

Optimum Basin Management Program Status Report 2007-2: July to December 2007

Introduction

This status report covers the period July 1, 2007 through December 31, 2007. The bulk of this report describes the activities that occurred and status of the work conducted for each program element of the Optimum Basin Management Program (OBMP). However, there are additional significant efforts that occurred during the reporting period to include:

The Wildermuth final report entitled “Optimum Basin Management Program State of the Basin Report – 2006,” dated July 2007 was accepted. This annual report documents groundwater production, recharge, quality, and level within the Chino Basin.

- The Wildermuth final report entitled “2007 CBWM Groundwater Model Documentation and Evaluation of the Peace II Project Description,” dated November 2007, was accepted. It evaluated the state of hydraulic control and the amount of Re-Operation water required to achieve and maintain hydraulic control. The report also provided a material physical injury analysis for the implementation measures.
- Watermaster received and evaluated the Special Referee’s “Preliminary Comments and Recommendations on Motion for Approval of Peace II Documents,” dated November 29, 2007. This document recommended that Watermaster conduct further technical analysis and modeling on a range of technical issues, and address certain legal issues related to Peace II implementation.
- Watermaster legal counsel prepared “Watermaster Response to Special Referee’s Preliminary Comments and Recommendations on Motion for Approval of Peace II Documents,” dated December 14, 2007. This document provided further technical and legal discussion of the issues raised in the Special Referee’s preliminary comments and recommendations.
- Watermaster received and evaluated the Special Referee’s “Final Report and Recommendations on Motion for Approval of Peace II Documents,” dated December 20, 2007. This report recommended that Watermaster submit to the court the Hydraulic Control technical reports, the Recharge Master Plan update and assurances, the Hydraulic Control evaluation standard, the safe yield analysis, and the new equilibrium assurances by the dates specified.
- Watermaster received and accepted the Superior Court’s “Order Concerning Motion for Approval of Peace II Documents,” dated December 21, 2007. This order adopted the recommendations made in the Special Referee’s Final Report, and provided dates certain when Watermaster is to submit various technical reports and legal briefs.

Program Element 1: Develop and Implement a Comprehensive Monitoring Program

Groundwater Level Monitoring

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 associated with the Chino I/II Desalter well fields and the Hydraulic Control Monitoring Program (HCMP), and 3) A piezometric monitoring program associated with land subsidence and ground fissuring in Management Zone 1 (MZ-1). The frequency of groundwater level monitoring varies with each program, depending on the needs of the data analyst. These groundwater level monitoring programs also rely on municipal producers, other government agencies, and private entities to supply their groundwater level measurements on a cooperative basis. Watermaster digitizes all these measurements and combines them into a relational database for general usage. During this period, Watermaster purchased and installed pressure

transducers/data loggers at key wells; principally in the northern portions of Chino Basin where more detailed groundwater level data are needed.

Groundwater Quality Monitoring

During this reporting period no additional wells were sampled. Watermaster continues a comprehensive data collection program whereby water quality data from other sources are routinely collected, QA/QC'd, and loaded into Watermaster's database.

Watermaster and the Inland Empire Utilities Agency (IEUA) are working closely with the Appropriative Pool members and their state-certified laboratories to obtain water quality data as an electronic data deliverable (EDD), which can be entered directly into Watermaster's relational database.

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 measures the quantity and quality of storm and supplemental water entering 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 values for State Water Project water are obtained from the Metropolitan Water District of Southern California (MWDSC) and recycled water quality values for the RP1 and RP4 treatment plant effluents are obtained from IEUA. Watermaster monitors the storm water quality in the eight major channels (San Antonio, West Cucamonga, Cucamonga, Deer Creek, Day Creek, San Sevaine, West Fontana, and DeClez) usually after each major storm event. 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 Santa Ana River (SAR). Watermaster measures the discharge of the river and selected water quality parameters to determine those reaches of the SAR that are gaining flow from Chino Basin and/or, conversely, those reaches that are losing flow into the Chino Basin. These bi-weekly flow and water quality measurements are combined with discharge data from permanent USGS and Orange County Water District (OCWD) stream gauges and discharge data from publicly owned treatment works (POTWs). These data are used in groundwater modeling to assess the extent of hydraulic control.

