Optimum Basin Management Program

Staff Status Report 2019-2: July to December 2019

CHINO BASIN WATERMASTER

Optimum Basin Management Program

Highlighted Activities

- During this reporting period, Watermaster manually measured 380 water levels at about 50 private wells and 12 municipal supply wells throughout the Chino Basin, conducted two quarterly download events at about 135 wells containing pressure transducers, collected 79 groundwater quality samples from 71 wells, and collected 4 surface water quality samples. Groundwater-quality monitoring included the one-time addition for analysis of the emerging compounds PFAS and 1,4-dioxane at 39 monitoring wells.
- Pursuant to a monitoring and mitigation requirement of the Peace II Subsequent Environmental Impact Report (SEIR), Watermaster, the Inland Empire Utilities Agency (IEUA), and the Orange County Water District (OCWD) continued to implement the Prado Basin Habitat Sustainability Program (PBHSP). During this reporting period, Watermaster collected two quarters of surface water and groundwater quality sampling at two PBHSP monitoring well locations and conducted two quarterly downloads of pressure transducers that measure water levels at the 18 PBHSP monitoring wells. And a custom high-resolution air photo was collected on the entire Prado Basin region.
- Pursuant to the *Chino Basin Subsidence Management Plan*, Watermaster continued to implement the Ground-Level Monitoring Program and completed the *2018/19 Annual Report of the Ground-Level Monitoring Committee*, which analyzes and interprets data from the monitoring program and recommends future monitoring and testing activities. During this reporting period, Watermaster completed the fabrication of the extensometer components for the Pomona Extensometer facilities. Installation of the extensometer components is expected to begin in February 2020.
- Watermaster and the IEUA are continuing to implement the 2013 Amendment to the 2010 Recharge Master Plan Update (2013 RMPU) pursuant to the October 2013 Court Order authorizing its implementation. During this reporting period, the contract award for construction of the Lower Day Basin was approved and authorized. The design plans and specifications are in the process of being finalized, and required permits are being obtained for the Wineville/ Jurupa/RP3 Basins and Montclair Basins.
- During this reporting period, Watermaster and the IEUA recharged a total of 29,838 acre-feet of water: 4,328 acre-feet of stormwater, 6,834 acre-feet of recycled water, and 18,676 acre-feet of imported water.
- Watermaster staff and consultants completed the 2020 Storage Management Plan (2020 SMP), an update of the SMP currently included in the OBMP Implementation Plan. Watermaster published a final SMP report on December 19, 2019 and is working with the Watermaster Parties and other stakeholders to incorporate it into the 2020 OBMP Update.
- Watermaster's consultant has continued the technical work necessary for the 2020 Safe Yield recalculation pursuant to the OBMP Implementation Plan and the April 28, 2017 Court Order. This recalculation will incorporate the impacts of projected climate change and land subsidence. The schedule calls for the recalculation of Safe Yield by early 2020 and for the Safe Yield reset to be filed with the Court by June 2020.
- Watermaster published the draft 2020 OBMP Update Report, which described (1) the 2020 OBMP Update process, (2) the OBMP goals and new activities for the 2020 OBMP, (3) the status of the OBMP Program Elements and ongoing activities within them, and (4) the recommended 2020 OBMP management plan. The management plan will form the foundation for the Watermaster Parties to develop a 2020 OBMP Implementation Plan and the agreements necessary to implement it. The report is expected to be finalized in 2020.

Program Element 1: Develop and Implement a Comprehensive Monitoring Program

Fundamental to the implementation of the OBMP Program Elements are the monitoring and data collection efforts performed in accordance with Program Element 1, including monitoring basin hydrology, production, recharge, groundwater levels, groundwater quality, and ground level movement. Various monitoring programs have and will continue to be refined over time to satisfy the evolving needs of Watermaster and the IEUA, such as new regulatory requirements and improved data coverage. Monitoring is performed by basin pumpers, Watermaster staff, and other cooperating entities as follows.

Groundwater Level Monitoring

Watermaster's basin-wide groundwater level monitoring supports the periodic reassessment of Safe Yield, the monitoring and management of ground level movement, the analysis of desalter pumping impacts at private wells, the analysis of the implementation of the Peace II Agreement on groundwater levels and riparian vegetation in the Prado Basin, 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 recalibrate Watermaster's computer-simulated groundwater flow model, to understand groundwater flow directions, to compute storage changes, to support interpretations of water quality data, and to identify areas of the basin where recharge and discharge are not in balance.

Watermaster Staff Measuring Groundwater Level

The current groundwater level monitoring program is comprised of about 1,200 wells. At about 1,000 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 200 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.

All groundwater level data are checked and uploaded to a centralized database management system that can be accessed online through HydroDaVE℠. During this reporting period, Watermaster measured about 380 water levels at about 50 private wells and 12 municipal supply wells throughout the Chino Basin and conducted two quarterly downloads of 135 pressure transducers installed in private, municipal, and monitoring wells. Additionally, Watermaster compiled all available groundwater-level data from well owners in the basin for the April 2019 to October 2019 period.

Groundwater Quality Monitoring

Watermaster initiated a comprehensive groundwater quality monitoring program in which the obtained data may be used for: the biennial State of the Basin report, the triennial ambient water quality update, the demonstration of Hydraulic Control, monitoring nonpoint-source groundwater contamination and plumes associated with point-source discharges, and assessing 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 salinity management and groundwater remediation strategies. The details of the groundwater quality monitoring programs as of fiscal year 2019/20 are described below.

Chino Basin Data Collection (CBDC). Watermaster routinely and proactively collects groundwater quality data from well owners, such as municipal producers and government agencies. Groundwater quality data are also obtained from special studies and monitoring that takes place under the orders of the Santa Ana Regional Water Quality Control Board (Regional Board)—such as for landfills and other groundwater quality investigations, the DTSC, the US Geological Survey (USGS), and others. These data are collected from well owners and monitoring entities at least twice per year. Data is collected for about 800 wells as part of the CBDC program. During this reporting period, Watermaster compiled data collected for the CBDC program for the January to June 2019 period.

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

Watermaster Field Groundwater Quality Monitoring Programs. Watermaster continues to sample privately owned wells and its own monitoring wells on a routine basis as follows:

1. *Private Wells*. About 80 private wells, located predominantly in the southern portion of the basin, are sampled at various frequencies based on their proximity to known point-source contamination plumes. Seven wells near contaminant plumes are sampled on an annual basis, and the remaining 72 wells are sampled on a triennial basis.

2. *Watermaster Monitoring Wells*. Watermaster collects groundwater quality samples from a total of 21 multi-nested monitoring wells located throughout the Chino Basin. These nested wells include nine HCMP monitoring well sites constructed to support the demonstration of Hydraulic Control in the southern Chino Basin, nine sites constructed to support the PBHSP in the Prado Basin region, and three sites that fill spatial data gaps near contamination plumes in MZ-3. Each nested well site contains up to four wells in the borehole. Additionally, Watermaster samples one single-casing well in MZ-3. Currently, the HCMP and MZ-3 wells are sampled annually, and the PBHSP wells, at two locations, are sampled quarterly.

3. *Other wells*. Watermaster collects quarterly samples from four near-river wells to characterize the interaction of the Santa Ana River and groundwater. These shallow wells along the Santa Ana River consist of two former USGS National Water Quality Assessment Program wells (Archibald 1 and Archibald 2) and two Santa Ana River Water Company wells (well 9 and inactive well 11).

