertook the following activities called for in the MZ-1 Plan:

- The continuation of high-resolution water-level monitoring at wells within the Managed Area and within the Areas of Subsidence Concern. All monitoring equipment is inspected at least quarterly and is repaired and/or replaced as necessary. The data collected were checked and analyzed to assess the functionality of the monitoring equipment and for compliance with MZ-1 Plan.
- The continuation of monitoring and maintenance at the extensometer facilities at the Ayala Park, Chino Creek, and Daniels sites. Specifically, the aging monitoring equipment and electronics at the Ayala Park Extensometer facility were replaced or refurbished. And, telemetry equipment was installed and activated at the Chino Creek Extensometer facility.



# Optimum Basin Management Program

## Program Element 1: Develop and Implement a Comprehensive Monitoring Program (Continued)

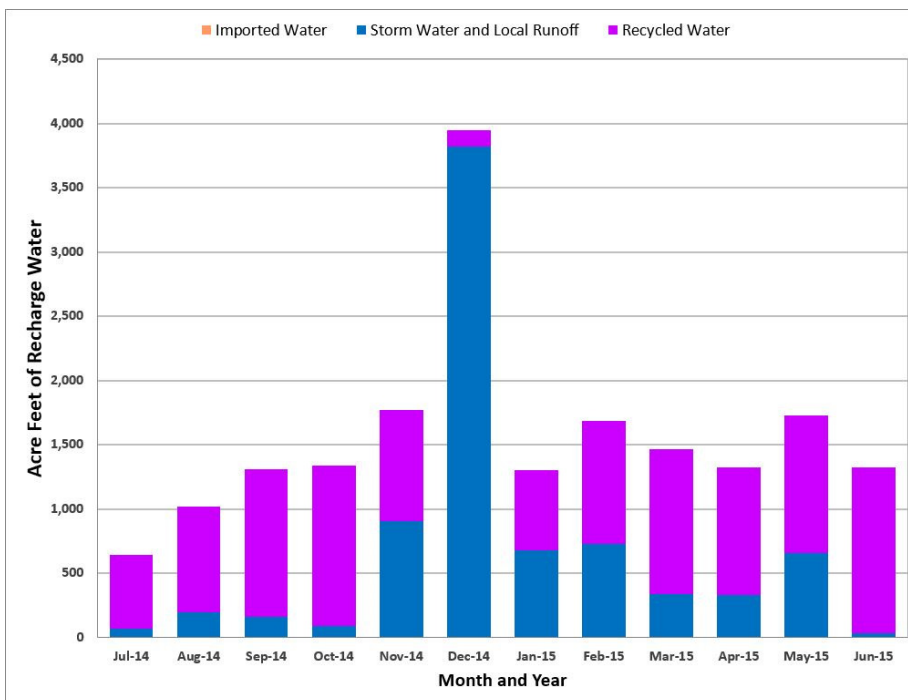
- The collection of InSAR data from radar satellites during the reporting period.
- Assisting the City of Chino Hills with the preparation of the final report for its Department of Water Resources Local Groundwater Assistance grant to support the ASR pilot test.
- The data generated from the Ground-Level Monitoring Program through March 2015 were analyzed. The data, results, and conclusions were incorporated into the draft 2014 Annual Report of the Ground-Level Monitoring Committee.

## Program Element 2: Develop and Implement a Comprehensive Recharge Program

The average stormwater recharge of the Chino Basin Facilities Improvement Program facilities is approximately 13,000 acre-feet per year, the supplemental “wet”<sup>1</sup> water recharge capacity is approximately 60,600 acre-feet per year, and the in-lieu supplemental water recharge capacity ranges from 25,000 to 40,000 acre-feet per year. There is also a demonstrated well injection capacity of 5,600 acre-feet per year. Current total supplemental water recharge capacity ranges from 91,200 to 106,200 acre-feet per year which is greater than projected supplemental water recharge capacity required by Watermaster.