HCMP Annual Report

In January 2004, the RWQCB amended the Water Quality Control Plan (Basin Plan) for the Santa Ana River Basin 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-nitrogen for the Chino and Cucamonga groundwater management zones. The application of the "maximum benefit" objectives relies on Watermaster and the IEUA's implementation of a specific program of projects and requirements, which are an integral part of the OBMP. On April 15, 2005, the RWQCB adopted resolution R8-2005-0064; thus approving the Surface Water Monitoring Program and Groundwater Monitoring Program in support of maximum benefit commitments in the Chino and Cucamonga Basins. Watermaster and the IEUA completed the 2006 Annual Report, which summarizes the results for those two programs, and submitted it to the RWQCB on April 16, 2007 in partial fulfillment of maximum benefit commitments.

Chino Basin Groundwater Recharge Program

The IEUA, Watermaster, 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 Groundwater Basin by increasing the recharge of storm water, imported water, and recycled water. The recharge program is regulated under RWQCB Order No. R8-2005-0033 and Monitoring and Reporting Program No. R8-2005-0033.



Recharge Activities. On-going recycled water recharge occurred in the, Hickory Basin during this reporting period, and a six month recycled water test recharge program began at the 7th and 8th Street basins in September 2007.

Monitoring Activities. Watermaster and the IEUA collect weekly and bi-weekly water quality samples from basins that are actively recharging recycled water and from lysimeters installed within those basins. During this reporting period, approximately 493 basin and lysimeter samples were collected. Monitoring wells located down gradient of the recharge basins were sampled every two weeks during the reporting period for a total of about 82 samples.

Construction Activities. Lysimeters and monitoring wells associated with the 7th and 8th Street Basins were installed in fiscal year (FY) 2007/08.

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

- Recycled Water Groundwater Recharge Program Phase I and Phase II Recharge Projects: Operation, Maintenance & Monitoring Plan, August 2007
- Recycled Water Groundwater Recharge Program Phase I and Phase II Recharge Projects: Diluent Water Monitoring Plan, October 2007
- 3Q07 Quarterly Report – November 2007

Land Surface Monitoring

Watermaster developed a multifaceted land surface monitoring program to develop data for a long-term management plan for land subsidence in Management Zone 1 (MZ-1). The monitoring program consisted of three main elements:

- An aquifer system monitoring facility consisting of multiple depth piezometers and a dual bore extensometer.
- The application of synthetic aperture radar interferometry (InSAR) to measure historical land surface deformation.
- Benchmark surveys to measure land surface deformation, “ground truth” the InSAR data, and evaluate effectiveness of the long term management plan.

Following two years of data collection and analysis, Watermaster submitted the MZ-1 Summary Report in October 2005, which contained Guidance Criteria to minimize subsidence and fissuring. The Guidance Criteria included a listing of Managed Wells and their owners subject to the criteria, a map of the so-called Managed Area, an initial threshold water level (Guidance Level) of 245 feet below the top of the PA-7 well casing, and a plan for ongoing monitoring and notification. Since October 2005, the MZ-1 Summary Report and the Guidance Criteria contained therein have been discussed extensively by the parties involved, and were adopted by the Watermaster Board at its May 2006 Meeting . The final MZ-1 Subsidence Management Plan was adopted by the Watermaster Board at its June 2007 Meeting.

The MZ-1 monitoring program continues unabated. Water level monitoring expanded to the central regions of MZ-1 with the installation of transducers/data loggers at selected wells owned by the City of Chino, the Monte Vista Water District, and the City of Pomona. This expansion of the water level monitoring program is the initial effort to better understand the mechanisms behind ongoing land subsidence in Central MZ-1. Watermaster also monitors vertical ground-surface deformation via ground level surveying and InSAR to understand the extent, rate, and spatial distribution of land subsidence in Central MZ-1. Watermaster uses electronic distance measurement (EDM) to monitor horizontal ground surface displacement across the zone of potential ground fissuring near the intersection of Central Avenue and Philadelphia Street.

All the data collected and analyzed during the Interim Monitoring Program (IMP) indicate very little permanent subsidence in the Southeast Area (east of Ayala Park) since the 1990s. However Watermaster monitors vertical ground-surface deformation via ground level surveying and InSAR techniques as part of the same program for the Managed Area. In addition, Watermaster installed pressure transducers/data loggers in 16 existing production and/or monitoring wells to record water levels every 15 minutes.

