

Cienega Creek & Davidson Canyon Monitoring Update

Presented to the Local Drought Impact Group
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Pima Association of Governments



Outline

- Background
- Drought Updates
- Next Steps

Background

- History
- Importance
- Methods

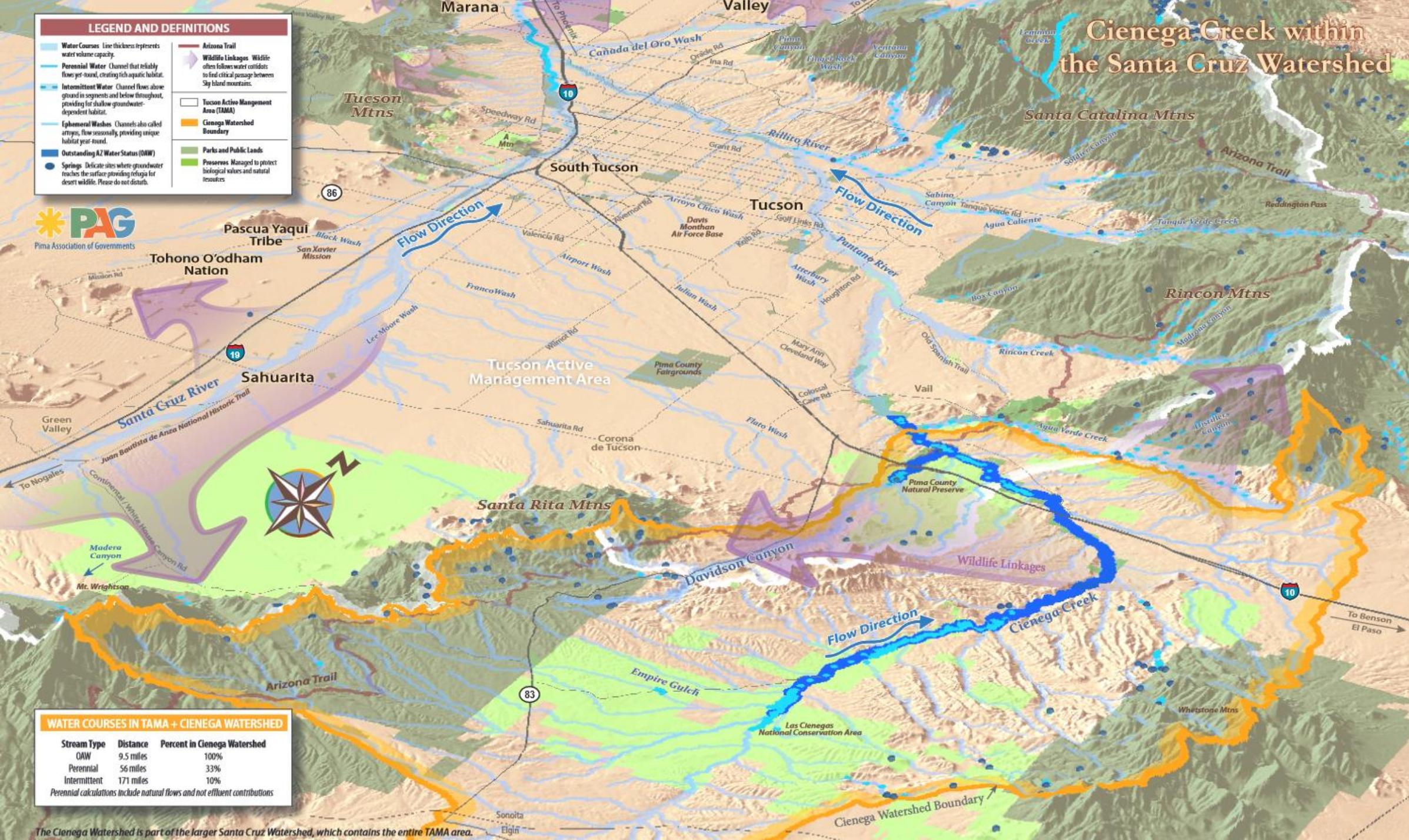


LEGEND AND DEFINITIONS

-  Water Courses: Line thickness represents water volume capacity.
-  Perennial Water: Channel that reliably flows year-round, creating rich aquatic habitat.
-  Intermittent Water: Channel flows above ground in segments and below throughout, providing for shallow groundwater-dependent habitat.
-  Ephemeral Washes: Channels also called arroyos, flow seasonally, providing unique habitat year-round.
-  Outstanding AZ Water Status (OAW)
-  Springs: Delicate sites where groundwater reaches the surface providing refugia for desert wildlife. Please do not disturb.
-  Arizona Trail
-  Wildlife Linkages: Wildlife often follows water corridors to find critical passage between Sky Island mountains.
-  Tucson Active Management Area (TAMA)
-  Cienega Watershed Boundary
-  Parks and Public Lands
-  Preserves: Managed to protect biological values and natural resources



Cienega Creek within the Santa Cruz Watershed



WATER COURSES IN TAMA + CIENEGA WATERSHED		
Stream Type	Distance	Percent in Cienega Watershed
