

# Optimum Basin Management Program

Staff Status Report 2010-1: January to June 2010



CHINO BASIN WATERMASTER

Optimum Basin Management Program

## Highlighted Activities

- The Chino Basin Facilities Improvement Project (CBFIP) Phase II, a joint effort of Watermaster, the Chino Basin Water Conservation District (CBWCD), Inland Empire Utilities Agency (IEUA), and the San Bernardino County Flood Control District (SBCFCD) to increase the annual recharge of storm, imported, and recycled water and to reduce long-term maintenance costs, was completed in May 2010.
- The Recharge Master Plan (RMP) was completed in June. Several workshops were held during this period. Numerous comments were received and responses were incorporated into the final report. The final report was submitted to the Court on July 1, 2010. The plan fully addressed all the requirements of the Court and the projected replenishment needs of the Watermaster.
- The Peace II Subsequent Environmental Impact Report (SEIR) was circulated for public review in May 2010. Several meetings were held to review the comments received. The impacts and mitigation measures were discussed during these meetings. A draft of the report is due out in August.
- On June 18, 2010, the Court ruled in favor of Watermaster on the paragraph 31 motion filed by Overlying Non-Ag pool.
- On April 19, 2010, the Regional Water Quality Control Board issued an Administrative Civil Liability Complaint (ACL) to Watermaster and Inland Empire Utilities Agency for not adhering to the adopted schedule for hydraulic control.
- Watermaster purchased 5,000 acre-feet (AF) of imported water from MWD and successfully recharged it in the MZ-1 basins during this reporting period.



New San Sevaine Basin No. 5 Conservation Berm

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

### Groundwater Level Monitoring

Watermaster initiated a comprehensive monitoring program as part of the implementation of the OBMP. The current groundwater level monitoring program is comprised of about 700 wells. At about 500 of these wells, water levels are measured by well owners, which include municipal water agencies, the California Department of Toxic Substance Control (DTSC), the County of San Bernardino, and various private consulting firms. The measurement frequency is typically about once per month. Watermaster collects these water level data twice per year. The remaining 200 wells are private wells or dedicated monitoring wells that are mainly located in the southern portion of the Chino Basin. Watermaster staff measures water levels at these wells using manual methods once per month or with pressure transducers that record water levels once every 15 minutes. The wells in the monitoring

## Important Court hearings and orders

- MARCH 16—NOTICE OF MOTION AND MOTION BY NON-AGRICULTURAL POOL COMMITTEE
- APRIL 12—WATERMASTER'S OPPOSITION TO PARAGRAPH 31 MOTION
- APRIL 19—APPROPRIATE POOL OPPOSITION TO THE MOTION BY THE NON-AG
- APRIL 26—AG POOL'S RESPONSE TO PARAGRAPH 31 MOTION
- JUNE 18—DECISION PARAGRAPH 31 RULING AND ORDER

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

WINTER STORMS LEFT MANY OF US WITH THE MISPERCEPTION THAT SOUTHERN CALIFORNIA'S RESERVOIRS WERE FILLED THIS WINTER.

program within the southern portion of the basin were preferentially selected to assist in Watermaster's monitoring programs for hydraulic control, land subsidence, and desalter impacts to private well owners. The remaining wells are monitored in support of the triennial recomputation of ambient water quality in the Chino-North management zone. The water level data are checked by Watermaster staff and uploaded to a centralized relational database.

### *Groundwater Quality Monitoring*

Watermaster initiated a comprehensive monitoring program as part of the implementation of the OBMP. The groundwater quality monitoring program consists of the following four components:

