



**PIMA COUNTY**  
**REGIONAL WASTEWATER RECLAMATION DEPARTMENT**  
201 NORTH STONE AVENUE  
TUCSON, ARIZONA 85701-1207

**JACKSON JENKINS**  
DIRECTOR

PH: (520) 724-6500  
FAX: (520) 620-0135

November 4, 2013

**TO:** Jackson Jenkins, Director

**FROM:** Kathleen M. Chavez, Water Policy Manager

A handwritten signature in blue ink, appearing to read "Kathleen M. Chavez".

**SUBJECT: Pima County Local Drought Impact Group (LDIG) 2013 Annual Report**

Attached is the Pima County Local Drought Impact Group's Annual Report to ADWR on the continuing drought impacts to the County. Part or all of the attached report will become part of the State's Annual Report to the Governor. Past reports may be found on the County's Drought Management web page. [drought management](#)

The drought, entering its second decade, continues to affect our area and residents. All of the local water providers continue their Stage One Drought Declaration in their service areas and focus on a water conservation and efficient water use message rather than restrictions.

The 2012/13 water year (October 2012 to September 2013) was the third driest year on record in the Colorado River Basin. The Bureau of Reclamation (BOR) recently completed the [Colorado River Basin Water Supply and Demand Study](#) which shows a projected 3.5 million acre feet deficit between supply and demand in the year 2060.

According to the U.S. Drought Monitor, at the start of the water year, 25 percent of Pima County (the Tucson region) was at a Stage D2 – Severe Drought with the remainder of the County assessed at Stage D1 – Moderate Drought.

The U.S. Drought Monitor gets its information from weather stations, gauges and groups like Pima County's LDIG.

If you have any questions, please do not hesitate to contact me.

Enclosure

c w/enc: Mike Hein, Office of Emergency Management

## **Pima County Local Drought Impact Group (LDIG) 2013 Annual Report**

The Pima County Local Drought Impact Group (LDIG) and 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- 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 "Extreme." Each "Stage" declaration within the county triggers drought stage reduction measures.

Since 2006, LDIG has explored 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, El Niño Southern Oscillation (ENSO) and other climate weather patterns in relation to their effect on drought conditions and climate variability in the Southwest. For a list of presentations and agendas, please visit Pima County's LDIG website at: [ldig website](#)

The study of tree ring growth, especially at the University of Arizona's Tree-Ring Laboratory, has been used to reconstruct flows in the Colorado River and to identify periods of drought as far back as 800 A.D., by comparison, precipitation records began in 1880. This data is being used to understand the extent, frequency, duration and severity of drought in the Southwest.

LDIG also monitors the status of the summer monsoon season and convenes roundtable discussions of drought and water conservation outreach programs.

### **IMPACTS**

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. We are seeing more invasive species like Bermuda grass and tamarisk and fewer birds, Gila Topminnows and aerial arthropods<sup>1</sup>. There is also a significant decrease in ephemeral stream flows.

In the spring, the Colorado River Basin had 83 percent of the 30-year average snow accumulations. Lakes Mead and Powell levels have been dropping as the snowmelt runoff had not yet begun. In March, Lake Powell was 48.5 percent full or 11.8 million acre-feet (maf) and Lake Mead was 53 percent full or 13.71 maf.

The 2012/13 water year (October 2012 to September 2013) was the third driest year on record in the Colorado River Basin. The Bureau of Reclamation (BOR) recently completed the *Colorado River Basin Water Supply and Demand Study* which shows a projected 3.5 maf deficit between supply and demand in the year 2060.

---

<sup>1</sup> *Drought and Arizona Rivers – Looking into the Past and Thinking about the Future*, Kelly Mott Lacroix, May 8, 2013 LDIG Presentation [Drought and Arizona Rivers](#)

In September, the in-flow to Lake Powell for water year 2013 was 4.3 maf – 40% of average (1981-2010). Lake Mead is currently 33 feet above the shortage declaration trigger of 1,075 foot elevation. Based on the BOR Colorado River Study, the earliest likelihood of a Shortage Declaration is 2016.

