



PIMA COUNTY

REGIONAL WASTEWATER RECLAMATION DEPARTMENT

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TO: C.H. Huckelberry, County Administrator

THRU: John M. Bernal, P.E., Deputy County Administrator - Public Works

FROM: Jackson Jenkins, Director - RWRD

SUBJECT: 2015 Annual Pima County Local Drought Impact Group Report

Attached is the 2015 Annual Report from Pima County's Local Drought Impact Group. This report was submitted to the Arizona Department of Water Resources for inclusion in their Arizona Drought Preparedness Annual Report. ADWR's report will be submitted to the Governor's office later this year.

During 2015 the Local Drought Impact Group continued to monitor the status of drought and its impacts. Several drought response actions are taking place throughout Pima County to mitigate current and future drought conditions.

Should you have any questions, I am available at your convenience.

Attached

c: Kathleen M. Chavez, Water Policy Manager

Pima County Local Drought Impact Group (LDIG) 2015 Annual Report

The Pima County Local Drought Impact Group (LDIG) has been an active component of County operations since 2006 when the Board of Supervisors adopted *the Drought Response Plan and Water Wasting Ordinance* (Chapter 8.70).

LDIG consists of water providers and local, state and federal agencies that have an interest in the cause and effect of drought conditions in Pima County. LDIG meets bimonthly to monitor the short-term and long-term drought status, discuss drought impacts and coordinate drought declarations and responses.

The County's *Drought Response Plan and Water Wasting Ordinance* established a four stage trigger category that corresponds to the Arizona Drought Monitor Report and their declaration of a watershed drought condition from "Abnormally Dry" to "Exceptional." Each "Stage" declaration within the county triggers drought stage reduction measures.

LDIG explores the impacts of drought on various sectors in Pima County including agricultural water use, ranching, wildfire, hydrology, and flooding. Because many water providers depend on Central Arizona Project water, LDIG also monitors the status of the Colorado River, the El Niño Southern Oscillation (ENSO) and other climate weather patterns in relation to their effect on drought conditions and climate variability in the southwest. LDIG also monitors the status of the summer monsoon season and convenes roundtable discussions of drought and water conservation outreach programs. For a list of presentations and agendas, please visit Pima County's [LDIG website](#)¹.

DROUGHT STATUS

- Weather (NWS Data)

In Tucson, the first half of the 2015 calendar year (January 2015 to June 2015) was the 2nd warmest on record with an average yearly temperature to date of 3.0°F above normal.² The summer of 2015 was the 2nd warmest on record (tied with 2013) with an average temperature of 88.3°F, 2.6°F above normal (85.7°F).

January through April was the warmest quarter on record, surpassing the same period in 2014; 4.3°F above normal. February was easily recorded as the hottest documented with 6.8°F above normal February temperatures. The warm quarter of 2015 was compounded by a very warm end of the year 2014 winter season; average low winter temperatures were 4.5°F above normal.

A cooling period began in April (18th warmest) and continued in May, which was the coolest May since 1998 accompanied by the longest stretch of recorded below normal highs and lows since the 1970's. In May, average high temperatures were 3.9°F below normal and average temperature down 2.6°F. The reprieve from record warm months proved temporary- despite a tropical moisture surge and early start to the monsoon, heat waves in June pressed that month to the 4th warmest. While July's monsoon pattern brought temperatures down to near normal, August was the 3rd warmest (+3.7°F) and contributed to another record warm summer, 2nd warmest, while pushing 2015 to the warmest year to date on record, tied with 2014.

While January through April was only an average wet period, the 2014-2015 winter season was the wettest since a strong El Niño event in 1997-1998 and the 14th wettest overall with 5.12" of rain, 2.39" above normal. In terms of the Water Year in February, it was the wettest since 2000-2001 with 6.45". Drier conditions set in as spring was the 10th straight spring with below normal rainfall.