Stormwater recharge during this reporting period was approximately 2,761 acre-feet. Recycled water recharge during this reporting period was approximately 6,059 acre-feet. No imported water was recharged during this reporting period. The IEUA and Watermaster recharge permit was amended in fiscal year 2009/10 to allow for underflow dilution and extended the dilution period from a running 60 months to a running 120 months. The significance of this permit amendment was to reduce the amount of imported and storm waters required for dilution. IEUA projects that dilution requirements will likely be met through 2019/20, even if no imported water were available for dilution.

The total amount of supplemental water recharged in MZ-1 since the Peace II Agreement through June 30, 2015 was approximately 45,096 acre-feet, which is almost 7,000 less than the 52,000 acre-feet required by June 30, 2015 (annual requirement of 6,500 acre-feet): the shortfall of 6,904 acre-feet will be recharged in MZ-1 in subsequent years as supplemental water becomes available. The amount of supplemental water recharged into MZ-1 during the reporting period was approximately 548 acre-feet.



Watermaster and IEUA continued work on the Turner Basins/Guasti Park Recharge Expansion Project in MZ-2. The expansion project, projected to recharge an additional 300 acre-feet of storm runoff annually was completed in February, 2015. Watermaster and IEUA meet monthly on the Turner Basins/Guasti Park, Wineville Basin and other projects that are currently in a phase of design and construction.

Pursuant to the October 2013 Court Order authorizing Watermaster and IEUA to implement the 2013 RMPU, Watermaster and IEUA have begun implementation of the 2013 RMPU. During the reporting period, Watermaster and IEUA continued a process to develop agreements to construct the storm and supplemental water recharge projects listed in Table 8-2c of the 2013 RMPU report, and will prioritize the construction of these projects relative to the availability of grant funding, and to plan subsequent implementation. Watermaster and IEUA meet monthly to review progress and advance implementation.

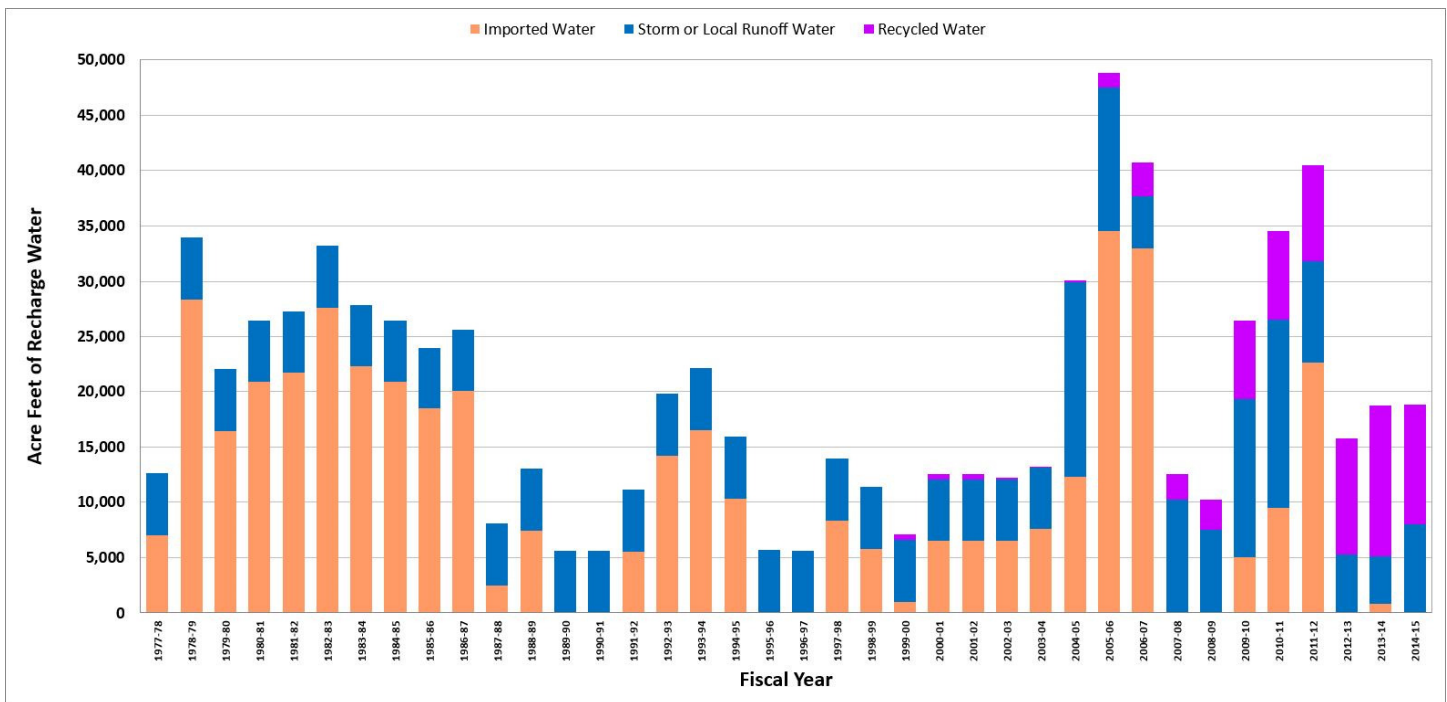
<sup>1</sup> The modifier “wet” means actual physical water is being recharged in spreading basins as opposed to the dedication of water from storage or in-lieu recharge.