OAW	9.5 miles	100%
Perennial	56 miles	33%
Intermittent	171 miles	10%

Perennial calculations include natural flows and not effluent contributions

The Cienega Watershed is part of the larger Santa Cruz Watershed, which contains the entire TAMA area.

>> History

- Initiated in mid-1980s
- Resumed in 1998 due to drought
- Began Davidson Monitoring in 2006



>> Importance

- Few lowland perennial streams
- Outstanding Arizona Water
- Priority Waterbodies in 208 Plan
- 208 Plan's Strategic Action Plan

PAG 208 Plan - 2020

Areawide WATER QUALITY Management Plan

DATE



>> Methods

- Quarterly Wet/Dry Mapping
 - Pools
 - Fish, Frogs
- Water Quality
- Repeat Photography
- Other Observations
 - MSCP Species
 - Invasives
 - Riparian Phenology
 - Human Activity



A photograph of a single sunflower with a bright yellow head and green leaves, growing in a harsh, arid environment. The ground is composed of light-colored, jagged rocks and is severely cracked, indicating a lack of water. In the background, there is sparse, dry, yellowish-brown grass. The overall scene conveys the effects of drought on natural vegetation.

Drought Updates

- Pre-Monsoon
“Perennial” Flows
- September 2019
- Lessons

>> Pre-Monsoon “Perennial” Flows

- Measured in June
- Typically minimum annual flow - perennial
- Aligns with other wet/dry efforts