During this reporting period, Watermaster collected 79 groundwater quality samples from 71 wells and sent to Eurofins Eaton Analytical Laboratory for analysis. At 39 monitoring wells the one-time addition for the analysis of the emerging compounds PFAS and 1,4-dioxane was included as part of the laboratory analysis. 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 Production Monitoring

As of the end of this reporting period, there were a total of 483 producing wells, 273 of which were for agricultural uses. The decrease in agricultural wells are mainly attributable to urbanization and development. Many of the remaining active agricultural production wells are metered which Watermaster reads on a quarterly basis. Meter reads and production data are then entered into Watermaster's relational database, which can be accessed online through HydroDaVE^{sm}.

Santa Ana River

Surface Water Monitoring in the Santa Ana River

Watermaster collects grab water quality samples at two sites along the Santa Ana River (Santa Ana River at River Road and Santa Ana River at Etiwanda) on a quarterly basis. Along with the data collected at the four wells near the Santa Ana River, these data are used to characterize the interaction between the Santa Ana River and nearby groundwater. During this reporting period, Watermaster collected four surface water quality samples.

Prado Basin Habitat Sustainability Program (PBHSP)

Mitigation Measure 4.4-3 from the Peace II SEIR requires that Watermaster and the IEUA, in collaboration with the OCWD, form a committee, the PBHSC, and develop and implement an Adaptive Management Plan for the PBHSP. The PBHSC is open to all interested participants, including the Watermaster Parties, IEUA member agencies, the OCWD, and other interested stakeholders. The objective of the PBHSP is to ensure that riparian habitat in the Prado Basin is not adversely impacted by the implementation of Peace II activities. Currently, the PBHSP consists of a monitoring program and annual reporting on the results of the monitoring program. The monitoring program includes an assessment of the riparian habitat and all factors that could potentially impact the riparian habitat, including those factors affected by Peace II activities, such as changes in groundwater levels. Sixteen monitoring wells at nine sites were constructed in 2015 to support the PBHSP. Two existing wells are also monitored as part of the PBHSP. The PBHSC developed the Adaptive Management Plan of the PBHSP to describe an initial monitoring program and a process to modify the monitoring program and/or implement mitigation strategies, as necessary.

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

During the reporting period, Watermaster performed the following tasks:

- Conducted the groundwater monitoring program, which included the quarterly download of transducers that measure groundwater levels at 18 PBHSP monitoring wells, and quarterly groundwater quality sampling at four PHBSP monitoring wells in two locations.
- Conducted the surface water monitoring program, which included: the purchase and installation of probes that measure EC, temperature, and level at two surface water sites; quarterly download of probes at the two site; quarterly water quality sampling at two sites; and the collection of surface-water quality and daily discharge data for POTWs and USGS stream gage locations tributary to Prado Basin for water year 2019.
- Collected climatic data near Prado Basin for water year 2019.
- Collected and reviewed the following riparian habitat monitoring data:
    - Normalized Difference Vegetation Index (NDVI) remote sensing data collected from Landsat satellites for water year 2019.
    - Performed a custom flight to collect a high-resolution air photo for 2019 of the Prado Basin region. This was cost shared with the OCWD.

Chino Basin Groundwater Recharge Monitoring Program

Watermaster, the 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 groundwater quality in local drinking water wells by increasing the recharge of storm, imported, and recycled waters. The recharge program is regulated under Regional Board Order No. R8-2007-0039 and Monitoring and Reporting Program No. R8-2007-0039.

Watermaster and the IEUA measure the quantity of storm and supplemental water that enters recharge basins using pressure transducers or staff gauges. Staff also collect weekly water quality samples from recharge basins actively recharging recycled water and from lysimeters installed within those recharge basins. 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 RP-1 and RP-4 treatment plant effluents are obtained from the IEUA. Combining measured flow data with respective water quality data enables the calculation of the blended water quality of the recharge sources in each recharge basin and the assessment of adequate dilution of recycled water, as required by the recycled water recharge permits held with the Division of Drinking Water (DDW). The recharge measurements are also used to estimate the New Yield to the Chino Basin due to recharge activities.

Monitoring Activities. During this reporting period, the IEUA performed its ongoing monitoring program to measure and record recharge volumes and to collect stormwater quality samples pursuant to its permit requirements. Also, during this reporting period, approximately 149 recharge basin and lysimeter samples were collected for water quality analysis, and 58 recycled water samples were collected for alternative water quality monitoring plans. Monitoring wells located downgradient of the recharge basins were sampled, at a minimum, on a quarterly basis and some monitoring wells were sampled more frequently during the reporting period for a total of 84 samples.

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

- 2Q-2019 Quarterly Report, submitted to the Regional Board – August 2019
- 3Q-2019 Quarterly Report, submitted to the Regional Board – November 2019

Ground Level Monitoring

To address the historical occurrence of land subsidence and ground fissuring in the Chino Basin, Watermaster prepared and submitted a subsidence management plan (known as the MZ-1 Plan) to the Court for approval, and in November 2007, the Court ordered its implementation (see Program Element 4 in this report for more on MZ-1 Plan implementation). The MZ-1 Plan required several monitoring and mitigation measures to minimize or abate the future occurrence of land subsidence and ground fissuring. These

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

measures and activities included:

- Continuing the scope and frequency of monitoring within the so-called Managed Area that was conducted during the period when the MZ-1 Plan was being developed.
- Expanding the monitoring of the aquifer system and ground level movement into other areas of MZ-1 and the Chino Basin where data indicate concern for future subsidence and ground fissuring (Areas of Subsidence Concern).
- Monitoring of horizontal strain across the historical zone of ground fissuring.
- Conducting additional testing and monitoring to refine the MZ-1 Guidance Criteria for subsidence management (e.g. the Long-Term Pumping Test).
- Developing alternative pumping plans for the MZ-1 producers 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).

Since the initial MZ-1 Plan was adopted in 2007, Watermaster has conducted the annual Ground Level Monitoring Program (GLMP). The main results of the GLMP are that very little permanent land subsidence has occurred in the MZ-1 Managed Area, indicating that subsidence is being successfully managed in this area, and land subsidence has been occurring in Northwest MZ-1. One concern is that subsidence in Northwest MZ-1 has occurred differentially across the San Jose Fault, following the same pattern of differential subsidence that occurred in the MZ-1 Managed Area during the time of ground fissuring.

Based on these observations, Watermaster determined that the subsidence management plan needed to be updated to include a Subsidence Management Plan for Northwest MZ-1 with the long-term objective of minimizing or abating the occurrence of the differential land subsidence. Thus, Watermaster expanded the GLMP into Northwest MZ-1 and prepared an updated Chino Basin Subsidence Management Plan, which included the Work Plan to Develop a Subsidence Management Plan for Northwest MZ-1 (Work Plan) as an appendix.

During this reporting period, Watermaster undertook the following Chino Basin Subsidence Management Plan activities:

- Continued 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 the Chino Basin Subsidence Management Plan.
- Performed monthly routine maintenance, data collection, and verification at the Ayala Park and Chino Creek extensometer facilities.
- Continued implementation of the Work Plan:
    - Collected, processed, and checked groundwater level data and production data from wells in Northwest MZ-1 on a monthly basis.
    - Cascade Environmental, Inc. (Cascade) drilled and constructed the Pomona Extensometer facility's two dual-nested piezometers. Fabrication of the Pomona Extensometer facilities cable extensometer components were completed in late December 2019. Installation of the cable extensometer components is expected to begin in February 2020.