# Optimum Basin Management Program

## Program Element 2: Develop and Implement a Comprehensive Recharge Program (Continued)

During the reporting period, Watermaster and IEUA continued to develop a series of projects outside of the 2013 RMPU effort that will increase stormwater and supplemental water recharge and have jointly agreed to fund these projects. Watermaster and IEUA staff's meet monthly to implement and monitor the progress of these projects. Watermaster's share of the cost of these projects was included in the budget adopted by Watermaster for fiscal 2014/15.

Watermaster continued work on the 2013 RMPU and is in the process of finalizing agreements with IEUA on their joint projects. In April, 2015, the Steering Committee and the IEUA/CBWM Joint Recharge Improvement Projects committee were combined to create the RIP Committee. The RIP Committee meets monthly on the progress of implementing the 2013 RMPU Projects and other recharge-related projects.



## Program Element 3: Develop and Implement Water Supply Plan for the Impaired Areas of the Basin; and Program Element 5: Develop and Implement Regional Supplemental Water Program

The Chino I Desalter Expansion and the Chino II Desalter facilities were completed in February 2006. As currently configured, the Chino I Desalter produces about 13,500 acre-feet per year (12.1 million gallons per day [MGD]) of groundwater at 15 wells (I-1 through I-15) that is treated through air stripping (VOC removal), ion exchange (nitrate removal), and/or reverse osmosis (for nitrate and TDS removal). The Chino II Desalter produces about 15,800 acre-feet per year (14.1 MGD) of groundwater at eight wells (II-1 through II-4 and II-6 through II-9) that is treated through ion exchange and/or reverse osmosis.

Development and planning continues between the CDA and Watermaster to expand the production and treatment capacity of the Chino Desalters by about 10,500 acre-feet per year (9.5 MGD). More than \$70 million in grant funds have been secured toward this expansion. The most recent expansion project completed includes the construction of five wells for the new CCWF (wells I-16, I-17, I-18, I-20 and I-21), which were required to meet the hydraulic control commitment associated with maximum benefit, and will provide additional raw water to the Chino I Desalter. Construction of the raw water pipelines from Wells I-16, I-17 and I-18 is complete, and production at wells I-16 and I-17 began in mid-2014. Well I-18 is currently not planned for operation due to high VOC concentrations. A nine-month pilot test at well I-18 for the treatment of TCE, 1,2,3-trichloropropane, and nitrate is planned through mid-2015. Equipping of wells I-20 and I-21 and subsequent production is planned to begin in late-2015. Three additional wells are being planned for construction to provide raw water to the Chino I Desalter; these wells are required to meet the

# Optimum Basin Management Program

## **Program Element 3: Develop and Implement Water Supply Plan for the Impaired Areas of the Basin; and Program Element 5: Develop and Implement Regional Supplemental Water Program (Continued)**

maximum-benefit commitment to produce a total 40,000 acre-feet per year from the combined desalter well fields. This amount was determined in the OBMP Phase I report as the production necessary to maintain hydraulic control. Watermaster and the IEUA coordinated with CDA to develop a plan to achieve the 40,000 acre-feet per year of desalter production and submitted a preliminary plan to the Regional Board on May 30, 2014. The plan, which was submitted to the Regional Board on June 30, 2015, includes the construction and operation of three new wells for the Chino II Desalter. During this period, construction began on two of the new wells (II-10 and II-11) , and the location of the third well (II-12) is being evaluated.