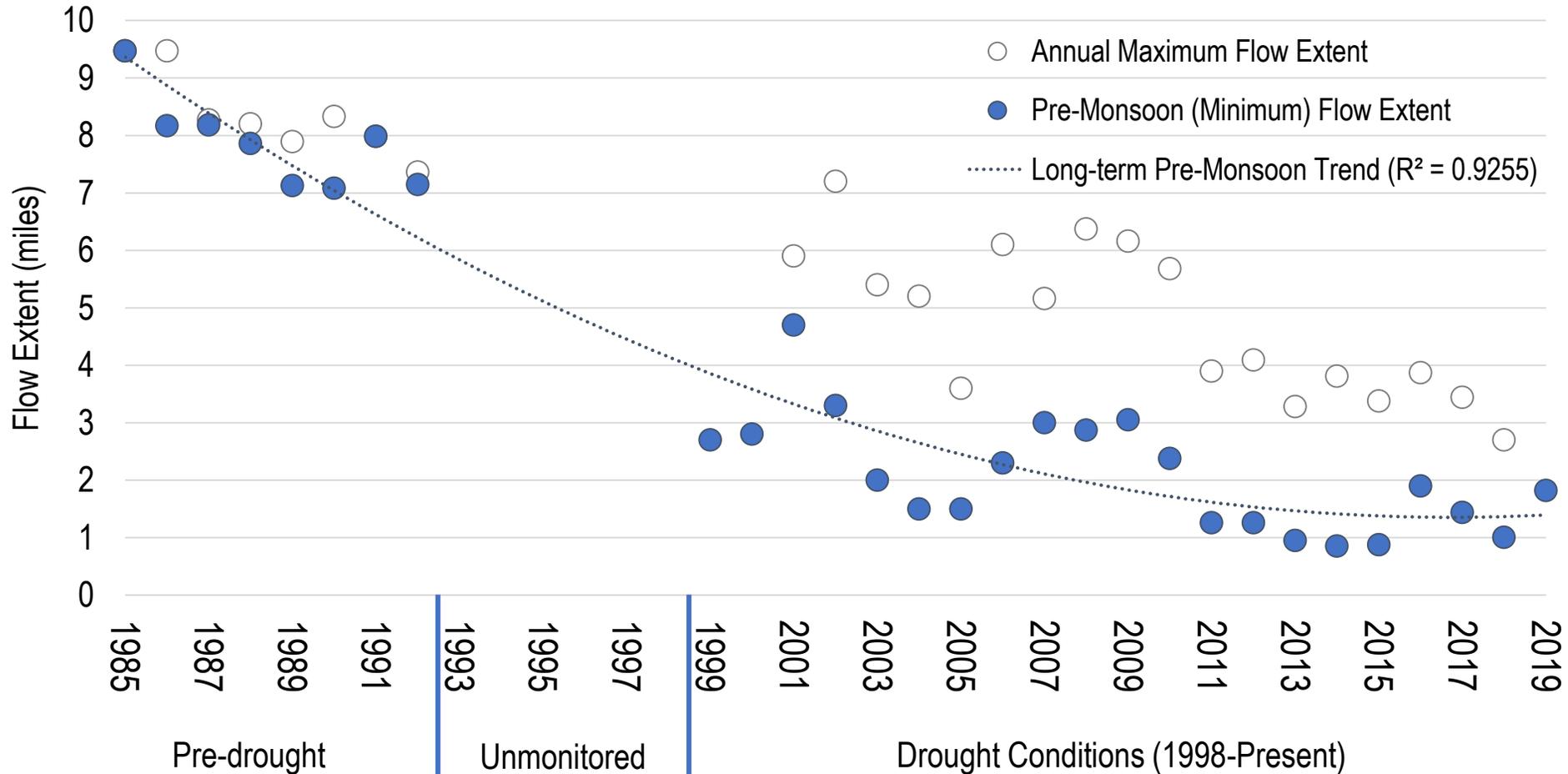
>> Pre-Monsoon “Perennial” Flows

- June 2019 – Cienega Creek
 - 1.8 miles of flow
 - Third wettest in 10 years
- June 2019 – Davidson Canyon
 - Dry