¹ LDIG website: <http://webcms.pima.gov/cms/one.aspx?portalId=169&pageId=70243>

² <http://www.wrh.noaa.gov/twc/climate/monthly/jun15.php>

In June, Pacific storm systems began pushing tropical moisture into southern Arizona jumpstarting an early monsoon season mixed with high pressure heat waves. However, local storms were sporadic and precipitation for the summer remained just below average, 60th driest on record. The monsoon season, continuing into a wet September with 2.40" rain (+1.11"), concluded just above normal with 6.63" of rain (normal is 6.08").

In summary, Pima County has experienced record above average temperatures and mixed rainfall with strong single storm events able to push precipitation just above average.

- Drought (NDMC and Arizona MTC Data)

Pima County benefitted from a wet 2014-2015 winter season and an average 2014 monsoon season that brought some strong storm events. Prior to last year's monsoon, Pima County was in majority Severe drought (Moderate in western portions, Extreme in the northeast corner). Conditions eased to majority Moderate drought (Abnormally Dry western, Severe northeastern) and remained going into the winter season. A wet December brought the January 2015 status of Moderate drought in eastern Pima County and no drought to Abnormally Dry in the western half. The January status remained unchanged into September, which then improved in the eastern portion of the County to Abnormally Dry leaving a central ribbon of Moderate drought, a result of the strengthening El Nino and southeastern rainfall.

Pima County's Long Term Drought Status improved during last year's winter season following the monsoon, from Severe in the Santa Cruz and San Simon watersheds and Abnormally Dry in the Lower Gila River watershed to Moderate in the Santa Cruz and San Simon and no drought in the Lower Gila. Winter and spring precipitation slowly improved eastern Arizona and by July Pima County recovered to Abnormally Dry in the Santa Cruz and San Simon watersheds; no drought in the Lower Gila.

In summary, drought in Pima County has improved beginning with an adequate 2014 monsoon and following a wet winter. Drought conditions remained stable, Moderate, through much of 2015 with incremental improvement through the monsoon season to an increasingly Abnormally Dry condition.

- Colorado River Basin & Central Arizona Project (CAP)

Several water providers are taking delivery of water from the Central Arizona Project. Tucson Water has the largest CAP annual municipal allocation in the state; 144,172 acre-feet. Metropolitan Domestic Water Improvement District, the Town of Oro Valley and others have smaller CAP allocations. Agricultural users and the Tohono O'odham Nation in Pima County also have access to and use CAP water. Consequently, the drought status of the Colorado River and the potential for a shortage declaration is of interest to these sectors.

Unregulated inflow into Lake Powell for water year 2015 was just below average, 95% or 10.34 million acre feet; water year 2015 precipitation for the Upper Colorado Basin was just below average as well, 92%.

Every month the Bureau of Reclamation releases their 24-Month Study which provides operational announcements and near-term projections. The study released in August 2015 stated, most importantly, there will be no shortage in 2016 and that the water release from Lake Powell to Lake Mead for water year 2016 (October 2015 to September 2016) will be 9.0 million acre feet.

Lake Mead elevation is projected to be just above 1075' in both 2016 (1083.92') and 2017 (1081.09') though a 15% chance of shortage is forecast at this time. A significant probability exists for shortage in 2018.

Significant uncertainty of future snowpack and inflow to Powell is evident in the minimum and maximum probable projections. Next year's inflow could be as high as 16.9 million acre feet (maf) or as low as 6.4 maf. The most probable is 9.54 maf, or 88% of average. Should minimum inflow occur, release to Lake

Mead would be reduced and storage in Powell would decline to 43%. In the event of maximum inflow, release to Mead would increase to 11.4 maf and storage in Powell would rise to 70%. Upper Basin reservoirs are mostly full, able to send substantial river flows to Powell.

On June 26, 2015, the water level elevation of Lake Mead was at its lowest (1,074.71') since being filled in the 1930s. Even with the increased water releases from Lake Powell, the Lake Mead water level is projected to decline in 2016. Based on the Bureau of Reclamation's projections the most probable (50th percentile) Lake Mead inflows and resulting water levels in January 2017 are six feet above the first shortage trigger of 1075'; the minimum probable (10th percentile) projected water level is three feet above 1075'. The earliest likelihood of a shortage declaration is 2018. This shortage declaration is not expected to reduce deliveries of CAP water to Native American or municipal and industrial users.