## **Program Element 4: Develop and Implement a Comprehensive Groundwater Management Plan for Management Zone 1**

### *MZ-1 Management Plan*

Because of the historical occurrence of pumping-induced land subsidence and ground fissuring in southwestern Chino Basin (southern MZ-1), the OBMP called for the development and implementation of an Interim Management Plan (IMP) for MZ-1 that would:

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

From 2001-2005, Watermaster developed, coordinated, and conducted an IMP under the guidance of the MZ-1 Technical Committee. The investigation provided enough information for Watermaster to develop Guidance Criteria for the MZ-1 producers in the investigation area that, if followed, would minimize the potential for subsidence and fissuring during the completion of the MZ-1 Plan. The Guidance Criteria included a listing of Managed Wells and their owners subject to the criteria, a map of the so-called Managed Area, and an initial threshold water level (Guidance Level) of 245 feet below the top of the PA-7 well casing. The MZ-1 Summary Report and the Guidance Criteria were adopted by the Watermaster Board in May 2006. The Guidance Criteria formed the basis for the MZ-1 Plan, which was approved by Watermaster in October 2007. The Court approved the MZ-1 Plan in November 2007 and ordered its implementation.

During this reporting period, Watermaster continued implementation of the MZ-1 Plan. Water levels at the PA-7 piezometer stayed above the Guidance Level during the reporting period, and very little, if any, permanent compaction was recorded at the Ayala Park Extensometer. The ongoing monitoring program called for by the MZ-1 Plan continued to be implemented.

Pursuant to the MZ-1 Plan, Watermaster staff and consultants analyzed the data generated from the Ground-Level Monitoring Program through 2014 and the data, results, and conclusions were incorporated into the 2014 Annual Report of the Ground-Level Monitoring Committee (GLMC).

In addition, the MZ-1 Plan states that if data from existing monitoring efforts in the so-called Areas of Subsidence Concern indicate the potential for adverse impacts due to subsidence, Watermaster will revise the MZ-1 Plan pursuant to the process outlined in Section 3 of the MZ-1 Plan. During this reporting period, Watermaster prepared a draft of the update to the MZ-1 Plan, which included a name change to the Chino Basin Subsidence Management Plan and a draft Work Plan to Develop the Subsidence Management Plan for the Northwest MZ-1 Area and an appendix.



Land Subsidence Monitoring Equipment



# Optimum Basin Management Program

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## **Program Element 4: Develop and Implement a Comprehensive Groundwater Management Plan for Management Zone 1 (Continued)**

The GLMC met in March, April, May and June 2015. The following was discussed at these meetings:

- The GLMC reviewed and discussed the monitoring results and developed a scope-of-work and budget for the GLMP for fiscal year 2015/16.
- The 2014 Annual Report of the GLMC was reviewed, and was forwarded to the Pools for review.
- The GLMC reviewed and discussed the draft 2015 Chino Basin Subsidence Management Plan, an update to the current Subsidence Management Plan (MZ-1 Plan).
- The GLMC reviewed and discussed the draft of the Work Plan to Prepare a Subsidence Management Plan for the Northwest MZ-1 Area.

