

Riparian Health Assessment Summary

Monitoring Year 2024-25: Surface Flows Decline Amid Severe Local Drought Conditions

Cienega Creek is one of the few remaining perennial lowland streams in the region. Cienega Creek and Davidson Canyon are stunning examples of what many desert streambeds could look like if similar preservation efforts were employed. These shallow groundwater-dependent systems and Outstanding Arizona Waters (OAW) support wildlife habitats and human activity alike. Cienega Creek and Davidson Canyon are among the priority waterbodies identified in Pima Association of Governments' Areawide Water Quality Management (208) Plan for monitoring and protection.

PAG has monitored hydrologic conditions in Pima County's Cienega Creek Natural Preserve (CCNP) since 1989. The CCNP is in the lower part of the Cienega Creek Watershed. Every quarter, PAG maps baseflow in the reaches of Cienega Creek and Davidson Canyon within the CCNP and Pima County's Bar V Ranch. Baseflows are groundwater-based surface flows without the influence of stormwater runoff. The scatter plot shows the time of year that is usually driest (May/June, pre-monsoon) to reflect the minimal perennial (year-round) extent of surface water. Annual maximum baseflow extents reflect the greater aquatic habitat present in wetter seasons.

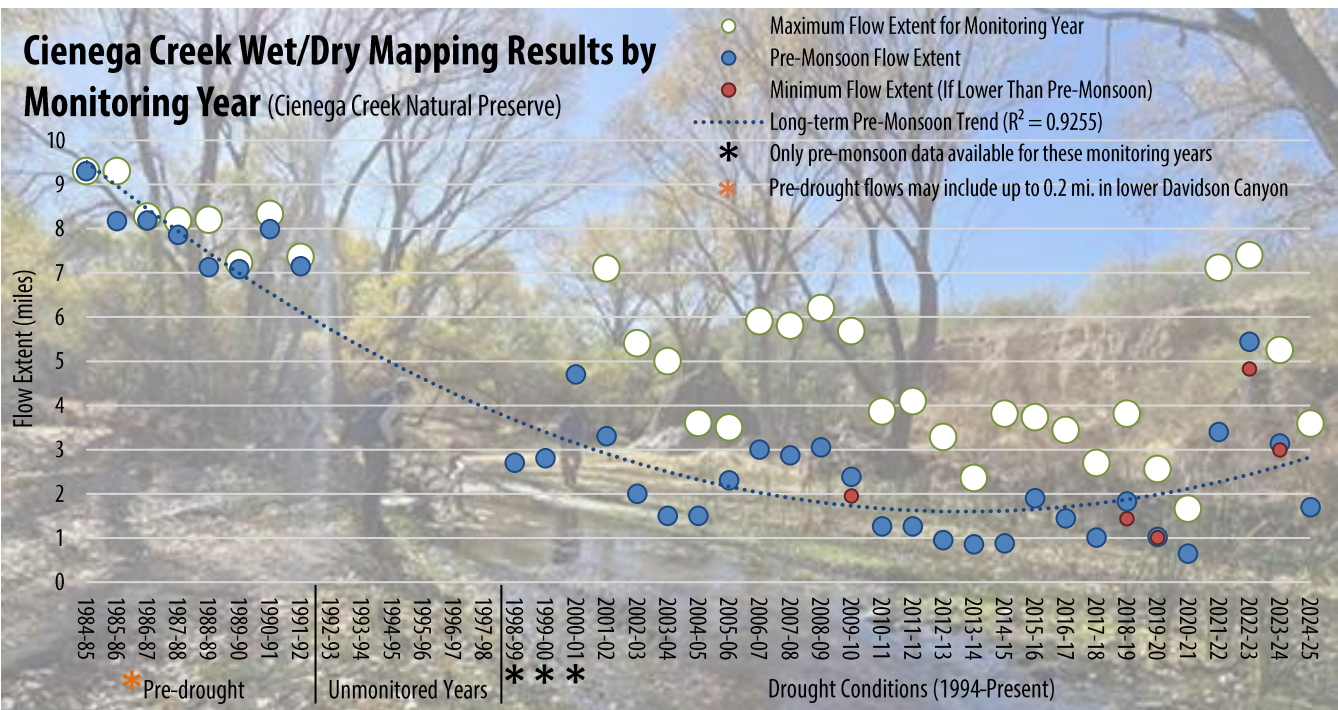
Pre-Monsoon Flows

In monitoring year (MY) 2024-25 (July 2024 through June 2025), flows continued to decline within the CCNP. The June 2025 baseflow extent was 1.69 miles, or 18% of the monitoring area along Cienega Creek. In June 2025, no baseflow was observed in Davidson Canyon. See page 3 for a scatter plot of MY 2024-25 wet/dry mapping results for Davidson Canyon.

An Emerging Pattern

In the Tucson region, pre-monsoon flows have typically been the lowest and are used, therefore, to represent perennial flow extents. Organizations that only wish to record perennial flows might only conduct wet/dry mapping once annually, in May or June, before the onset of monsoon rainfall.