Program Element 2: Develop and Implement a Comprehensive Recharge Program

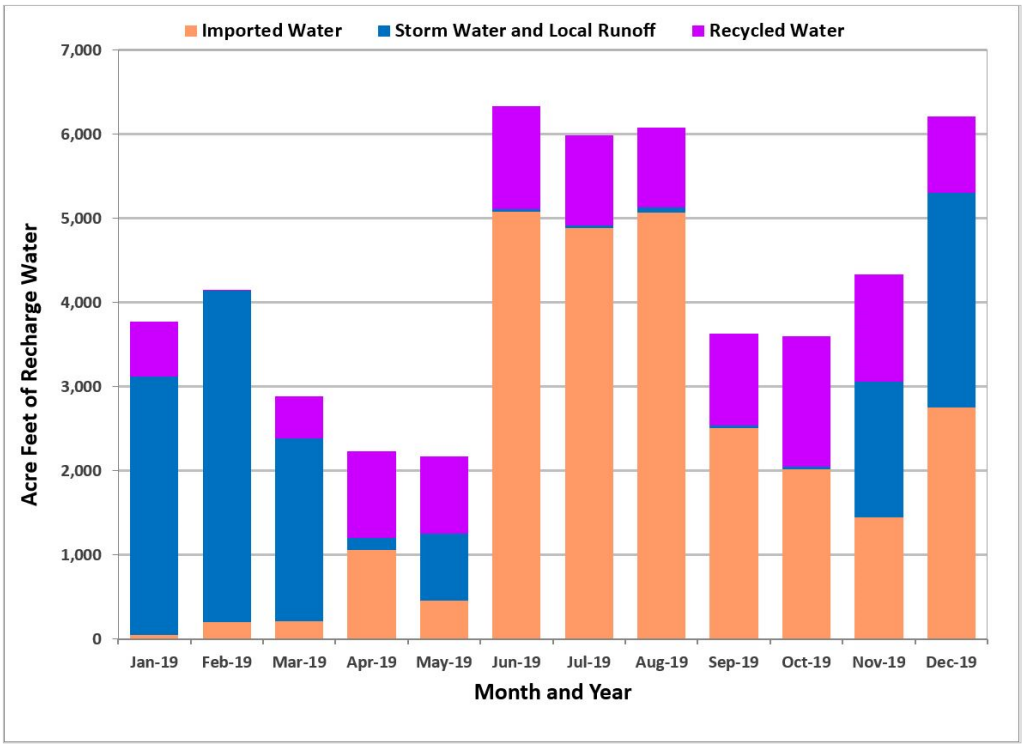
The objectives of the comprehensive recharge program include enhancing the yield of the Chino Basin through the development and implementation of a Recharge Master Plan to improve, expand, and construct recharge facilities that enable the recharge of storm, recycled, and imported waters; ensuring a balance of recharge and discharge in the Chino Basin management zones; and ensuring that sufficient storm and imported waters are recharged to comply with the recycled water dilution requirements in Watermaster and the IEUA's recycled water recharge permits.

Pursuant to Program Element 2 of the OBMP, Watermaster and the IEUA partnered with the San Bernardino County Flood Control District and the Chino Basin Water Conservation District to construct and/or improve eighteen recharge sites. This project is known as the Chino Basin Facilities Improvement Project (CBFIP). The average annual stormwater recharge of the CBFIP facilities is approximately 10,000 acre-feet per year, the supplemental "wet"[1] water recharge capacity is about 56,600 acre-feet per year, and the in-lieu supplemental water recharge capacity ranges from 17,700 to 49,900 acre-feet per year. In addition to the CBFIP facilities, the Monte Vista Water District has five ASR wells with a demonstrated well injection capacity of 5,500 acre-feet per year. The current total supplemental water recharge capacity ranges from 90,310 to 118,310 acre-feet per year, which is greater than the projected supplemental water recharge capacity required by Watermaster.

In 2008, Watermaster began preparing the *2010 Recharge Master Plan Update* (2010 RMPU) pursuant to the December 21, 2007 Court Order (the Peace II Agreement) to complete a Recharge Master Plan Update by July 1, 2010. In October 2010, the Court accepted the 2010 RMPU as satisfying the condition and ordered that certain recommendations of the 2010 RMPU be implemented. In November 2011, Watermaster reported its progress to the Court pursuant to the October 2010 Court Order, and in December 2011, the Court issued an order directing Watermaster to continue with its implementation of the 2010 RMPU per its October 2010 order but with a revised schedule. On December 15, 2011, the Watermaster Board moved to:

> "approve that within the next year there will be the completion of [a] Recharge Master Plan Update, there will be the development of an Implementation Plan to address balance issues within the Chino Basin subzones, and the development of a Funding Plan, as presented."

This motion led to the development of an update to the 2010 RMPU, and in 2012, Watermaster staff sent out a "call for projects" to the Watermaster Parties, seeking their recommendations for recharge improvement projects that should be considered in the update. The *2013 Amendment to the 2010 Recharge Master Plan Update* (2013 RMPU) outlines the recommended projects to be implemented by Watermaster and the IEUA and lays out the implementation and financing plans. The 2013 RMPU report was approved by the Watermaster Board in September 2013 and filed with the Court in October 2013. In December 2013, the Court approved the 2013 RMPU except for Section 5, which dealt with the accounting for new recharge from Municipal Separate Stormwater Sewer Systems; Section 5 was later approved by the Court in April 2014.



In September 2018, Watermaster completed the 2018 Recharge Master Plan Update (2018 RMPU) and submitted it to the Court in October 2018. On December 28, 2018, the Court approved the 2018 RMPU. The next Recharge Master Plan Update will be performed no later than October 2023.

[1]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.