The data collected and analyzed during the IMP indicate minor but persistent permanent subsidence in the Northeast Area since the early 1990s. Consequently, Watermaster monitors ground-surface deformation via ground level surveying and InSAR techniques as part of the same program conducted in the Managed Area.

During FY 2007/08, Watermaster and the MZ-1 Technical Committee will further evaluate the contribution of pumping in the central and northern portions of MZ-1 on groundwater conditions, continue testing and monitoring to refine the Guidance Criteria, and work with Chino Hills to evaluate their options for producing groundwater from MZ-1. By the end of March 2008, the MZ-1 Technical Committee will have prepared specific scopes of work and detailed cost estimates for the above activities for inclusion in the FY 2008/09 budget.

Program Element 2: Develop and Implement a Comprehensive Recharge Program

Construction on the Chino Basin Facilities Improvement Project (CBFIP) Phase I was completed by December 31, 2005 at a cost of \$38M; 50% from a SWRCB Proposition 13 Grant, and 25% each from Watermaster and the IEUA. A CBFIP Phase II list of projects was developed by Watermaster and the IEUA, including monitoring wells, lysimeters, recycled water connections, SCADA system expansions, three MWDSC turnouts, and berm heightening and hardening. At a cost of approximately \$12M, these Phase II facilities will be financed through a 50% Grant from DWR and 25% each from Watermaster and the IEUA.

In FY 2005/06, the CBFIP Phase I facilities were able to recharge 49,000 AF of storm and supplemental water. With the completion of the Phase II facilities in FY 2007/08, the total recharge capacity will be about 91,000 AF. By the start of FY 2009/10, most of the basins will be able to operate on a 12 months-per-year basis with combinations of storm, imported, and recycled water, with occasional downtime for silt and organic growth removal. Operations and basin planning are coordinated through the Groundwater Recharge Coordinating Committee (GRCC), which met monthly during this reporting period.

Because of the drought and Delta water quality issues, MWDSC has been unable to provide replenishment water to southern California since May 1, 2007. This greatly restricts Watermaster's ability to recharge recycled water, since the California Department of Public Health requires that two parts of diluent water (imported or storm water) be blended with each part of recycled water. For this reporting period, only 4,000 AF of storm and recycled water have been recharged.

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

Construction on the Chino I Desalter Expansion and the Chino II Desalter facilities was completed in February 2006 and an application has been made for \$1.6 M in Proposition 50 funds to add 8 MGD of ion exchange capacity to the Chino II Desalter. As currently configured, the Chino I Desalter provides 2.6 MGD of treated (air stripping for VOC removal) water from Wells Nos. 1-4, 4.9 MGD of treated (ion exchange for nitrate removal) water from Wells Nos. 5-15, and 6.7 MGD of treated (reverse osmosis for nitrate and TDS removal) water from Wells Nos. 5-15 for a total of 14.2 MGD (16,000 AFY). The Chino II Desalter provides 4.0 MGD of ion exchange treated water and 6.0 MGD of reverse osmosis treated water from 8 additional wells for a total of 10.0 MGD (11,000 AFY).

Negotiations are currently underway between the Chino Desalter Authority and Western Municipal Water District to allow WMWD to join the CDA and to expand the Chino II Desalter by 10.5 mgd (10,600 AFY). Raw water will be drawn from existing CDA II wells, and possible additional new wells if needed. In addition, a new Chino Creek Well Field, required for hydraulic control, will provide additional raw water to the Chino I Desalter, enabling existing Well Nos. 13, 14, and 15 to shift production to the expanded Chino II Desalter facility if needed.

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

In October 2005, Watermaster completed the MZ-1 Summary Report, including the Guidance Criteria. Since then the impacted parties have had numerous meetings to transform the Summary Report into a Long-term Management Plan. The Summary Report and the Guidance Criteria were adopted by the Watermaster Board in May 2006, and the Long-term Management Plan was adopted in June 2007.