Outflow from Lake Mead has been exceeding the inflow since 2000, except in 2004 and 2010 when there was significant snowpack in the Colorado River Basin. The flow imbalance, referred to as a structural deficit, is lowering the elevation of Lake Mead. At the current rate of decline, Lake Mead's elevation could fall below 1000 feet in five to eight years unless equalization or corrective action is taken. The consequences could reduce diversions of CAP water to municipal and industrial users and Indian users. The CAP, Arizona Department of Water Resources and Colorado River basins states are evaluating options for corrective action to reduce the declining water elevation in Lake Mead.

- El Niño

The current El Niño advisory predicts a greater than 95% chance El Niño will continue through the 2015-2016 winter season and an 85% chance it will last into early spring 2016. The Climate Prediction Center has repeatedly forecast chances for above average precipitation for Pima County; a 40-50% chance exists for September through October. While indication is of a strengthening El Niño, any probable impact to Lake Mead and Colorado River water supply is guarded. CAP officials warn El Niño is a poor predictor of streamflow conditions in the Colorado River Basin and correlations between El Niño and inflow to Lake Powell are weak. Past instances have contributed to local reservoir replenishment (Salt River system). A possible indirect benefit to Pima County could be reduced demand as increased rainfall might result in less CAP ordered, for the agriculture sector as an example, stalling a shortage.

- "Miracle" May

Upper Colorado River Basin precipitation in May was 205% of average with some sub-basins inundated with 230-330% of average rainfall. This unexpected reversal of the normal precipitation pattern provided sufficient inflow to forestall shortages perhaps for two years, eliminating increasing chance of shortage in 2016 and 2017, though concern remains for 2018. The weather pattern did not impact Pima County, rainfall was 0.14" below average with 0.09" received during this typically dry month.

IMPACTS IN PIMA COUNTY

The 32 shallow groundwater areas in Pima County are important for riparian areas that are dependent on groundwater. Sustained drought conditions can adversely impact groundwater levels if nearby well owners pump more groundwater to mitigate drought effects on their property. Invasive species like buffel grass and tamarisk and fewer birds, Gila Topminnows and aerial arthropods are still being observed in Pima County. There is also a significant decrease in ephemeral stream flows.

Agua Caliente Park, located northeast of Tucson has historic and cultural significance. The park's focal point is a natural artesian spring that feeds a creek and produces an abundant variety of oasis vegetation and a habitat for native species. The natural spring has been historically pumped to feed a pond which produces a recreational element for neighborhood residents and park visitors. Over the last several years, water levels have decreased to levels where pumping was ineffective, and eventually failed, to keep the pond filled. Summer and winter rains replenished groundwater, allowing sufficient pumping to replenish the pond, though this is not a sustainable source. However, the natural spring flow has not recovered and managers stress short term precipitation gains cannot reverse multi-year drought.

Pima County continues to investigate measures to maintain the health and vigor of Agua Caliente Park.

Cienega Creek, in eastern Pima County, continues to show the impacts of sustained drought though some improvement has occurred this year. Pima Association of Governments' (PAG) drought reporting uniquely depicts the localized drought impacts on a shallow groundwater dependent system, important for habitat and rural residents dependent on this water source. Streams and rivers are rare exceptionally productive systems in the arid landscape of Arizona that are especially sensitive to changes in water availability. With long term support and interest from its member jurisdictions, PAG has consistently monitored the shallow groundwater-dependent riparian area of Cienega Creek Preserve on a monthly and quarterly basis since 1989 and reported the findings to ADWR for compilation into state records. This rich dataset is used by numerous entities to track and evaluate the seasonal, annual and cumulative impacts of drought. This Preserve, located outside of Tucson, AZ, is the site of a rare, low-elevation perennial stream that is of regional importance for its environmental and recreational value and has been designated as an "Outstanding Water" by the State of Arizona.