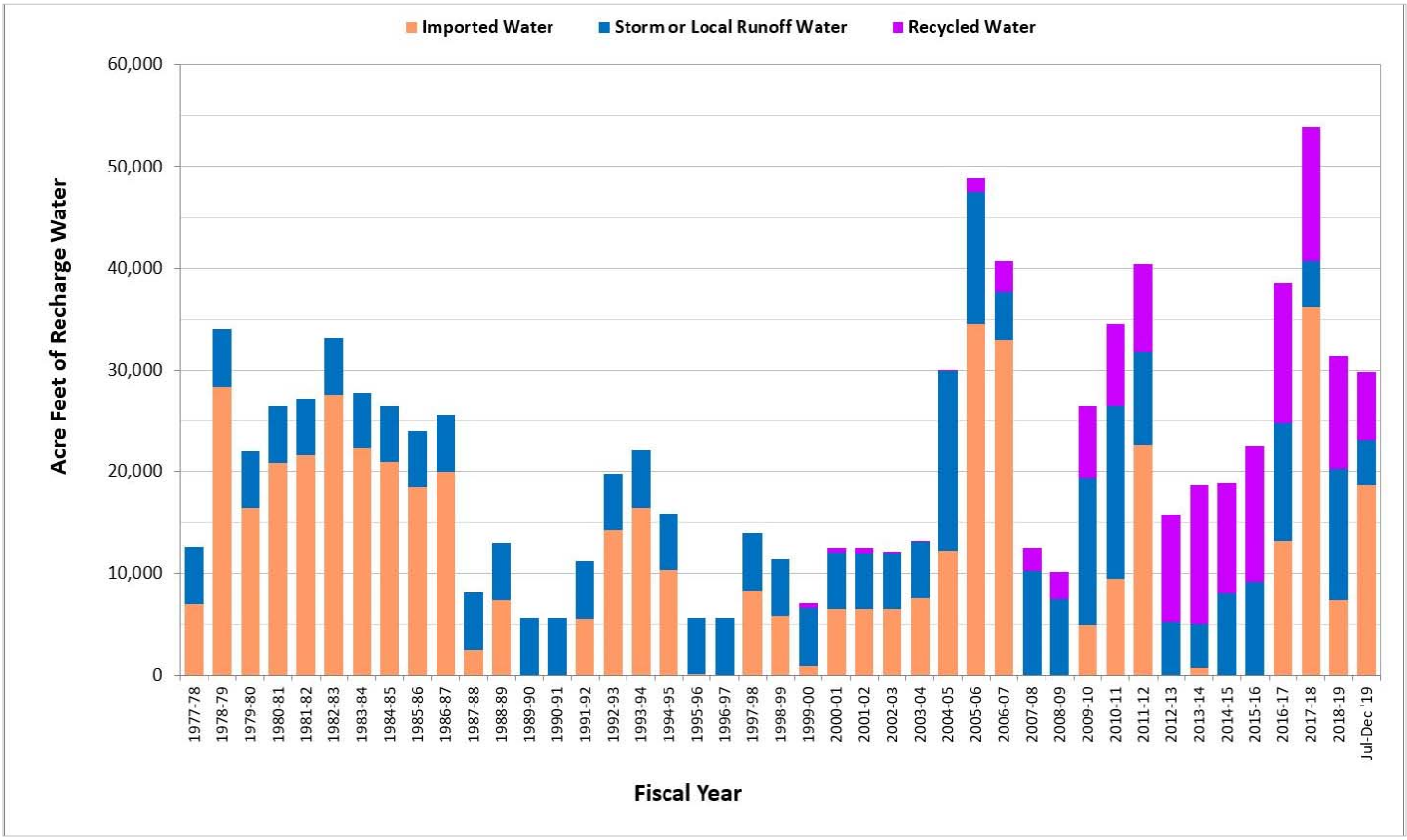
Program Element 2: Develop and Implement a Comprehensive Recharge Program (Continued)

2013 RMPU Implementation. Watermaster and the IEUA are continuing to carry out the October 2013 Court Order, which authorizes them to implement the 2013 RMPU. Construction of the San Sevaine Basin improvements was completed in September 2018 and the construction of the Victoria Basin improvements was completed in December 2018. During this reporting period, the IEUA Board approved and authorized the contract award for the construction of the for Lower Day Basin. The design plans and specifications are being finalized, and required permits are being obtained for the Wineville/Jurupa/RP3 Basins and Montclair Basins.

Additionally, Watermaster and the IEUA continued to develop a series of projects outside of the 2013 RMPU effort that will increase and/or facilitate stormwater and supplemental water recharge and have jointly funded these projects, including monitoring upgrades and habitat conservation. Watermaster's share of the cost of these projects was included in the budget adopted by Watermaster for fiscal year 2018/19.

The Recharge Improvements Project Committee met quarterly on the progress of implementing the 2013 RMPU Projects and other recharge-related projects.

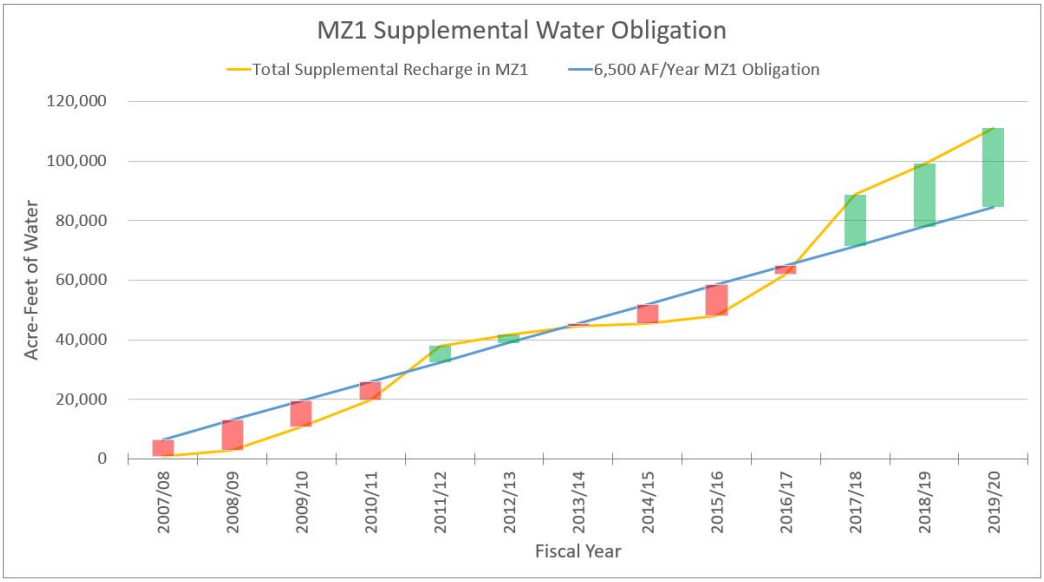
Recharge for Dilution of Recycled Water. In fiscal year 2009/10, Watermaster and the IEUA's recharge permit was amended to allow for existing underflow dilution and extended the period for calculating dilution from a running 60-month to a running 120-month period. Additionally, the IEUA has worked with the DDW to obtain approval to increase the allowable recycled water contribution (RWC) at wells to 50 percent. These permit amendments allow for increased recycled water recharge without having to increase the amount of imported and storm waters required for dilution. The IEUA projects its dilution requirements as part of its annual reporting to the DDW. Based on the latest Annual Report (May 2019), the IEUA projects that dilution requirements will be met through 2029 even if no imported water is available for dilution.



Recharge Activities. During this reporting period, ongoing recycled water recharge occurred in the Brooks, 7th Street, 8th Street, Ely, Turner, RP-3, Declez, Hickory, Banana, and Victoria Basins; stormwater was recharged at 18 recharge basins across all Chino Basin

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

management zones; and imported water was recharged at the Upland, College Heights, Montclair, Brooks, 7th Street, 8th Street, Ely, Lower Day, Etiwanda, Victoria, San Sevaine, Jurupa, Hickory, and RP3 Basins, and through the Monte Vista Water District's ASR wells. Watermaster and the IEUA recharged a total of 29,838 acre-feet of water: 4,328 acre-feet of stormwater, 6,834 acre-feet of recycled water, and 18,676 acre-feet of imported water.



Balance of Recharge and Discharge in MZ-1. The total amount of supplemental water recharged in MZ-1 since the Peace II Agreement through December 30, 2019 was approximately 111,118 acre-feet, which is about 26,618 acre-feet more than the 84,500 acre-feet required by June 30, 2020 (annual requirement of 6,500 acre-feet). The amount of supplemental water recharged into MZ-1 during the reporting period was approximately 12,035 acre-feet.