1. An Annual Key Well Water Quality Monitoring Program consisting of 120 wells which are mostly privately owned agricultural wells in the southern portion of Chino Basin that are otherwise not included in an established sampling program. Twenty of these wells are sampled every year; the remaining wells are sampled every three years. The wells sampled annually are for the continuous monitoring of areas of concern associated with the southern edge of the OIA VOC plume, the southern region of the Chino Airport Plume, and the Kaiser Steel Plume which includes the two multi-port MZ3 monitoring wells. Data obtained for the Key Well Quality Monitoring Program are used for the triennial ambient water quality analysis, hydraulic control assessment, the Biennial State of the Basin Report, and to assess the overall health of the basin.
2. Annual sampling at nine HCMP multi-port monitoring wells strategically placed between the Chino Basin Desalter well fields and the Santa Ana River. Results of the annual sampling are used to analyze the effect of desalter pumping over time by comparing water quality of the native groundwater and the Santa Ana River.
3. Monthly sampling at four near-river wells to characterize the Santa Ana River's influence to nearby groundwater. These shallow monitoring wells along the Santa Ana River consist of two former United States Geologic Survey (USGS) National Water Quality Assessment Program (NAWQA) wells (Archibald 1 and Archibald 2), and two wells (well 9 and well 11) owned by the Santa Ana River Water Company (SARWC).
4. A cooperative basin-wide data collection effort known as the Chino Basin Data Collection (CBDC) program which relies on municipal producers and other government agencies to supply groundwater quality data on a cooperative basis. These sources include the appropriators, Department of Toxic Substance Control (DTSC), Regional Water Quality Control Board (RWQCB), US Geological Survey (USGS), the Counties, and other cooperators. All water quality data are routinely collected, QA/QC'd, and loaded 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



Lower Day Basin after a storm

# Optimum Basin Management Program

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

measure water levels during recharge operations. In addition to these quantity measurements, imported water quality data for State Water Project water are obtained from the Metropolitan Water District of Southern California (MWDSC) and recycled water quality data for the RP-1 and RP-4 treatment plant effluents are obtained from IEUA. 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 the 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 the 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 along with 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 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.

Pursuant to the Basin Plan and the Watermaster/IEUA permit to recharge recycled water, Watermaster and IEUA have conducted groundwater and surface water monitoring programs since 2004. During this reporting period, Watermaster measured 377 manual water levels at private wells throughout the Chino Basin, conducted two quarterly downloads at the 125 wells containing pressure transducers, collected 90 groundwater quality samples, and 221 surface water quality samples. Quarterly Surface Water Monitoring Program Reports that summarize data collection efforts were submitted to the RWQCB in July and October of 2009. The Chino Basin Maximum Benefit Monitoring Program 2009 Annual Report was submitted to the RWQCB on April 15, 2010.



HCMP Stream Gaging & Sampling

### *Chino Basin Groundwater Recharge Program*

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

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

The recharge program is regulated under RWQCB Order No. R8-2007-0039 and Monitoring and Reporting Program No. R8-2007-0039.

**Recharge Activities.** On-going recycled water recharge occurred in the Brooks, 8th Street, Hickory, Turner, RP-3, and Ely Basins this reporting period.

**Monitoring Activities.** Watermaster and IEUA collect weekly water quality samples from basins that are actively recharging recycled water and from lysimeters installed within those basins. During this reporting period, approximately 271 basin and lysimeter samples were collected and two recycled water samples were collected for alternative monitoring plans that include the application of a correction factor for Soil-Aquifer Treatment determined from each basin's start-up period. Monitoring wells located down-gradient of the recharge basins were sampled quarterly at a minimum, however, some monitoring wells were sampled more frequently during the reporting period for a total of 108 samples.

**Construction Activities.** Lysimeters and monitoring wells associated with the 7th and 8th Street Basins were installed in the first half of Fiscal Year (FY) 2007/08. There have been no further construction activities since that time.

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

- 2Q-2009 Quarterly Report, submitted to the RWQCB – August 2009
- 3Q-2009 Quarterly Report, submitted to the RWQCB – November 2009
- 4Q- 2009 Quarterly Report, submitted to the RWQCB – February 2010
- 1Q- 2010 Quarterly Report, submitted to the RWQCB – May 2010

### Land Surface Monitoring

The MZ-1 Subsidence Management Plan (MZ-1 Plan) was approved by Watermaster in October 2007, and was approved by the Court in November 2007 which ordered its implementation (see Program Element 4: Develop and Implement a Comprehensive Groundwater Management Plan for Management Zone 1). The MZ-1 Plan calls for a number of activities with the goal of minimizing or completely abating the future occurrence of land subsidence and ground fissuring in Chino Basin. Some of these activities include:

