2016 Results --Drought Impacts Lessened But Still Severe in Riparian Areas

Increase in Cienega Creek Flow Extent and Return of Davidson Canyon Flows

Cienega Creek is one of the few remaining perennial lowland streams in our region, and is used as a proxy to represent regional riparian conditions. Although the creek is a stunning example of what many of our riverbeds could be, monitoring results show its vulnerability to dropping water tables.

Pima Association of Governments has monitored riparian conditions in Pima County’s Cienega Creek Natural Preserve since 1989. As part of the monitoring program, on a quarterly basis PAG maps baseflow in the reaches of Cienega Creek and Davidson Canyon that fall within the Preserve. This handout displays PAG’s surface flow extent survey results from the driest time of year (May/June) to reflect the perennial surface water.

In 2016, PAG found improvement in perennial flow extent after several years of record lows. In June 2015, only 9% of Cienega Creek within the Preserve was flowing. This year, creek flows improved to 20%. Long-term drought impacts were still apparent, as Cienega Creek has not recovered above pre-drought flow levels. Davidson Canyon also saw improvement, with its first pre-monsoon flows since 2012.

Consistent monitoring of these areas reveals changes in long-term seasonal trends. El Niño’s ample winter precipitation, plus low spring temperatures may have played a role in maintaining shallow groundwater reserves. Research into the relationship between increased flow, water use, weather patterns, and other climate factors is aiding the understanding and management of these unique water resources. To assist, PAG shares techniques and protocols with interested individuals and agencies.

Many well owners and water systems in rural areas rely on shallow groundwater, while enjoying the riparian habitat near which they live. Because surface baseflow and groundwater levels are strongly correlated, drought conditions and pumping increase vulnerability, making it more difficult to achieve a sustainable balance of water needs.

Private well owners experience unique localized drought conditions and do not receive updates or resources that are available in areas with large municipal providers. Because of this, PAG encourages coordinated information-sharing among stakeholders in shallow groundwater areas and commends efforts to provide water conservation assistance in rural areas to sustain our region’s heritage of streamflow in the desert.

PAG recommends increased use of stormwater and reclaimed water to benefit our regionally cherished water resources. Best management practices are encouraged, including low impact development techniques that help stormwater to infiltrate into the shallow groundwater, to supply water to vegetation and to reduce groundwater pumping for irrigation.
This map displays changes in pre-monsoon baseflows within the Cienega Creek Natural Preserve over time. Baseflows are groundwater-based creek flows, without the influence of stormwater runoff. June marks the end to the part of the year with lowest rainfall and highest heat and evapotranspiration. Monitoring during this time provides a look at the minimum perennial flow extent of the creek.

The most recent results are shown on the map. The stacked bars show conditions from previous years, translated to-scale into linear bars, allowing easy comparison of flow length and location from year to year. Colors alternate for visual aid.

Water levels respond to changes in the drought cycle. The creek becomes more segmented during drought and we find that flows are limited to reaches where shallow bedrock layers keep the water table close to the surface. Wetter years elevate the water table, allowing segments to flow to a greater extent.