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

As stated in the OBMP, "the goal of Program Elements 3 and 5 is to develop a regional, long range, cost effective, equitable, water supply plan for producers in the Chino Basin that incorporates sound basin management." One element of the water supply plan is the development of a way to replace the decline in groundwater production to prevent significant amounts of degraded groundwater from discharging to the Santa Ana River and violating the Basin Plan. Replacing the decline in agricultural groundwater production will mitigate the reduction of the Safe Yield of the basin and allow for more flexibility in the basin's supplemental water supplies if the produced groundwater is treated. This is achieved through the operation of the Chino Basin Desalter facilities, which comprise a series of wells and treatment facilities in the southern Chino Basin that are designed to replace the decline in production of the agricultural groundwater producers and to treat and serve this groundwater to various Appropriative Pool members.

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 of groundwater per year (12.1 million gallons per day [MGD]) at 15 wells (I-1 through I-15). This water is treated through air stripping (volatile organic compound [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 of groundwater per year (14.1 MGD) at eight wells (II-1 through II-4 and II-6 through II-9). This water is treated through ion exchange and/or reverse osmosis. Development and planning continue 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 $77 million in grant funds have been secured toward this expansion.

The most recently completed expansion project included the construction of five wells for the new Chino Creek Well Field (CCWF): wells I-16, I-17, I-18, I-20, and I-21. These wells were constructed to meet the Hydraulic Control commitment associated with the

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 (see the Program Element 7 update in this status report) and provide additional raw water to the Chino I Desalter. Production began at wells I-16 and I-17 in mid-2014 and at wells I-20 and I-21 in early 2016. Production at well I-17 ceased in late 2017 due to 1,2,3-trichloropropane (1,2,3-TCP) concentrations in excess of the newly adopted maximum contaminant level (MCL). Well 1-18 is not planned for operation by the CDA due to high concentrations of VOCs.

The current expansion project includes adding three additional desalter wells. Wells II-10, II-11, and II-12 to provide additional raw water to the Chino II Desalter to meet the maximum-benefit commitment to produce a total of 40,000 acre-feet per year from the combined desalter well fields. These wells will also be utilized as part of the remediation action plan to clean up the South Archibald Plume (see the Program Element 6 update in this status report). Construction of wells II-10 and II-11 was completed in late-2015, equipping of the wells was completed in August 2018, and production at the wells commenced soon after.

Construction of well II-12 and a nearby monitoring well began in 2019 and is expected to be completed by 2020. The construction of a dedicated pipeline to convey groundwater from wells II-12, II-10, II-11, and the existing I-11 to the Chino II Desalter is in process. The overall project is anticipated to be operational by 2020.

During this reporting period, the CDA completed the construction of a monitoring well near the proposed location of well II-12.

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

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

- Minimize subsidence and fissuring in the short-term.
- Collect the information necessary to understand the extent, rate, and mechanisms of subsidence and fissuring.
- Formulate a management plan to 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 (referred to now as the Ground-Level Monitoring Committee or GLMC). 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. Watermaster has implemented the MZ-1 Plan since that time, including the ongoing Ground-Level Monitoring Program (GLMP) called for by the MZ-1 Plan (refer to Program Element 1 update, see above).

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. In early 2015, Watermaster prepared an update to the MZ-1 Plan, which included a name change to the *2015 Chino Basin Subsidence Management Plan* and a *Work Plan to Develop the Subsidence Management Plan for Northwest MZ-1* (Work Plan) as an appendix. The Chino Basin Subsidence Management Plan and the Work Plan were adopted through the Watermaster Pool process in July 2015.

The data, analysis, and reports generated through the implementation of the MZ-1 Plan, Chino Basin Subsidence Management Plan, and Work Plan are reviewed and discussed by the GLMC, which meets on a periodic basis throughout the year. The GLMC is open to all interested participants, including the Watermaster Parties and their consultants. During this reporting period, Watermaster undertook the following data analysis and reporting tasks:

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

- Conducted a GLMC meeting on August 22, 2019 to review the planned activities of the Ground Level Monitoring Program for FY 2019/20.
- Conducted a GLMC meeting on September 26, 2019 to review the *draft 2018/19 Annual Report of the Ground-Level Monitoring Committee*.
- Finalized the *2018/19 Annual Report of the Ground-Level Monitoring Committee* and submitted the report to Watermaster in November 2019.

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

Program Elements 6 and 7 are necessary to address the water quality management problems in the Chino Basin. During the development of the OBMP, it was identified that Watermaster did not have sufficient information to determine whether point and non-point sources of groundwater contamination are being adequately addressed, including the various Chino Basin contaminant plumes. With the Regional Board and other agencies, Watermaster has worked to address the following major point source contaminant plumes in the Chino Basin:

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 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 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, 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 as 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 and subsequently 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 IEUA as the previous and current operators of the RP-1 treatment plant and disposal area (collectively, the RP-1 Parties). In part, the draft CAOs require that RP-1 Parties "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 RP-1 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."

Under the Regional Board's oversight, the ABGL Parties and/or the RP-1 Parties conducted sampling at private residential wells and taps approximately every two years (2007-2008, 2009, 2011, 2013-2014) in the region where groundwater is potentially contaminated with TCE. By 2014, all private wells and/or taps in the region of the plume had been sampled at least once since 2007. Alternative water systems (tanks) have been installed at residences in the area where well or tap water contains TCE at or above 80% of the MCL for TCE. Residents who declined tank systems 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 spatial extent of the plume. The most recent characterization of the plume completed by Watermaster was in June 2019 for the *2018 State of the Basin* Report. In October of this reporting period, Watermaster prepared a semi-annual status report on the South Archibald plume for Watermaster Parties.

In July 2015, the RP-1 Parties completed the Draft Feasibility Study Report for the South Archibald Plume (Feasibility Study). The Feasibility Study established cleanup objectives for both domestic water supply and plume remediation and evaluated alternatives to accomplish these objectives. In November 2015, a revised Draft Feasibility Study, Remedial Action Plan, and Responses to Comments

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 (Continued)

were completed to address input from the public, the ABGL, and others. In September 2016, the Regional Board issued the Final CAO R8-2016-0016 collectively to the RP-1 Parties and the ABGL Parties. The Final CAO was adopted by all parties in November 2016, thus approving the preferred plume remediation and domestic water supply alternatives identified in the Remedial Action Plan. The parties also reached a settlement agreement that aligns with the Final CAO and authorizes funding to initiate implementation of the plume remediation alternative.

The plume remediation alternative involves the use of existing and proposed CDA production wells and facilities. The RP-1 Parties reached a Joint Facility Development Agreement with the CDA for the implementation of a project designed to remediate the South Archibald Plume. The proposed project, termed the Chino Basin Improvement and Groundwater Clean-up Project, includes the operation of three new CDA desalter wells (II-10, II-11, and II-12) and a dedicated pipeline connecting the three wells and the existing CDA well I-11 to the Desalter II treatment facility. Construction of two of the three wells were completed and became operational in 2018. In July 2018, the Regional Board approved an extension of imposed project deadlines in the Final CAO R8-2016-0016 for the RP-1 Parties. The deadlines included: (1) a well II-12 design report and its construction completed by September 2019 and July 2020 respectively; (2) a dedicated pipeline design report for the remaining portion of the pipeline and its construction completed by December 2018 and April 2020 respectively; and (3) a decarbonator modification design report and its construction completed by July 2019 and February 2020 respectively. During this reporting period: the CDA submitted to the RWQQB the 100% design plan for well II-12 and the 90% design plan for the raw water pipeline; the CDA completed the construction of a monitoring well near the location of well II-12; and the Regional Board provided comments on all of the design plans for well II-12 and the raw water pipeline . In addition, the RP-1 Parties and the CDA continued coordinating with the Regional Board to prepare the *Monitoring and Reporting Plan the Chino Basin Improvement and Groundwater Clean-up Project*.