## **Program Element 6: Develop and Implement Cooperative Programs with the Regional Water Quality Control Board, Santa Ana Region and Other Agencies to Improve Basin Management; and**

## **Program Element 7: Develop and Implement a Salt Management Program**

### *South Archibald Plume*

In July 2005, the Regional Board prepared draft Cleanup and Abatement Orders (CAOs) for six parties who were tenants on the Ontario Airport with regard to the South Archibald trichloroethene (TCE) Plume. The draft CAOs required the parties to “submit a work plan and time schedule to further define the lateral and vertical extent of the TCE and related volatile organic compounds (VOCs) that are discharging, have been discharged, or threaten to be discharged from the site” and to “submit a detailed remedial action plan, including an implementation schedule, to cleanup or abate the effects of the TCE and related VOCs.” Four of the six parties (Aerojet-General Corporation, The Boeing Company, General Electric, and Lockheed Martin) voluntarily formed a group (known as ABGL) to work jointly on a remedial investigation. Northrop Grumman declined to participate in the group. The US Air Force, in cooperation with the US Army Corps of Engineers, funded the installation of one of the four clusters of monitoring wells installed by the ABGL parties.

In 2008, the Regional Board staff conducted research pertaining to the likely source of the TCE contamination, and identified discharges of wastewater that may have contained TCE to the RP-1 treatment plant and associated disposal areas to be a potential source. The Regional Board identified several industries, including some previously identified tenants of the Ontario Airport property, that likely used TCE solvents before and during the early-1970s, and discharged wastes to the Cities of Ontario and Upland’s sewage systems to the RP-1 treatment plant and disposal areas. In 2012, an additional Draft CAO was issued by the Regional Board jointly to the City of Ontario, City of Upland, and the IEUA as the previous and current operators of the RP-1 treatment plant and disposal area (collectively RP-1 parties). In part, the draft CAOs require the parties to “supply uninterrupted replacement water service...to all residences south of Riverside Drive that are served by private domestic wells at which TCE has been detected at concentrations at or exceeding 5 µg/L...” and to report this information to the Regional Board. In addition, the parties are to “prepare and submit [a] ...feasibility study” and “prepare, submit and implement the Remedial Action Plan” to mitigate the “effects of the TCE groundwater plume.”

Upon the Regional Board’s oversight, sampling at private residential wells and taps has been conducted approximately every two years (2007-2008, 2009, 2011, 2013-2014) by multiple parties in the region where groundwater is potentially contaminated with TCE. As of 2014, all private residences in the area of the plume have been sampled at least once. Alternative water systems (tanks) have been installed at residences in the area where well water contains TCE at or above 80% of the MCL for TCE. Residents who declined tank system are being provided bottled water. Watermaster also routinely samples for water quality at private wells in the area, and uses data obtained from this monitoring to delineate the plume.

The Regional Board has indicated that many of the potential responsible parties issued Draft CAOs will work together to prepare a remedial action feasibility study. Discussions among those parties are ongoing to resolve details about how to proceed with that work. Many of the parties are also pursuing various grant funding opportunities to develop a remediation strategy that is long-term, regional, and mutually beneficial to the Chino Basin.

# Optimum Basin Management Program

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## **Program Element 6: Develop and Implement Cooperative Programs with the Regional Water Quality Control Board, Santa Ana Region and Other Agencies to Improve Basin Management; and Program Element 7: Develop and Implement a Salt Management Program (Continued)**

The IEUA has worked closely with the Cities of Ontario and Upland, and the CDA, to develop a collaborative proposal for the construction and operation of the Chino Basin Desalter well expansion, that is mutually beneficial to meet the requirement of Watermaster and IEUA to maintain hydraulic control, and the goal of other parties to remediate groundwater contamination. On June 17, 2015, the RP-1 parties reached a Joint Facility Development (JFD) agreement with the CDA for implementation of a project designed to remediate the South Archibald Plume by utilizing Chino Basin Desalter wells and facilities. The project includes the construction and operation of three new Chino Basin Desalter wells; two wells directly southeast of the plume, and one in south-eastern region of the plume. On June 30, 2015 the Watermaster and the IEUA submitted the final plan to the Regional Board for the construction and operation of this Chino Basin Desalter well expansion.