In 2015, PAG's analysis documented water level trends that indicate marginal improvement. June 2015 showed only 0.88 miles of flow, an increase of 0.02 miles from last year, but still just nine percent of the full 9.5 miles of flow extent observed in June of the mid-1980s. In addition, 2015 records showed increases in average annual stream flow, volume not recorded since the wet 2008-2009 period, and a slight rise in average groundwater well levels. Because surface water base flows and groundwater are strongly correlated, these trends parallel each other.

Annual reports and studies can be found on PAG's Cienega Creek web pages. Based on a 2014 Pima County report, precipitation in the Cienega Watershed has been declining in the winter but shows no trend in the summer. PAG's Cienega Creek monitoring data reflects the lack of winter rains as found in June, which is the season with the most significant decline in stream flow. This delayed seasonal impact can only be recognized by monitoring the creek and tracking long term response in addition to precipitation

Erosion is another result of drought in this system. PAG has tracked a major erosion head-cut in the streambed that progressively erodes after major flood events, if those floods are preceded by dry periods. Head cutting in the Cienega Creek watershed is a dramatic demonstration of sediment fluctuation within the stream system. PAG continues to note erosion and sedimentation patterns along the watercourse, but the change of form of erosion makes continued analysis difficult. The head cut has changed from being a nick point with a steep drop in elevation within the three stream channels to a more gradual incline and a destabilized flood plain as it continues to move upstream.

PAG recommends further ecological study to track species habitats and water needs in Cienega Creek Preserve in order to establish critical thresholds. Pima County's preserve has heretofore been a successful safe harbor for threatened and endangered species with few invasive species issues. The impacts of drought – coupled with increased temperatures and groundwater pumping – pose an unprecedented and increasingly serious threat, causing land managers in the region to be concerned about the prospects for long term health of the aquatic and riparian system of Cienega Creek. Ranked conservation strategies from watershed assessments should be considered in the prioritization of management goals and strategies throughout the watershed. Pima County's current threat assessment process for the watershed will be a key planning effort that will address key data needs and conservation strategies. Data from PAG's field effort are an invaluable source of information for the threat assessment.

Increased coordination with land use planners and well owners to encourage conservation strategies near vulnerable riparian areas is recommended. Monitoring is recommended where groundwater restoration methods are applied to increase stormwater infiltration. PAG's 2012 report on groundwater use near shallow groundwater areas showed a steady increase of wells drilled near Cienega-Davidson since 1990. Strategic additions of land through open space acquisition and Pima County's conservation land system should be considered as a means to reduce additional groundwater withdrawals.

Outreach, training, and engagement of water users in the Cienega Watershed to conserve, share information, and increase infiltration of stormwater will help create a more resilient landscape. Drought information is primarily disseminated by large municipal water providers in urban areas, and private wells are exempt from coordinated water use tracking requirements. These well owners may not be receiving conservation messaging even though their water use impacts the system and may increase to compensate for the lack of rainfall.

DROUGHT RESPONSE ACTIONS

Pima County continues its efforts to respond to drought conditions. Several organizations, such as Conserve to Enhance (C2E), urge water conservation that translates into donations to support environmental enhancement. C2E participants have saved 6.9 million gallons (21.35 acre-feet) of water since the program inception in 2011, average gallons per capita savings of approximately 11,474 gallons. C2E has awarded funding to 10 local neighborhood projects totaling \$67,000 in investment. School projects offer an opportunity to engage students in continuing water conservation education.

The Conservation Effluent Pool (CEP) is an effluent allocation set aside pursuant to intergovernmental agreements between the City of Tucson and Pima County for use in riparian restoration projects. In previous years, a CEP taskforce, coordinated by the Community Water Coalition, identified thirteen candidate projects for CEP effluent allocations. The projects are prioritized into three groups: immediate potential, strong potential, and long-term potential. Three of the projects have been recommended for implementation that all have immediate potential.

The first proposed project is a request for several thousand acre feet of reclaimed water to be reserved within the Santa Cruz River along the existing streamflow extent in order to safeguard existing habitat. Both County and City administrations are reviewing the proposal; the request may require some amendment in order to execute within the operational constraints of multiple systems.