Since PAG began quarterly monitoring along Cienega Creek in 2001, minimum baseflow extents in a calendar year have most often been observed in June. However, a



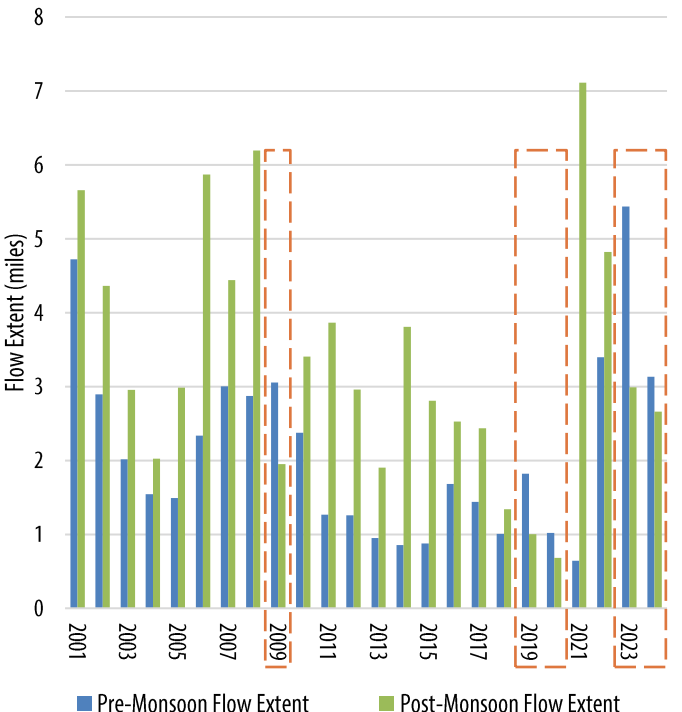
new pattern has emerged in recent years, as September (post-monsoon) baseflows have more often been lower than the preceding June (pre-monsoon) baseflows.

In June 2024, the pre-monsoon baseflow extent was 3.13 miles. In September 2024, the post-monsoon baseflow extent was 2.66 miles. Post-monsoon baseflows that were lower than the preceding pre-monsoon baseflows also were observed in September 2009, 2019, 2020, and 2023, as shown in the orange dashed boxes on the bar chart to the right. In addition, red dots on the scatter plot above show instances when minimum baseflow extents for a monitoring year were lower than in the following June. These minimum baseflows were observed in September, at the end of the previous monsoon season.

As these results demonstrate, between long-term local drought and increasing weather variability in recent years, monitoring the flows only during the pre-monsoon season is no longer sufficient to reflect true minimum, perennial flow extents. Consistent seasonal monitoring such as PAG's quarterly wet/dry mapping is recommended, if feasible.



Cienega Creek Pre- and Post-Monsoon Monitoring Results by Calendar Year (Cienega Creek Natural Preserve)



Cienega Creek

Pre-Monsoon Flow Extent Figure 1999 to 2025



Legend

- Pool locations (2025)
- Flowing segment**
 - 2025
 - odd year
 - even year
- Dry segment**
 - 2025
 - past years
- Cienega Creek Natural Preserve



The chart below displays changes in June pre-monsoon baseflows for Cienega Creek within the CCNP since 1999. As the creek's flow extent decreases due to sedimentation, drought and/or groundwater pumping, the increasingly segmented flows are limited to reaches where shallow confining geologic layers keep the water table close to the surface. Wetter years elevate the water table, allowing segments to connect and flow to a greater extent.

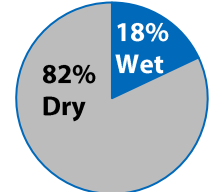
Results from 2025 are shown on the map. The map displays eight of the 9.3 miles of Cienega Creek that are monitored quarterly. PAG does not monitor the upper 1.3 miles of Cienega Creek, as this area has been presumed dry since PAG resumed monitoring in 1999. The bar chart shows conditions from previous years, translated to-scale into linear bars, allowing easy comparison of flow length and location from year to year. Colors alternate for visual aid. The pie charts were generated based on pre-monsoon flow extents within the full 9.3-mile monitoring area. See page 3 for Davidson Canyon results.

PAG's consistent and long-term monitoring is necessary to provide reliable trend analysis. Results are shared with Pima County and reported to the Arizona Department of Water Resources, where they are compiled into state drought records, and to the Arizona Department of Environmental Quality to support flow regime data. Pima County also uses this data to inform land management decisions and water planning. Groundwater data are also available.