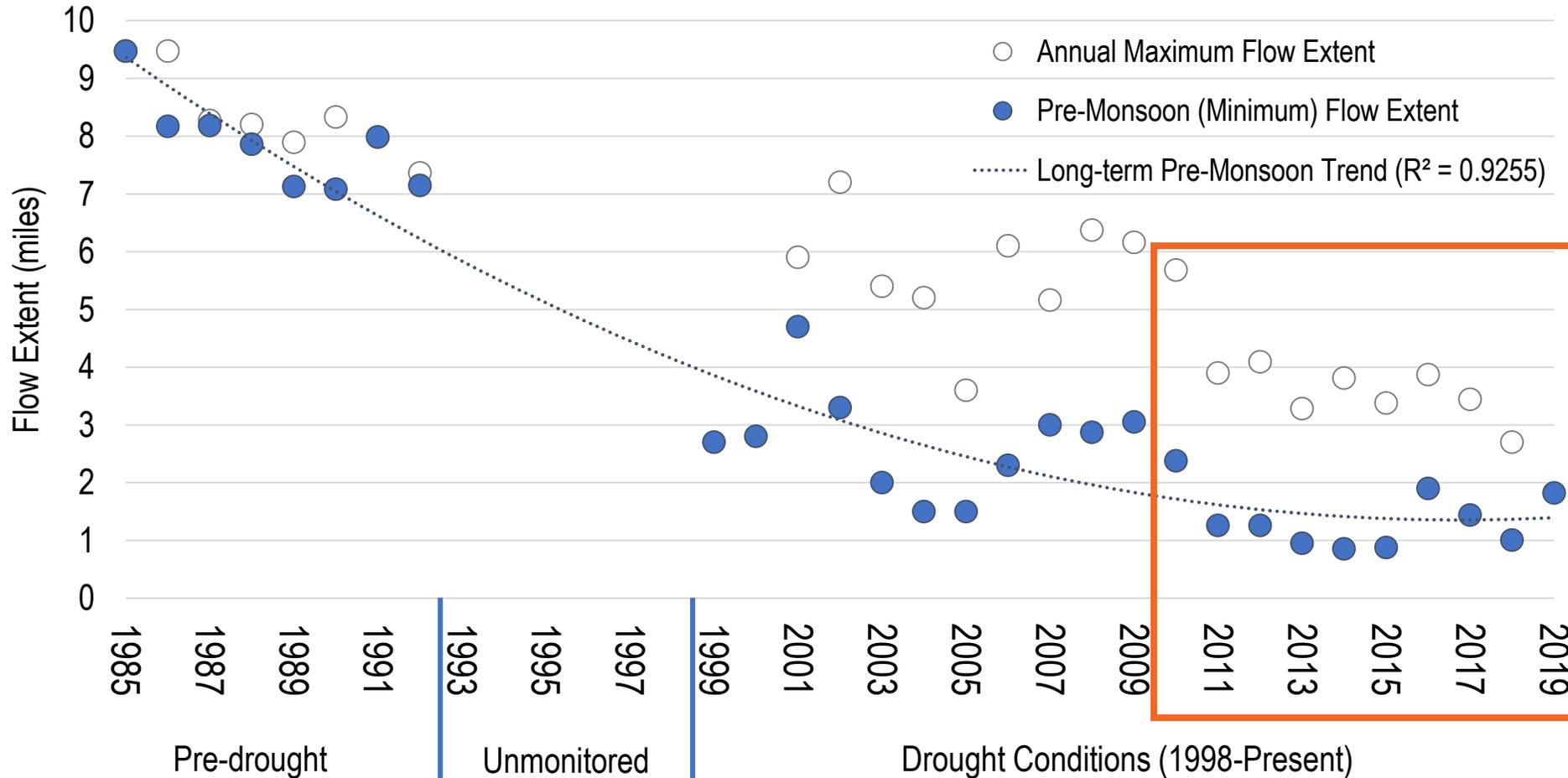
>> Pre-Monsoon "Perennial" Flows

Cienega Creek Monitoring Results (Pima County Preserve)