In 2010, Pima County and the City of Tucson completed the Water & Wastewater Infrastructure, Supply and Planning Study. An important outcome of the study was the 2011-2015 Action Plan for Sustainability. This year is the fifth and final year of the action plan implementation, a final report card itemizing successful completion toward shared goals and recommendations is underway.

In addition to the Water & Wastewater Infrastructure, Supply and Planning Study, Pima County adopted the Water Resources Asset Management Plan (WRAMP), a distinct water resource planning process to guide the County in maximizing all its water assets. **WRAMP, drafted by the County's Water Management Committee**, is designed to provide direction in executing County Board of Supervisor Policy F 54.9 Water Rights Acquisition, Protection and Management. WRAMP includes directives to maintain an up to date central database of all water rights and wells, map and inspect wells and develop strategic plans for the County's reclaimed water, long term storage credits and surface and groundwater rights. The County has implemented the following:

- The Strategic Plan for Use of Reclaimed Water (SPUR) has been developed and accepted by County Administrator and Board of Supervisors; multiple recommendations supporting the objective of maximize the County's water resources asset value and the production and use of reclaimed water to sustain and protect the natural environment.
- Underground Storage Facility (USF) applications have been submitted for two County Water Reclamation Facilities (WRF), Avra Valley and Green Valley, to maximize long term storage credits. Both applications deemed complete, Green Valley process completed, accruing credits.
- County Regional Wastewater Reclamation Department (RWRD) is cooperating with CMID, Metropolitan Domestic Water Improvement District and the U.S. Bureau of Reclamation to deliver effluent from Tres Rios WRF to CMID agriculture in a Groundwater Savings Facility project.
- RWRD is partnering with Tucson Water to deliver effluent to a newly constructed USF, the County has 2,000 acre-feet capacity at the South Houghton Area Recharge Project Underground Storage Facility to earn credits.

- Building an accurate baseline of potable and reclaimed water using EnergyCap (after correction of database) and other methods. Devising methods for flagging high consumption buildings for individual water audits. Preliminary effort underway for formulation of an Energy/Water Master Plan for county operations, building upon the County's Sustainability program.
- A well and water rights database has been linked with County GIS mapping and migrated to GIS servers. A *springs* database (with points of diversion) links ADWR and County springs.
- The Lower Santa Cruz Living River Project, funded by an EPA grant, is a monitoring strategy and reporting tool evaluating water quality and environmental improvement along the effluent dependent habitat and wetlands, providing better understanding of beneficial impact from upgraded effluent production. Second year report indicates WRF improvements have had the effect of an increase of 12,000 acre-feet infiltration, with a decrease in flow extent and habitat. A large reduction in ammonia has removed a barrier to increased aquatic life. These benefits and impacts are a result of ROMP project upgrade to metropolitan WRF's. The Living River report will help inform a Lower Santa Cruz River Management Plan.

In August, Pima County approved a new comprehensive plan, *Pima Prospers*, which includes goals and policies for water resources, including policy and implementation related to the Action Plan for Water Sustainability, water supply including for economic development and conservation, demand management, and groundwater quality.

The County continues to enhance Low Impact Development/Green Infrastructure (LIDGI) within the region's built environment. LIDGI utilizes stormwater as a renewable water resource to irrigate native vegetation, which has an added benefit of providing shade during the higher temperatures associated with drought conditions. The Pima County Regional Flood Control District coordinated the publication of the Low Impact Development and Green Infrastructure Guidance Manual describing stormwater harvesting features effective in a semi-arid climate. The Pima County Board of Supervisors unanimously passed an update to Title 18 (Zoning) to incentivize building stormwater harvesting features and green infrastructure. The newly updated Design Standards for Stormwater Detention and Retention Basins requires the retention of first-flush waters within stormwater harvesting features. A 2015 Low Impact Development (LID) Workshop was organized by the Pima County Regional Flood Control District's collaborative LID Working Group and Pima Association of Governments. The group held discussions on the future of LID in the Tucson region, field visit experience covered best practices in LID, methods of measuring the economic benefits of LID and strategies for minimizing maintenance issues, among other insights for both public and private sector professionals. The PAG Regional Council passed a LIDGI Resolution in 2015, reaffirming the importance of encouraging stormwater harvesting to reduce irrigation needs and enhance drought resiliency.³