The domestic water supply alternative for the private residences affected by TCE groundwater contamination is a hybrid between the installation of tank systems for some residences, where water is delivered from the City of Ontario potable supply via truck deliveries, and the installation of a temporary pipeline to connect some residences to the City of Ontario potable water system. The Cities of Ontario and Upland have assumed responsibility for implementing the domestic water supply alternative. In February 2017, the Cities of Ontario and Upland submitted the Domestic Water Supply Work Plan to the Regional Board to outline the approach to monitoring and supplying alternative water supplies for affected residences. During this reporting period the City of Ontario conducted the third annual water supply sampling event at private residences in October and November 2019 pursuant to the Domestic Water Supply Plan.

Chino Airport Plume

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 Chino Airport. During 1991 to 1992, ten underground storage tanks and 310 containers of hazardous waste were removed, and 81 soil borings were drilled and sampled on the airport property. From 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, requiring the County to define the lateral and vertical extent of the plume and prepare a remedial action plan. From 2009 to 2012, Tetra Tech, 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. From 2013 to early-2015, Tetra Tech conducted an extensive investigation of several areas identified for additional characterization of soil and groundwater contamination; at the conclusion of this work, they constructed an additional 33 groundwater monitoring wells on and adjacent to the airport property. In August 2016, the County completed a Draft Feasibility Study to identify remedial action objectives and evaluate remediation alternatives for mitigation. In January 2017, the Regional Board issued CAO R8-2017-0011, which requires the County to prepare a Final Feasibility Study that incorporates comments from the Regional Board and to prepare, submit, and implement a Remedial Action Plan. The County submitted a Final Feasibility Study for Chino Airport on June 6, 2017, and it was approved by the Regional Board on June 7, 2017. On December 18, 2017, the County submitted the *Draft Interim Remedial Action Plan* for public review and comment through April 2018. The preferred remediation alternative is a groundwater pump-and-treat system to provide hydraulic containment and treatment of both the West and the East Plumes, originating from Chino Airport. The system consists of ten extraction wells that combined will produce approximately 900 gallons per minute of groundwater for onsite treatment using carbon adsorption. The system may also utilize CDA wells I-17 and I-18. Once treated, the preferred option is to discharge the treated groundwater to the CDA's Chino-I Desalter influent pipeline via a newly constructed pipeline. Currently the County is in discussions with the CDA to discharge the treated water from the extraction system to the CDA's influent pipeline.

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 (Continued)

In late 2018, Watermaster used the Chino Basin groundwater flow model to analyze how increased groundwater production for the remedial solution from the ten new well clusters and CDA wells I-17 and I-18 will affect groundwater levels within the vicinity. Watermaster has commitments to this area to maintain Hydraulic Control and to avoid impacts to the groundwater dependent habitat in the Prado Basin. Watermaster completed the modeling and prepared a technical memorandum to describe the results, which concluded operation of the remedial solution would improve Hydraulic Control in this area.

In 2018, the County constructed five production wells and 12 nearby piezometers at well clusters in both the East and West plumes to conduct aquifer pumping tests. The County also constructed eleven new monitoring wells at five locations to assist with the delineation of the plume. During this reporting, the Regional Board provided response on the *Interim Remedial Action Plan* to the County in September 2019.

The County conducts quarterly and/or annual monitoring events at all 86 of their monitoring wells constructed to date. The conclusions from this monitoring program can be found in reports posted on the Regional Board's GeoTracker website. Watermaster also routinely samples for water quality at private and monitoring wells in the area and uses this and other data obtained from its data collection programs to independently delineate the spatial extent of the plume. Watermaster completed its most recent characterization of the plume in June 2019 for the *2018 State of the Basin* Report. In October of this reporting period, Watermaster prepared a semi-annual status report on the Chino Airport Plume for Watermaster Parties. And, the County submitted, to the Regional Board, *a Semiannual Groundwater Monitoring Report Winter and Spring 2019 Chino Airport Groundwater Assessment, San Bernardino County, California.* and *Work Plan for Installation of Monitoring Wells.*

Other Water Quality Issues

Watermaster continues to track the 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. During this reporting period, Watermaster prepared annual status reports for the GE Test Cell, GE Flatiron, Milliken Landfill, California Institution for Men, Stringfellow Plumes, and the former Kaiser Steel Mill site.

In June 2019, Watermaster completed updated delineations of the extent of the VOC plumes for the GE Test Cell, GE Flatiron, Milliken Landfill, and so-called Pomona VOC Plumes as part of the *2018 Chino Basin OBMP State of the Basin Report.*

Program Element 7: Develop and Implement a Salt Management Program

Maximum Benefit Salinity Management Plan

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 (GMZs). The maximum benefit objectives allow for the reuse and recharge of recycled water and the recharge of imported water without mitigation; these activities 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. There are a total of nine commitments, and Watermaster and the IEUA report the status of compliance with each commitment to the Regional Board annually in April. Specific details of the commitments and related activities are described below.

Monitoring Programs. Two of the maximum-benefit commitments are to implement surface and groundwater monitoring programs. On April 15, 2005, the Regional Board adopted resolution R8-2005-0064, approving Watermaster and the IEUA's surface and groundwater monitoring programs. These monitoring programs were conducted pursuant to the 2005 work plan 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. The Basin Plan amendment allows for the monitoring programs to be modified over time on a go-forward basis, subject to the 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. In the place of specific monitoring requirements, the Basin Plan amendment required that Watermaster and the IEUA submit 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, the new surface water

Program Element 7: Develop and Implement a Salt Management Program (Continued)

monitoring program work plan. In December 2013, Watermaster and the IEUA submitted an updated *Maximum Benefit Monitoring Program Work Plan* (Work Plan) for approval, describing: the questions to be answered by the monitoring program, the methods that will be employed to address each question, the monitoring and data collection that will be performed to implement the methods, and a reporting schedule. The Work Plan was adopted by the Regional Board in April 2014. The monitoring pursuant to the Work Plan is incorporated as part of the groundwater level, groundwater quality, and surface water monitoring programs described in Program Element 1. During this reporting period, Watermaster continued implementing the monitoring programs (see Program Element 1 for details).

Hydraulic Control and Chino Desalters. One of the main maximum-benefit commitments is to achieve and maintain "Hydraulic Control" of the Chino Basin through the operation of the Chino Basin Desalters to protect downstream beneficial uses of the Santa Ana River. The Chino Basin Desalters are required to replace the diminishing agricultural production that previously prevented the outflow of high TDS and nitrate groundwater. Hydraulic Control is defined by the Basin Plan as the elimination of groundwater discharge from the Chino-North GMZ 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 GMZ to the Prado Basin surface water management zone (PBMZ) in an amount less than 1,000 acre-feet per year is considered *de minimus*. Watermaster and the IEUA have demonstrated that complete Hydraulic Control has been achieved at and east of Chino-I Desalter Well 20. The construction and operation of the CCWF (see Program Element 5), which began in 2010, is intended to achieve Hydraulic Control, per the definition above, in the area west of Chino-I Desalter Well 5. And, the 2014 Work Plan states that Watermaster and the IEUA will recalibrate the Chino Basin groundwater flow model every five years and use it to estimate groundwater discharge from the Chino-North GMZ to the PBMZ (i.e. annual underflow past the CCWF) to determine whether Hydraulic Control has been achieved.