>> Pre-Monsoon "Perennial" Flows

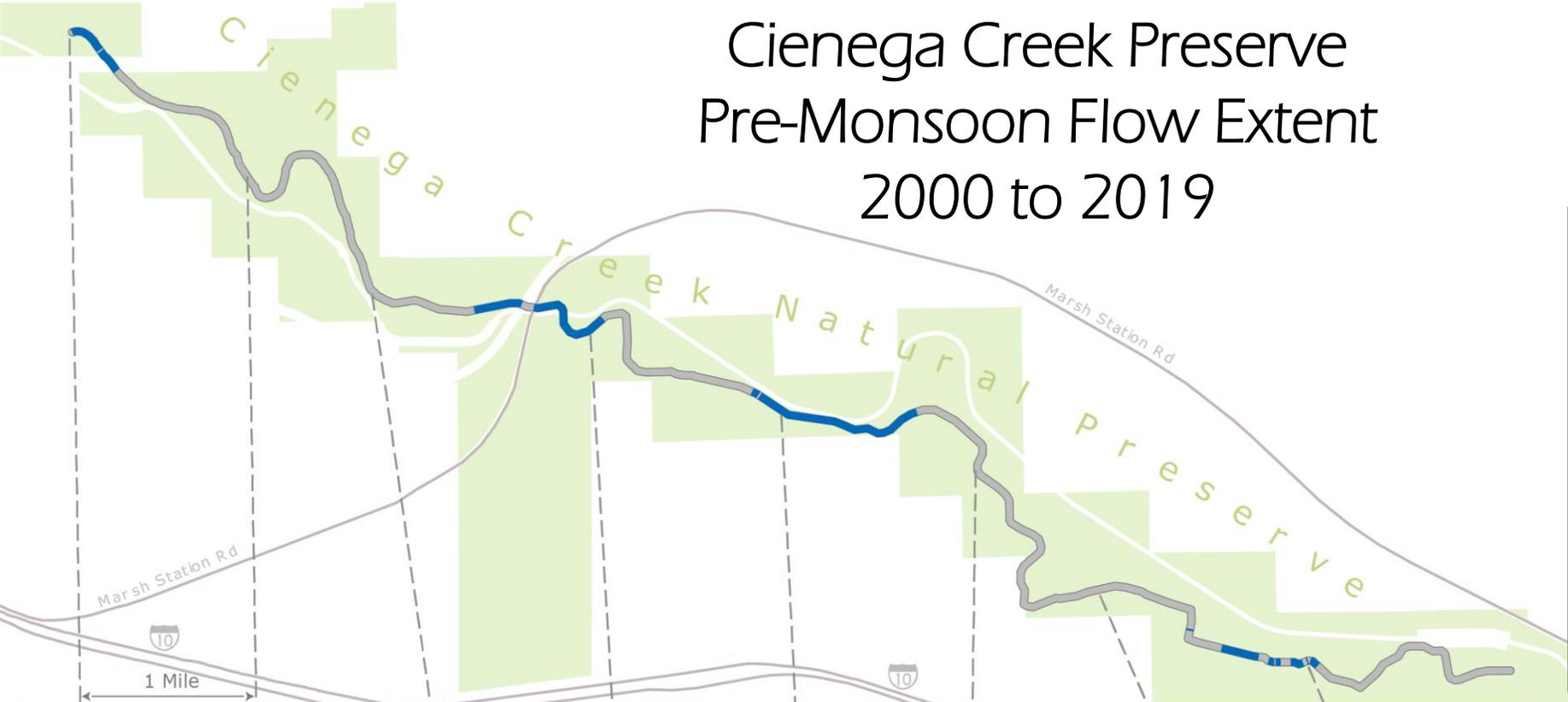
Cienega Creek Monitoring Results (Pima County Preserve)



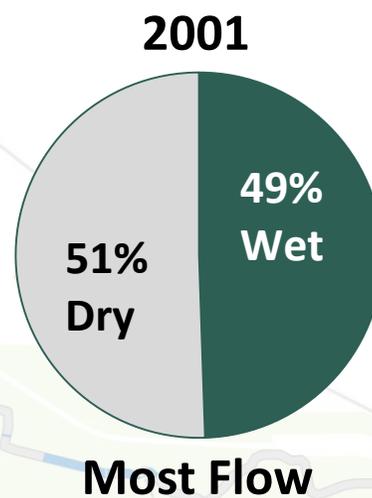
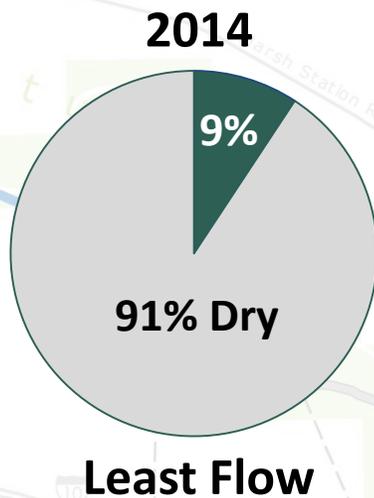
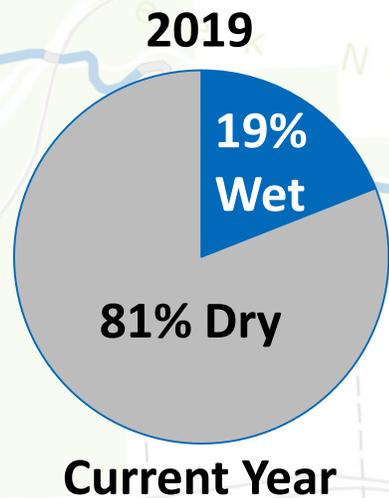
Cienega Creek Preserve Pre-Monsoon Flow Extent 2000 to 2019

Legend

- █ Flowing segment (2019)
- █ Flowing segment (even year)
- █ Flowing segment (odd year)
- █ Dry stretch (2019)
- █ Dry stretch (past years)
- █ Cienega Creek Natural Preserve