As of now, the region's water providers and other entities with established drought plans are at Drought Stage 1 or its equivalent (voluntary reductions). Given some incongruity among the various drought plans, Pima Association of Governments has undertaken a local drought plan comparison effort, documenting variances among the plans and issuing a report and recommendations to aid in a more coordinated response and mitigation approach to drought in Pima County. An early draft was presented at the County's LDIG and a stakeholder comment period is underway.

RECOMMENDATIONS

In 2015, Pima County recorded some improving conditions as drought impacts eased, a result of last year's monsoon, a wet winter and a strengthening El Niño effect that has brought slightly above normal precipitation for the calendar year (and water year). However, the cumulative effect of multi-year drought and inherent climate variability require the County to maintain a diligent assessment and response posture; Severe and Extreme drought conditions could return.

³ <http://www.pagnet.org/tabid/189/default.aspx>

As Pima County LDIG monitors local drought, concern remains for the Colorado River Basin water supply. The Tucson Metro region's past reliance on and overdraft of the groundwater supply has been reined by the importation of CAP water. Pima County's large M&I sector is reliant on continued delivery of this renewable supply in order to maintain progress toward safe yield and consistency with AMA management goals. Lacking any surface water supply, the only alternative for Pima County is optimizing reuse. In an effort to relieve dependence on CAP supply, the region's largest water provider has initiated a recycled water plan that includes indirect potable reuse. Pima County's Strategic Plan for Reclaimed Water supports maximizing the direct reuse of reclaimed supply.

In addition to continuing recommendations from last year's annual report, discussion among Pima County LDIG included the following:

- Given increasing demand for LTSC's and large reserve deficits of AWBA and GRD, LDIG supports the development of new "wet" water delivery to the TAMA rather than "paper" water accounting of traded credits. The AMWUA/SAWUA inter-AMA storage agreement is an example of increasing the physical water supply within the TAMA. Regardless, AWBA and GRD efforts to close large gaps in their reserve of LTSC's should be supported but development of physical supplies and recharge of renewable water is more beneficial.

M&I Firming by the AWBA for the TAMA is "farther behind than the other AMA's", with just half of necessary credits accrued to achieve Planning goal (864,000 acre-feet). After AWBA ten year planning period, in 2025, TAMA firming goal will only be 69% completed (596,000 acre-feet). AWBA has given direction to develop as many credits as possible in the Tucson area. Additionally, AWBA staff recommends continued evaluation of the AMWUA/SAWUA inter-AMA storage proposal. AMWUA's Executive Director has mentioned that "Tucson-area cities are more vulnerable to a water bank supply cutoff because the bank hasn't met its goal for recharging water to back up this area's CAP supplies."

GRD has established a Replenishment Reserve subaccount for each AMA to accrue LTSC's that can be applied to replenishment obligations; a "savings account" GRD will use during water supply shortage or infrastructure failure to offset obligations rather than buying "spot-market water". A full Reserve Target volume must be maintained over time, any Replenishment Reserve credits used are to be replaced. The Reserve Target is unique to each AMA based upon projected obligations and available supplies.

The target reserve for the TAMA is 112,600 acre-feet but GRD has only 34,818 acre-feet in reserve leaving a deficit of 77,782 acre-feet or 70% of its target reserve unfulfilled. GRD proposes to meet their obligation and the reserve by recharging excess CAP water and purchasing long term storage credits. Another consideration is the growing replenishment obligation. Within the TAMA, GRD supplied 3,000 acre-feet of water to replenish excessive groundwater pumping in 2013. Increasing demand from growth and future enrollment will require an additional 9,700 acre-feet per year by 2034.