Chino Desalter Well CDA II-10

In February 2016, the CCWF commenced full-scale operation with production at wells I-16, I-17, I-20, and I-21. In late 2017, pumping from the CCWF well field declined because well I-17 ceased operation due to the presence of 1,2,3-TCP at concentrations in excess of the newly adopted MCL. In 2020, Watermaster will use its updated and recalibrated groundwater model to estimate the volume of groundwater discharge from the Chino-North GMZ to the PBMZ under the reduced pumping conditions.

Future agricultural groundwater production in the southern part of the basin is expected to continue to decline, necessitating future expansion of the desalters to sustain Hydraulic Control. In a letter dated January 23, 2014, the Regional Board required that by May 31, 2014, Watermaster and the IEUA submit a plan detailing how Hydraulic Control will be sustained in the future as agricultural production in the southern region of Chino-North continues to decrease—specifically, how the Chino Basin Desalters will achieve the required total groundwater production level of 40,000 acre-feet per year. On June 30, 2015, Watermaster and the IEUA submitted a final plan and schedule for the construction and operation of three new desalter wells (II-10, II-11, and II-12). During this reporting period, Watermaster coordinated with the CDA to track the construction progress of the desalter expansion facilities. A full status report on the desalter expansion facilities is described in Program Element 3.

Recycled Water Recharge. The maximum benefit commitments require Watermaster and the IEUA to construct and operate expanded facilities for the recharge of storm and recycled waters and to report on the quality of the individual and combined sources of water used for recharge. Commitment number 7 requires that the use of recycled water for artificial recharge be limited to the amount that can be blended on a volume-weighted basis with other sources of recharge to achieve five-year running average concentrations of no more than the maximum-benefit objectives (420 mgl for TDS and 5 mgl for nitrate-nitrogen). This data is compiled and analyzed each year for reporting to the Regional Board. During this reporting period, Watermaster and the IEUA continued their monitoring programs to collect the data required for analysis and reporting to the Regional Board. As of December 2018, the five-year volume-weighted TDS and nitrate-nitrogen concentrations of these three recharge sources were 281 and 2.0 mgl, respectively. The five-year running averages have never exceeded the Basin Plan limits. The averages as of December 2019 will be computed and reported to the Regional Board in April 2020.

Program Element 7: Develop and Implement a Salt Management Program (Continued)

Recycled Water Quality. Commitment number 6 requires that recycled water quality be managed to ensure that the agency-wide, 12-month running average wastewater effluent quality does not exceed 550 mgl and 8 mgl for TDS and total inorganic nitrogen (TIN), respectively. Watermaster and the IEUA must submit a plan and schedule to the Regional Board for the implementation of measures to ensure long-term compliance with these limits when either the 12-month running average IEUA agency-wide effluent TDS concentration exceeds 545 mgl for three consecutive months or the TIN concentration exceeds 8 mgl in any one month. During 2015, a historical high 12-month running average IEUA agency-wide effluent TDS concentration of 534 mgl was calculated for three consecutive months: June, July, and August. This 12-month running average IEUA agency-wide effluent TDS concentration of 534 mgl was only 11 mgl below the trigger. In Winter 2015, the increasing trend reversed, and by December 2016, the 12-month running average IEUA agency-wide effluent TDS concentration decreased to 504 mgl. Through analysis of water supply and wastewater data, Watermaster and the IEUA concluded that drought conditions have a meaningful impact on the short-term TDS concentration of the water supplies available to IEUA agencies and that future droughts similar to the 2012-2016 period could lead to short-term exceedances of the 12-month running average IEUA agency-wide effluent TDS. For this reason, in October 2016, Watermaster and the IEUA petitioned the Regional Board to consider modifying the TDS compliance metric for recycled water to a longer-term averaging period. The Regional Board agreed that an evaluation of the compliance metric was warranted and directed Watermaster and the IEUA to develop a technical scope of work to support the adoption of a longer-term averaging period. The proposed technical scope of work to support a Basin Plan amendment to revise the recycled water compliance metric was submitted to the Regional Board for approval in May 2017, and after approval, the work began in September 2017. During this reporting period, a workshop to review the initial modeling results with Regional Board staff was held in October 2019. During the workshop several changes to the assumptions used in the modeling work were discussed and ultimately directed to proceed. A schedule to complete the technical work (based on the revised assumptions) and the Basin Plan amendment will be finalized in early 2020.

Ambient Groundwater Quality. Commitment number 9 requires that Watermaster and the IEUA recompute ambient TDS and nitrate concentrations for the Chino Basin and Cucamonga GMZs every three years (due by June 30). The recomputation of ambient water quality is performed for the entire Santa Ana River Watershed, and the technical work is contracted, managed, and directed by the Santa Ana Watershed Project Authority's (SAWPA) Basin Monitoring Program Task Force (Task Force). Watermaster and the IEUA have participated in each triennial, watershed-wide ambient water quality determination as members of the Task Force. The most recently completed recomputation, covering the 20-year period from 1996 to 2015, was completed in September 2017. During this reporting period, SAWPA continued the work to perform the 2018 recomputation, covering the 20-year period from 1999 to 2018. As in past efforts, the Watermaster and IEUA are participating in the watershed-wide effort. The work is scheduled to be completed by the June 30, 2020 deadline.

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 critical to the Chino Basin stakeholders. The OBMP outlines Watermaster's commitments 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 is the only Storage and Recovery Program that is being implemented in the Chino Basin. By April 30, 2011, all DYY program construction projects and a full "put" and "take" cycle had been completed, leaving the DYY storage account with a zero balance. Another DYY cycle began in June 2017. By December 31, 2019, the volume of groundwater in the DYY program account was 49,477 acre-feet.

Safe Yield Recalculation

The Basin's Safe Yield was initially set by the Judgment at 140,000 acre-feet per year. The Safe Yield was based on the hydrology for the period of 1965 through 1974. Pursuant to the Judgment, the Chino Basin Safe Yield is to be recalculated periodically but not for at least ten years following 1978.

Pursuant to the OBMP Implementation Plan and Watermaster's Rules and Regulations, in year 2010/11 and every ten years thereafter, Watermaster is to recalculate the Safe Yield. The 2011 Safe Yield recalculation began in 2011 and after significant technical and legal process, on April 28, 2017, the Court issued a final order, resetting the Safe Yield to 135,000 acre-feet per year.

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

In July 2018, Watermaster's Engineer began the technical work necessary for the Safe Yield recalculation for 2020 pursuant to the OBMP Implementation Plan utilizing the approved methodology in the April 28, 2017 Court Order. The Engineer has compiled the necessary data, updated and recalibrated the groundwater-flow model of the basin, and is currently using the model to recalculate the Safe Yield for the period 2020-2030. This recalculation will address the impacts of projected climate change and land subsidence. The schedule calls for recalculation of Safe Yield in early 2020 and for the Safe Yield reset to be filed with Court by June 2020.