Tucson's "winter" season was the 40th coldest and 39th wettest. Precipitation was 0.05 inches above average (2.78") and the average monthly temperature was 1.8°F below average (51.4°F). On January 22, there was a record low of 17°F and record rainfall on January 26. Tucson International Airport (TIA) recorded .71" (the old record was .67" in 1985). Compared to the last 25 years, the Tucson area ranked 2<sup>nd</sup> for the number of freezing temperature days – 23.

The summer in Tucson saw the hottest June on record – everyday at least 100°F and little precipitation (0.03" at TIA, 0.24" is the normal for June). There was a little break in July; precipitation was above average and widespread (2.63" at TIA/normal is 2.45"). August was hot and dry with 13 consecutive days of 100° temperatures or hotter. Precipitation measured at TIA was 0.48" (normal is 2.39").

Tucson International Airport recorded 6.69" for the water year ending September 30. The normal is 10.83" – the Tucson area was more than 4" below normal for that period.

Cumulative drought stress degrades forest viability as prolonged heat and dry conditions create abundant and explosive fuel for wildfire. Combined with frontal weather patterns producing sustained winds and peak gusts, the potential for critical "Fire Weather" days (relative humidity below 15%, winds above 19mph, high/extreme fire danger) is expected to increase.

Additional reactions to drought/climate change conditions include earlier spring flight of butterflies, earlier snowmelt in the Rockies influencing the timing of sub-alpine blooms, yellow-bellied marmots emerge earlier from hibernation and migrant birds arrive earlier creating food source mismatches. Drought conditions affect bloom time of desert adapted plants and the timing of egg laying in Mexican jays.

Cienega Creek experienced record breaking drought conditions in the summer of 2013. On an annual walk through in June, there was 25% less flow than the same time last year. The perennial flow has been reduced to 0.93 mile, the lowest flow on record and 0.31 mile shorter than June 2012.

The 2013 Monsoon has provided some relief from drought especially south and east of Pima County in Douglas/Cochise County. However, Pima County is in a declared Drought Stage 1 the same as the major water providers in the area.

This is a manufactured anomaly compared to the Drought Impact maps produced by *U.S. Drought Monitor* and distributed by ADWR's Drought Monitoring Technical Committee. The Monitoring Technical Committee determines the drought status for each watershed by comparing the precipitation and streamflow percentiles for the past 24, 36 and 48 months to a 40-year historical record.

To be better prepared for prolonged drought conditions and their impacts, what may be needed is a County-wide vulnerability assessment to monitor drought impacts, identify appropriate response measures and improve drought resiliency.

Entity	Drought Declaration
Pima County	Stage One
City of Tucson	Stage One
Town of Oro Valley	Stage One
Town of Marana	Stage One
Metropolitan DWID	Stage One
Community Water of Green Valley	Stage One

Given the probability of continued warming and an unpredictable forecast for precipitation, annual ENSO weather trends and climate records, the County ordinance and *Drought Management Plan* should be revisited to facilitate improved implementation and communication to the public and affected groups ahead of worsening drought conditions and associated impacts.

### DROUGHT ABATEMENT EFFORTS

Pima County is continuing its diligence in drought abatement efforts. Several organizations, such as C2E (Conserve to Enhance), urges water conservation that translates into donations to support environmental enhancement. C2E participants have saved 1.9 million gallons (5.8 acre feet) of water from January 2011 through September 2012.

In 2010, Pima County and the City of Tucson completed a *Water/Wastewater Study Action Plan* and are in Year Three of its implementation. Actions underway during 2013 included an update to the City of Tucson's *Drought Preparedness and Response Plan*, increased reclaimed water system efficiencies, increased use of renewable sources of water including reclaimed water and Central Arizona Project water and model city/county building codes that reduce the water/energy footprint in new and renovated buildings.

Several conservation and loss reduction mechanisms are in place to ease a shortage on the Colorado River, including:

- Yuma Desalting Plant that could deliver contracted water to Mexico
- Brock Reservoir – a temporary storage for water that was ordered but not used, but could be delivered at a later date
- Vegetation Management – the reestablishment of low water using native vegetation and non-native plant reduction/eradication
- Public outreach on the impacts of a shortage declaration on the Colorado River on water supplies
- Increased underground storage of Colorado River water in the Tucson Active Management Area
- Increased use of reclaimed water supplies
- The City of Tucson's eight rebate programs are estimated to generate about 788 acre feet per year in water savings and Tucson Water has banked over 2,400 acre feet over the last five plus years