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

Program Element 7: Develop and Implement a Salt Management Program

A Water Quality Committee meeting was held on July 19, 2007 to discuss the status of the investigations of the three major water quality plumes (Chino Airport, Ontario Airport, and Stringfellow Hazardous Waste site) in the Basin. For the Chino Airport, the consulting engineer for the San Bernardino County Department of Airports has successfully characterized the horizontal extent of TCE contamination, and submitted a work plan on December 10, 2007 to determine the vertical extent of contamination. Their work plan calls for installing 3 wells up to 300' in depth along the plume axis; to be followed by two wells ranging in depth from 100'-200' in order to sample the highest TCE concentrations. The SBCDA proposes to construct the wells in April 2008.

For the Ontario International Airport (OIA) plume, the Potentially Responsible Parties (PRPs) have been working with Watermaster to quantify the depth and extent of the TCE plume. The PRPs submitted a Work Plan in May 2007 for installing and sampling four groundwater monitoring wells, with two wells down gradient of the OIA and two wells down gradient of the Milliken Landfill. Watermaster and the RWQCB approved the Work plan; and the PRPs propose to begin drilling their monitoring wells in March 2008.

At the Stringfellow site, the consultants to the Department of Toxic Substances Control have been investigating whether the perchlorate plume from the site adds to the existing perchlorate levels in the Santa Ana River, or whether the perchlorate plume is diverted towards the Chino II Desalter well field. The results of their investigation, together with further discussion of the Chino Airport and OIA plumes will be the key topics of the Water Quality Committee meeting on February 12, 2008. Lastly, Watermaster continues to monitor the activities of General Electric's (GE) remediation at the Flat Iron facility and their efforts to develop a new location for recharge of their treated effluent.

MZ-3 Monitoring Program

The former Kaiser plume has been incorporated into an overall monitoring program for the MZ-3 area. The MZ-3 monitoring program is also assessing the groundwater quality impairment from total dissolved solids (TDS), nitrate, and perchlorate. The perchlorate may have originated from the Mid-Valley Landfill (in Rialto Basin, across the Rialto-Colton fault) or it may be a non-point source that resulted from the historical application of Chilean fertilizer. Four rounds of quarterly samples have been collected from 22 wells, including former Kaiser wells that Watermaster previously renovated: MP2 and KOFS. The MP2 cluster of wells (four depths) was in the heart of the Kaiser plume when the well was constructed; while KOFS was just beyond the leading edge of the plume. MP2 continues to show an impact from the Kaiser plume and the KOFS well is now impacted. Based on the analytical results, two new monitoring wells were constructed and two quarterly samples taken. Results from the entire monitoring program for MZ-3 will be presented in the final report, to be completed in FY 2007/08.

TDS and Nitrogen Monitoring Pursuant to the 2004 Basin Plan Amendment

Pursuant to the 2004 Basin Plan Amendment and the Watermaster/IEUA permit to recharge recycled water, Watermaster and the IEUA have conducted groundwater and surface water monitoring programs. Quarterly HCMP reports that summarize data collection efforts were submitted to the RWQCB in July and October of 2007. An annual HCMP report for 2007 will be submitted to the RWQCB in April 2008.

Program Element 8: Develop and Implement a Groundwater Storage Management Program; and

Program Element 9: Develop and Implement a Storage and Recovery Program

The existing Watermaster/IEUA/Metropolitan Dry Year Yield (DYY) program continued during the reporting period. As of December 31, 2007, about 88,434 acre-ft had been stored in the Basin in Metropolitan's DYY account. The construction statuses of local facilities included in the DYY program for the participating parties are as follows:

- City of Ontario – Wellhead treatment facility: final design received in October 2007. DYY Wells: Bids received for equipping Well No's 44 and 52; but were rejected in September 2007. New bid opening scheduled for 1Q 2008.
- Cucamonga Valley Water District – Five new wells (Nos. 39-42, and 43): construction completed for Well Nos. 39-42 and contract issued for wellhead equipment and transmission main for Well No. 43.
- City of Upland – New IX treatment facility constructed and online.
- City of Pomona – Expansion of existing IX treatment facility is 95% complete, and a permit to operate has been requested.
- City of Chino Hills – Refurbish Pellisier well and construct new treatment facility: design underway
- Monte Vista Water District – Well No. 31: well construction completed July 2006 and well equipping is scheduled for completion in August 2008. Well No. 32 is substantially complete. Well No. 33 and treatment facility (joint MVWD/Chino project): Well construction is complete and treatment facility construction is underway, with completion scheduled for July 2008.
- Jurupa Community Services District – Expansion of the Teagarden IX facility completed and online.