- Continuing the scope and frequency of monitoring within the so-called Managed Area (southwest MZ-1) that was conducted during the period when the MZ-1 Plan was being developed.
- Expanding the monitoring of the aquifer system and land subsidence into other areas of MZ-1 and Chino Basin where the data indicate concern for future subsidence and ground fissuring.
- Monitoring of horizontal strain across the historical fissure zone.
- Further evaluating the potential contribution of pumping in the central and northern portions of MZ-1 on groundwater conditions in the central and southern portions of MZ-1.
- Conducting additional testing and monitoring to refine the Guidance Criteria.



MZ-1 Monument Construction & Surveying

# Optimum Basin Management Program

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

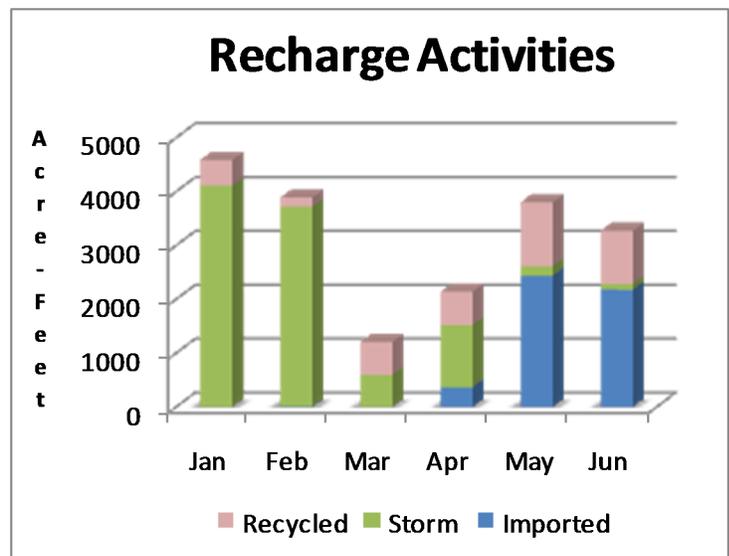
- Developing alternative pumping plans for the MZ-1 producers that are impacted by the MZ-1 Plan.
- Constructing and testing a lower-cost extensometer facility at Ayala Park.
- Evaluating and comparing ground-level surveying and Interferometric Synthetic Aperture Radar (InSAR), and recommending future monitoring protocols for both techniques.
- Conducting an ASR (aquifer injection and recovery) feasibility study at a production well owned by the City of Chino Hills within the Managed Area.
- Providing for recovery of groundwater levels.

With regard to monitoring and testing, Watermaster began or continued the implementation of some of these activities called for in the MZ-1 Plan. During this reporting period these activities included:

- The continuation of detailed water-level monitoring at wells within the Managed Area and at wells in central MZ-1. Replacement of water-level-recording transducers at wells where these transducers have failed after about seven years of reliable service.
- Continuation of monitoring and maintenance at the Ayala Park Extensometer Facility. This includes monitoring at the newly installed lower-cost pair of cable extensometers within two piezometers at Ayala Park to test this technology for possible application in other parts of the Basin.
- Developed a new testing and monitoring program within and east of the Managed Area with the goals of (1) refining the Guidance Criteria, (2) confirming the existence of the Riley Barrier, (3) testing the feasibility of injection in the Managed Area, (4) better understanding the potential for subsidence and fissuring east of the Managed Area, and (5) evaluating the affect of pumping and drawdown on the fissure zone.
- Collected InSAR data from radar satellites during all six months of the reporting period, which will be analyzed for land surface displacement in early 2011.
- Installed new survey monuments across the historical zone of ground fissuring in the spring of 2010. Collected vertical and horizontal strain data across the historical zone of ground fissuring during spring of 2010, which will be used to locate high-resolution, horizontal strain measuring devices.