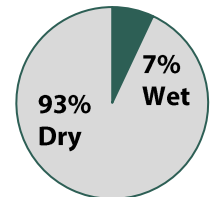
PAG's reports and resources are available here:
<https://maps.PAGregion.com/PAGLibrary/>



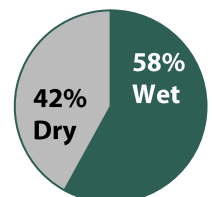
This Year (2025)



Least Flow (2021)

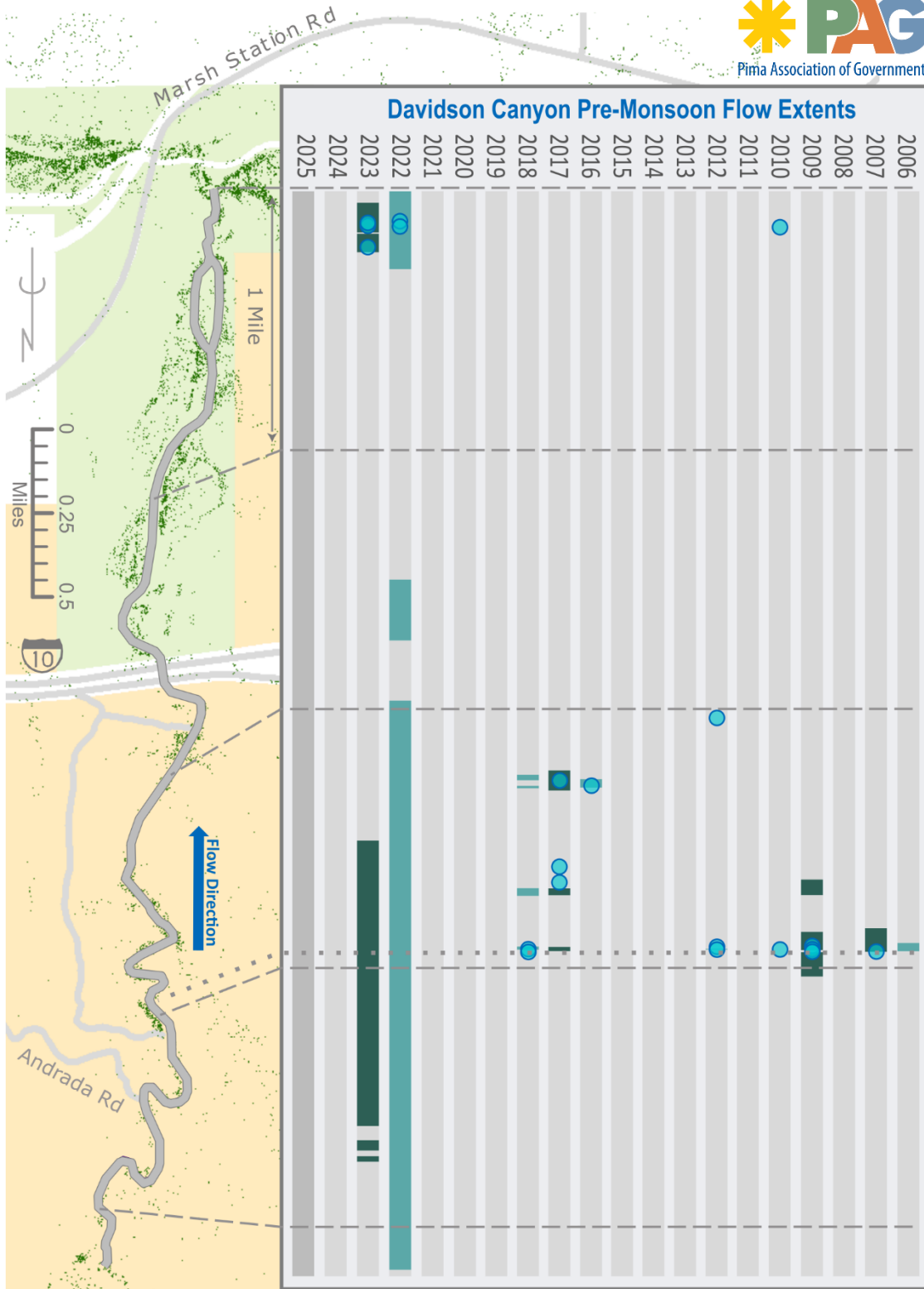


Most Flow (2023)



Davidson Canyon

Flow Extent Figures, 2005 to 2025



Pre-Monsoon Flow Legend

- Pool locations
- Flowing segment
 - 2025
 - odd year
 - even year
- Dry stretch
 - 2025
 - past years
- 6+ Foot Tree Canopy (2015)
- Mile Indicator
- Davidson OAW Upstream Limit
- Cienega Creek Natural Preserve
- Pima County's Bar V Ranch

The chart at left displays changes in June pre-monsoon baseflows for Davidson Canyon within the CCNP since 2006. Results from 2025 are shown on the map. The map displays over four miles of Davidson Canyon, which PAG has monitored quarterly since 2006 and includes the OAW reaches. Cienega Creek flow data is not pictured on this map. Tree canopy data and riparian health assessment data show that riparian vegetation in the canyon has persisted over time, supported by shallow groundwater.

The scatter plot below shows pre-monsoon baseflow extents. Within this stretch of Davidson Canyon, the total length of flow includes isolated pools that are not adjacent to flow.

Davidson Canyon Wet/Dry Monitoring Results

(CCNP & Bar V Ranch)