### *Chino Airport*

In 1990, the Regional Board issued CAO No. 90-134 to the County of San Bernardino, Department of Airports (County) to address groundwater contamination originating from the Chino Airport. During 1991 to 1992, 310 containers of hazardous waste were removed and 81 soil borings were drilled and sampled on the airport property. During 2003 to 2005, nine onsite monitoring wells were installed and used to collect groundwater quality samples. In 2007, the County conducted its first offsite monitoring effort, and in 2008, the Regional Board issued CAO No. R8-2008-0064, which requires the County to define the lateral and vertical extent of the plume and prepare a remedial action plan. Tetra Tech, the consultant to the County, conducted several off-site plume characterization studies to delineate the areal and vertical extent of the plume, and constructed 33 offsite monitoring wells. The County has conducted quarterly monitoring events at their monitoring wells on and offsite. Conclusions from this monitoring program can be found in reports posted on the Regional Board's GeoTracker website. In April 2015, Tetra Tech submitted the *Semiannual Groundwater Monitoring Report, Summer and Fall 2014, Chino Airport Groundwater Assessment, San Bernardino County, California*.

Watermaster has also collected samples from dedicated monitoring wells and private wells in and around the Chino Airport plume area. Watermaster has also used its calibrated groundwater model to estimate cleanup times and contaminant concentrations in the CCWF. This work will be updated, given new information about the extent of contamination, subsurface hydrogeology, well performance, and the need for habitat sustainability in the Prado Basin.

On April 30, 2015 Tetra Tech and the County submitted a Remedial Investigation Report Addendum describing the results of a comprehensive groundwater investigation that occurred from 2013 through 2014, and the construction of 33 new monitoring wells in 17 locations, to provide additional characterization of groundwater contamination in the northern portion of the plume on the airport property.

### *Other Water Quality Issues*

Watermaster continues to track monitoring programs and mitigation measures associated with other point sources in the Chino Basin, including: Alumax Aluminum Recycling, Alger Manufacturing Facility, the Former Crown Coach Facility, General Electric Test Cell and Flatiron, Former Kaiser Steel Mill, Milliken Landfill, Upland Landfill, and the Stringfellow National Priorities List sites.

## **Program Element 8: Develop and Implement a Groundwater Storage Management Program; and Program Element 9: Develop and Implement a Storage and Recovery Program**

Groundwater storage is important to the Chino Basin. Watermaster has committed to investigate the technical and management implications of Local Storage Agreements, improve related policies and procedures, and then revisit all pending Local Storage Agreement applications.

The existing Watermaster/IEUA/MWDSC/Three Valleys Municipal Water District Dry-Year Yield (DYY) program continued during the reporting period. By April 30, 2011, all DYY program construction projects and a full "put" and "take" cycle had been completed, leaving the storage account with a zero balance. During the reporting period no water was stored or withdrawn from storage in the DYY Program.

# Optimum Basin Management Program

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## **Program Element 8: Develop and Implement a Groundwater Storage Management Program; and Program Element 9: Develop and Implement a Storage and Recovery Program (Continued)**

### *Safe Yield Redetermination*

The Basin's Safe Yield was initially set by the Judgment at 140,000 acre-feet per year. The Safe Yield was based in part on the hydrology of the period 1965 through 1974. Pursuant to the Judgment, the Chino Basin Safe Yield is to be re-determined periodically, but provides that the Safe Yield would not be reexamined for at least ten years from 1978. The Safe Yield has not been reevaluated since the time of the Judgment. Pursuant to the OBMP Implementation Plan and Watermaster's Rules and Regulations, in year 2010/11 and every ten years thereafter, Watermaster is to compute the Safe Yield based in part on the information obtained in the prior ten-year period and reset the Safe Yield for the next ten-year period.

In 2011, Watermaster authorized Watermaster staff to compile the data necessary to recalculate Safe Yield and update its computer model of the Basin and based on the information developed from the data and the model to recalculate the Safe Yield. The model calibration was completed in 2012, and evaluation of the Safe Yield began in 2013. During the prior reporting period, the Watermaster Board advised the parties to enter into a facilitated process to develop an agreement to implement the recalculated Safe Yield. During this reporting period Watermaster parties met intensively in a facilitated process to develop an agreement regarding the implementation of the recalculated Safe Yield. Key principles of agreement were articulated during this reporting period, and drafting of the agreement continues into the next reporting period.



Safe Yield Recalculation Meeting