Groundwater Storage Management

Addendum to PEIR. The OBMP storage management plan was temporarily revised in March 2017. The original OBMP storage management program consists of managing groundwater production, replenishment, recharge, and storage such that the total storage within the basin would range from a low of 5,300,000 acre-feet to a high of 5,800,000 acre-feet. The following storage related definitions are included in the OBMP Implementation Plan:

- Operational Storage Requirement – The Operational Storage Requirement is the storage or volume in the Chino Basin that is necessary to maintain the Safe Yield. (Note: this is an average value with the storage oscillating around this value due to dry and wet periods in precipitation. The Operational Storage Requirement was estimated in the development of the OBMP to be about 5.3 million acre-feet. This storage value was set at the estimated storage in the basin in 1997.)
- Safe Storage – Safe Storage is an estimate of the maximum storage in the basin that will not cause significant water quality and high groundwater related problems. (Note: safe storage was estimated in the development of the OBMP to be about 5.8 million acre-feet.)
- Safe Storage Capacity – Safe Storage Capacity is the difference between Safe Storage and the Operational Storage Requirement. The allocation and use of storage space in excess of the Safe Storage Capacity will preemptively require mitigation: mitigation must be defined, and resources must be committed to mitigation prior to allocation and use.

Water occupying the Safe Storage Capacity includes Local Storage Account Water, Carryover Water, and water anticipated to be stored in future groundwater storage programs. This storage management program was evaluated in the OBMP programmatic environmental impact report (PEIR) in 2000.

Subsequent to the OBMP PEIR, Watermaster and the Watermaster Parties developed revisions to the OBMP based on: new monitoring and borehole data collected since 1998, an improved hydrogeologic conceptualization of the basin, new numerical models that have improved the understanding of basin hydrology since 2000, and the need to expand the Chino Basin Desalters (desalters) to the 40,000 acre-feet per year of groundwater production required in the OBMP Implementation Plan. These investigations included a recalculation of the total water in storage in the basin, based on the improved hydrogeologic understanding. The total storage in the Chino Basin for 2000 was estimated to be about 5,935,000 acre-feet.

The Peace II Agreement was negotiated by the Watermaster Parties to implement, among other things, the expansion of the desalters, the dedication of 400,000 acre-feet of groundwater in storage to desalter replenishment, and changes in the Judgment to implement the Peace II Agreement. However, there was no change to the storage management plan in the OBMP Implementation Plan even though the revised storage estimated for 2000 was greater than the Safe Storage, and the implementation of the Peace II Agreement would result in 400,000 acre-feet of new controlled overdraft. The IEUA completed and subsequently adopted a supplemental environmental impact report for the Peace II Agreement in 2010.

There is a significant difference in what is known today regarding storage management and basin conditions compared to what was known in 2000 when the OBMP storage management plan was developed and evaluated in the PEIR. Watermaster and the IEUA proposed a temporary change in the Safe Storage Capacity, increasing it from 500,000 acre-feet to 600,000 acre-feet for the period July 1, 2017 through June 30, 2021. On March 15, 2017, the IEUA adopted an addendum to the 2000 PEIR, increasing the Safe Storage Capacity from 500,000 acre-feet to 600,000 acre-feet for the period July 1, 2017 through June 30, 2021. This temporary increase in Safe Storage Capacity was found to not cause material physical injury (MPI) and/or loss of Hydraulic Control, and it will provide Watermaster, with assistance from the parties, time to develop a new storage management plan and agreements to implement it.

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

Storage Framework Investigation. Watermaster staff, at the direction of the Watermaster Board, began an investigation to assess the groundwater basin response to the planned use of Managed Storage (storage space used by the Watermaster Parties that includes carryover, excess carryover, and local supplemental waters) and potential Storage and Recovery programs. In the prior reporting period, Watermaster updated its modeling tools and planning projections and subsequently completed an assessment of potential MPI for the Watermaster Parties' use of Managed Storage. In this work, it was determined that with the Watermaster Parties' projected future water use and pumping, the Parties would likely use up to 700,000 acre-feet of storage space for Managed Storage and the use of that storage space would not result in MPI through 2050. Watermaster staff evaluated the use of storage space in the range of 700,000 acre-feet to 1,000,000 acre-feet for potential Storage and Recovery programs. The results of this assessment were presented in three workshops in January, March, and May 2018. Watermaster staff documented this work in a draft report that was distributed to the Watermaster Parties in August 2018. Subsequently, Watermaster presented the entirety of the work at a September 2018 workshop, addressed all of the Watermaster Parties' comments, and submitted a final report to the Watermaster in October 2018.

2020 Storage Management Plan. During this reporting period, Watermaster staff and consultants started the process to develop the 2020 Storage Management Plan (2020 SMP) to update the SMP that is currently included in the OBMP implementation plan. Watermaster prepared a white paper that outlines the need and requirements of the 2020 SMP and presented it to the Watermaster Parties and other interested stakeholders in June 2019. Watermaster and its Engineer published a final SMP report on December 19, 2019 and are working with the Watermaster Parties and other stakeholders to have the SMP incorporated into the 2020 OBMP Update.

Storage Management Plan Workshop #2, July 2019

2020 OBMP Update

OBMP implementation began in 2000. By 2019, many of the projects and management programs envisioned in the 2000 OBMP have been implemented. The understanding of the hydrology and hydrogeology of the Chino Basin has improved since 2000, and new water-management issues have been identified that necessitate that the OBMP be adapted to protect the collective interests of the Watermaster Parties and their water supply reliability. For these reasons, the Watermaster Parties are preparing a 2020 OBMP Update to set the framework for the next 20 years of basin-management activities.

During 2019, Watermaster convened a collaborative stakeholder process to prepare the 2020 OBMP Update, similar to that the process employed for the development of the 2000 OBMP. A series of eight stakeholder "Listening Sessions" were held by the Watermaster to obtain information, ideas, and feedback from the Chino Basin stakeholders to define their issues needs and wants, their collective goals for the 2020 OBMP Update, the impediments to achieving the goals, and the management actions required to remove the impediments.

The final 2020 OBMP Scoping Report (Scoping Report) was published in November 2019 to document the results of the first four Listening Sessions. The Scoping Report summarized (1) the need to update the OBMP, (2) the issues, needs, and wants of the stakeholders, (3) the goals for the 2020 OBMP Update, and (4) the recommended scope of work to implement seven stakeholder-defined basin-management activities that could be included in the 2020 OBMP Update.

Through the listening session process, it became apparent that the 2000 OBMP goals remain unchanged, and the nine Program Elements (PEs) defined in the 2000 OBMP are still relevant today as the overarching program elements of a basin management program. Each of the seven activities in the Scoping Report had objectives and tasks that were directly related to one or more of the 2000 OBMP PEs. Based on this finding, the nine PEs defined in the 2000 OBMP are being retained for the 2020 OBMP Update. Each of the seven activities were mapped to one of the existing PEs.

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

In December 2019, the Watermaster published the draft 2020 OBMP Update Report, which described (1) the 2020 OBMP Update process, (2) the OBMP goals and new activities for the 2020 OBMP Update, (3) the status of the OBMP PEs and ongoing activities within them, and (4) the recommended 2020 OBMP management plan – inclusive of ongoing and new activities. The management plan will form the foundation for the Watermaster Parties to develop a 2020 OBMP Implementation Plan and the agreements necessary to implement it.

During 2020, the 2020 OBMP Update Report will be finalized and the Watermaster will convene a series of "Drafting Sessions" with the Watermaster Parties to develop a 2020 OBMP Implementation Plan Update and an agreement to implement it. Additionally, the Watermaster and IEUA (as the lead agency) are preparing new environmental documentation for the OBMP Update. The updated PEIR will better support decision-making, investment, and grant applications for ongoing and new management actions under the OBMP.