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

The theoretical average stormwater recharge capacity of the Chino Basin Facilities Improvement Program (CBFIP) facilities is about 14,000 acre-ft/yr and the theoretical supplemental water recharge capacity is 99,000 acre-ft/yr. Stormwater recharge in the fiscal year ending June 30, 2010 was about 14,100 acre-ft. Because of the drought and Delta environmental issues, the MWDSC has been unable to provide replenishment water to southern California since May 1, 2007. Recycled and imported water recharge in the fiscal year ending June 30, 2010 were about 7,200 acre-ft and 5,000 acre-ft, respectively. The IEUA and the Watermaster recharge permit was amended in fiscal year 2009-10 to allow for underflow dilution and extended the dilution period from a running 60 months to a running 120 months. The significance of this permit amendment was to reduce the amount of imported and storm waters required for dilution. IEUA projects that dilution requirements will likely be met through 2019-20,



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

even if no imported water were available for dilution.

The cumulative unmet replenishment obligation was about 4,368 acre-ft on June 30, 2010. The total amount of supplemental water recharged in MZ1 since 2005 was over 52,000 acre-ft exceeding the average annual requirement of 6,500 acre-ft.

Progress on the Recharge Master Plan update continued during the reporting period. Several workshop were held during this period including two workshops that covered the contents of the entire report. Numerous comments were received on the Recharge Master Plan Update draft report: every comment was responded to and was included in the final report. The final 2010 Recharge Master Plan Update report was completed in early June 2010 and was submitted to the Court in late June 2010. The recharge master plan fully addressed all the requirements of the Court and the projected replenishment requirements of the Watermaster. The focus of Watermaster's October 2010 Strategic Planning retreat will be the implementation of the Recharge Master Plan.

## 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 of the Chino I Desalter Expansion and the Chino II Desalter facilities was completed in February 2006. As currently configured, the Chino I Desalter provides 2.6 million gallons per day (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 Well 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 (15,900 AFY). The Chino II Desalter provides 4.0 MGD of ion exchange treated water and 6.0 MGD of reverse osmosis treated water from eight additional wells for a total of 10.0 MGD (11,200 AFY).

During the reporting period, negotiations continued between the Chino Desalter Authority (CDA) and Western Municipal Water District (WMWD) to allow WMWD to join the CDA and to expand the Chino II Desalter by 10.5 MGD (11,800 AFY). The CDA approved WMWD membership in November 2008. Planning and engineering investigations related to the expansion are ongoing. Watermaster worked with the CDA parties to produce a realistic schedule approved by the RWQCB in June. Raw water will be drawn from existing CDA II wells, and possible additional new wells, if needed. In addition, a new Chino Creek Desalter Well Field, required for the hydraulic control commitment associated with Maximum Benefit, will provide additional raw water to the Chino I Desalter, enabling some existing wells to direct production to the expanded Chino II Desalter facility, if approved by the Chino Basin Desalter Authority.

## Program Element 4: Develop and Implement a Comprehensive Groundwater Management Plan for Management Zone 1 and Management Zone 3

### *MZ-1 Management Plan*

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

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

From 2001-2005, Watermaster developed, coordinated, and conducted an Interim Monitoring Program (IMP) under the guidance of the MZ - 1 Technical Committee, which is composed of representatives from all major MZ-1 producers and their technical consultants. The IMP was an aquifer-system and land subsidence investigation focused in the southwestern region of MZ-1 that would support the development of a long-term management plan to minimize and abate subsidence and fissuring (MZ-1 Plan). The IMP involved the construction of highly-sophisticated

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## **Program Element 4: Develop and Implement a Comprehensive Groundwater Management Plan for Management Zone 1 and Management Zone 3 (Continued)**

monitoring facilities, such as deep borehole extensometers and piezometers, the monitoring of land surface displacements through traditional ground-level surveys and remote-sensing techniques, the detailed monitoring of the aquifer system with water-level-recording transducers installed at an array of production and monitoring wells, and the purposeful stressing of the aquifer system through multiple controlled pumping tests.

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

During this reporting period, Watermaster continued implementation of the MZ-1 Plan. Drawdown at the PA-7 piezometer did not fall below the Guidance Level during the reporting period, and very little, if any permanent compaction was recorded at the Ayala Park Extensometer. The ongoing monitoring program called for by the MZ-1 Plan continues to be implemented. Review and revision of the monitoring program for FY 2010-11 was agreed upon by the MZ-1 Technical Committee during this reporting period, and these changes were included in the Watermaster budget for FY 2010-11.