- Review Arizona Drought Preparedness Plan (ADPP) for update given approaching shortage, determination of Lake Mead structural deficit and to include shortage sharing agreement and its impact to Colorado River water users, information not available at time of ADPP drafting. Original ADPP tasks included the development of risk-based vulnerability assessments for each basin/watershed. An update to the ADPP could expand risk assessment by providing analysis of the economic impact at each Shortage Tier and CAP reduction. Moreover, a statewide vulnerability assessment could define the potential impacts within all water use sectors of the state's economy and provide a better understanding of differing mitigation and response needs of each county. Additionally, ADWR could explore options that encourage LDIG formation in non-active counties. LDIG's serve a key function within the ADPP; inquiring other entities to serve in an LDIG function (i.e., non-profits) could assist in reporting local impacts to the MTC.
- Rural areas rely on domestic wells and Pima County residents have reported the loss of production from their exempt wells. The private well owner needs tools to assess water availability and make such determinations as to drill deeper or add a new well to supply their property, or reallocate the expense if availability is severely limited to transporting water and haul water. With accurate information

of local aquifers and water tables available to this vulnerable sector, the best strategy for water provision can be devised and public health impacts from a sudden lack of water can be avoided. California's drought experience has necessitated an interim emergency drinking water program providing information and funding of bottled water and water hauling provision. A planning document guiding affected well owners in water hauling practices may be beneficial. At the same time, well owners could be advised of the best conservation strategies and the impact of groundwater pumping to the local environment surrounding their property.

The following are continuing recommendations regarding ADWR's Drought Program:

- Arizona and ADWR, in particular, must continue to monitor the status of the Colorado River and work with the Basin States and the Bureau of Reclamation to address the structural deficit in Lake Mead. Failure to take corrective action could have impacts to both agricultural, municipal and industrial CAP deliveries in Southern Arizona in the future
- Water providers in Pima County have made significant water infrastructure investment to increase the use of renewable water supplies to achieve the Groundwater Management goal of Safe Yield. ADWR's and ADEQ's regulatory setting should be supportive of adaptive management strategies to develop new and renewable water supplies and innovative demand management
- ADWR's Drought Management Program should continue to monitor the status of drought and report statewide drought conditions through the Drought Monitoring Technical Committee and the Interagency Coordinating Group.
- ADWR should incorporate environmental benefits from recharging and/or reducing groundwater pumping near shallow groundwater dependent ecosystems when designing and developing criteria for Special Enhancements Areas and similar efforts.
- ADWR should encourage and promote a study evaluating the effectiveness of managed stormwater recharge throughout Arizona, as recommended by the Blue Ribbon Panel, and evaluate potential for recharge credits.
- Monitoring of riparian areas in other regions for localized drought impact reporting should be encouraged.
- Drought response resources should be disseminated to exempt well owners not receiving drought alerts from water providers
- Unique drought response resources should be disseminated to areas of shallow groundwater dependent ecosystems that are sensitive to well impacts and drought.
- ADWR should improve statewide coordination and information sharing of local drought responses by posting water providers' drought response plans to ADWR's Drought Program website. This could assist communities that wish to prepare or update their drought program
- ADWR should maintain on its website a list of cities and towns where water restrictions are in place. Doing so illustrates the extent and severity of drought on water supplies
- An annual statewide roundtable of county agencies might reinvigorate the establishment of local drought impact groups. These groups can provide valuable input to the ADWR on drought conditions. They can provide a forum for sharing drought impacts, adaptive management strategies and successful drought preparedness measures for their constituencies.

- ADWR should encourage coordinated shortage outreach where shared messaging is appropriate across regions as well as continued press releases to national media about our preparedness efforts.
- ADWR should continue to explore ways to account for riparian areas as well as cumulative impacts of exempt wells within groundwater models and Water Accounting Areas efforts to plan for sub-regional groundwater balance.
- Due to the history of efforts in our region to fully utilize reclaimed water and community desire to preserve environmental flows, ADWR should consider special exemptions for full credits for instream recharge of effluent where appropriate.
- ADWR should provide protocols and criteria for applying for pump tax funds for conservation and drought programs.

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