## **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**

### *Ontario International Airport*

Watermaster continued to negotiate with the potentially responsible parties (PRPs) associated with the Ontario International Airport (OIA). The PRPs have formed a group called ABGL (Aerojet, Boeing, GE, and Lockheed). Watermaster had several meetings with ABGL and their consultants, counsel, coverage counsel, the US Army Corps of Engineers, US Air Force, the Regional Board, and CDA in order to find common ground for a joint remedy for desalting and plume mitigation. Watermaster provided an updated water level and water quality database to ABGL.

In June 2010, Watermaster collected water quality samples at the 12 OIA monitoring wells as part of a split sampling event between ABGL and CBWM.

### *Chino Airport*

Watermaster continued to negotiate with the County of San Bernardino, Department of Airports (County) in order to find common ground for a joint remedy for desalting and plume mitigation. Watermaster coordinated with the County and exchanged pertinent well, water level, and water quality for wells that the County has installed and for wells that Watermaster samples. Watermaster continued to pursue an alternate well location for one of the County's monitoring wells. This alternate location would still meet the County's needs, while saving Watermaster parties the cost of a new monitoring well for the HCMF.

### *California Institute for Men*

The Regional Water Quality Control Board (RWQCB) determined that volatile organic compounds (VOCs) plume were limited to the area immediately adjacent to and downgradient of the source area, and have not migrated, and are not expected to migrate off CIM's property. In December 2009, RWQCB sent a letter of determination

# Optimum Basin Management Program

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

of No Further Action (NFA) to CIM. Watermaster continued to coordinate with the State on a memorandum of understanding that would allow Watermaster to continue to monitor a subset of monitoring wells on CIM rather than being decommissioned.

### *Perchlorate in MZ-3*

Watermaster is participating on the Technical Advisory Committee on a study of perchlorate isotopes in the Rialto-Colton and MZ-3 Management Zones. The project is to be funded by the Environmental Security Technology Certification Program (ESTCP), which is a Department of Defense (DoD) program that promotes innovative, cost-effective environmental technologies through demonstration and validation at DoD sites. Watermaster attended a TAC meeting and reviewed the *Well Selection Memorandum: Evaluation of Perchlorate Sources in the Rialto-Colton-Fontana Area Using Chlorine and Oxygen Stable Isotope Ratio Analysis and Depth Dependent Water Quality Data (SERDP Project ER-0942)*.

### *Crown Coach*

Watermaster prepared comments on a technical report by AMEC Geomatrix concerning *“Effectiveness of Remedial Actions, Former Crown Coach Facility, Chino, California, Regional Board Case Number 08300684T.”*

### *Other Water Quality Issues*

Watermaster coordinated with GE and their consultants regarding the new injection wells for the GE Flat Iron remediation. Watermaster reviewed the following Regional Water Quality Control Board document: *“Directive to Submit a Work Plan and Conduct an MTBE Investigation at the Mountain Valley Express Facility at 3561 Philadelphia Street in Chino, California, UST Case No. 083604075T.”*

## **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/MWDSC Dry-Year Yield (DYY) program continued during the reporting period. All DYY program construction projects have been completed and are currently being used for DYY “take”, or removal from storage. As of June 30, 2010 there was 13,400 acre-ft in the DYY storage account and this water is projected to be withdrawn during fiscal 2010-11.

In February 2008, the DYY Expansion Project was initiated by IEUA and Watermaster to evaluate increasing the DYY storage account. The purpose of the DYY Expansion Project was to determine the facilities needed to store up to 150,000 AF and to recover up to 50,000 AFY. The expansion project analysis was completed in December 2008. The expansion project evaluated the technical, financial, and institutional frame work for individual projects to move forward. Negotiations to-date related to actual projects and the amount of expansion have not resulted in any planned expansion projects.

“WHEN THE  
WELL IS DRY, WE  
KNOW THE  
WORTH OF  
WATER.”  
BENJAMIN  
FRANKLIN