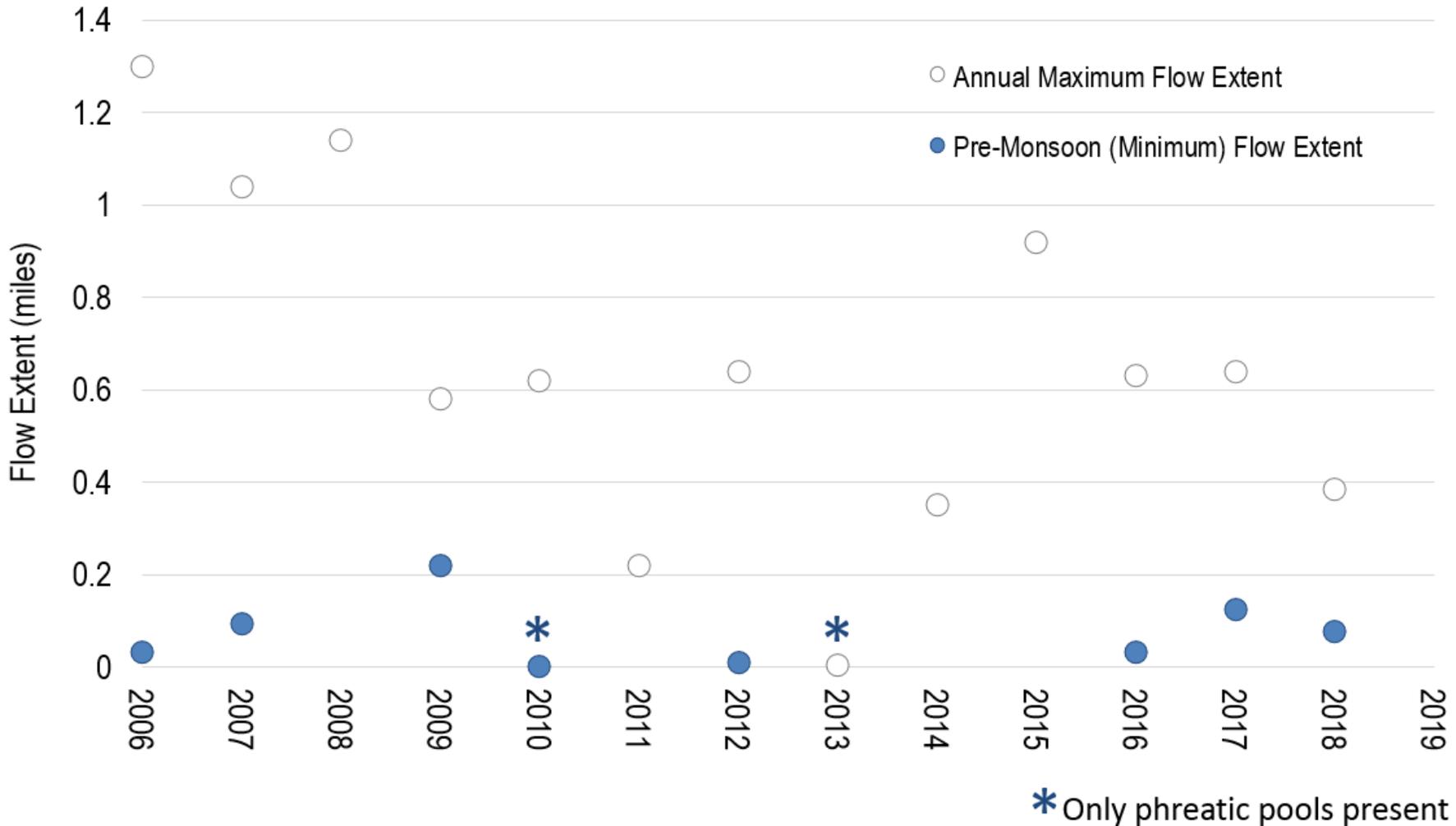
Cienega Creek Preserve Pre-Monsoon Flow Extent 2000 to 2019



Marsh Station Rd
10
1 Mile

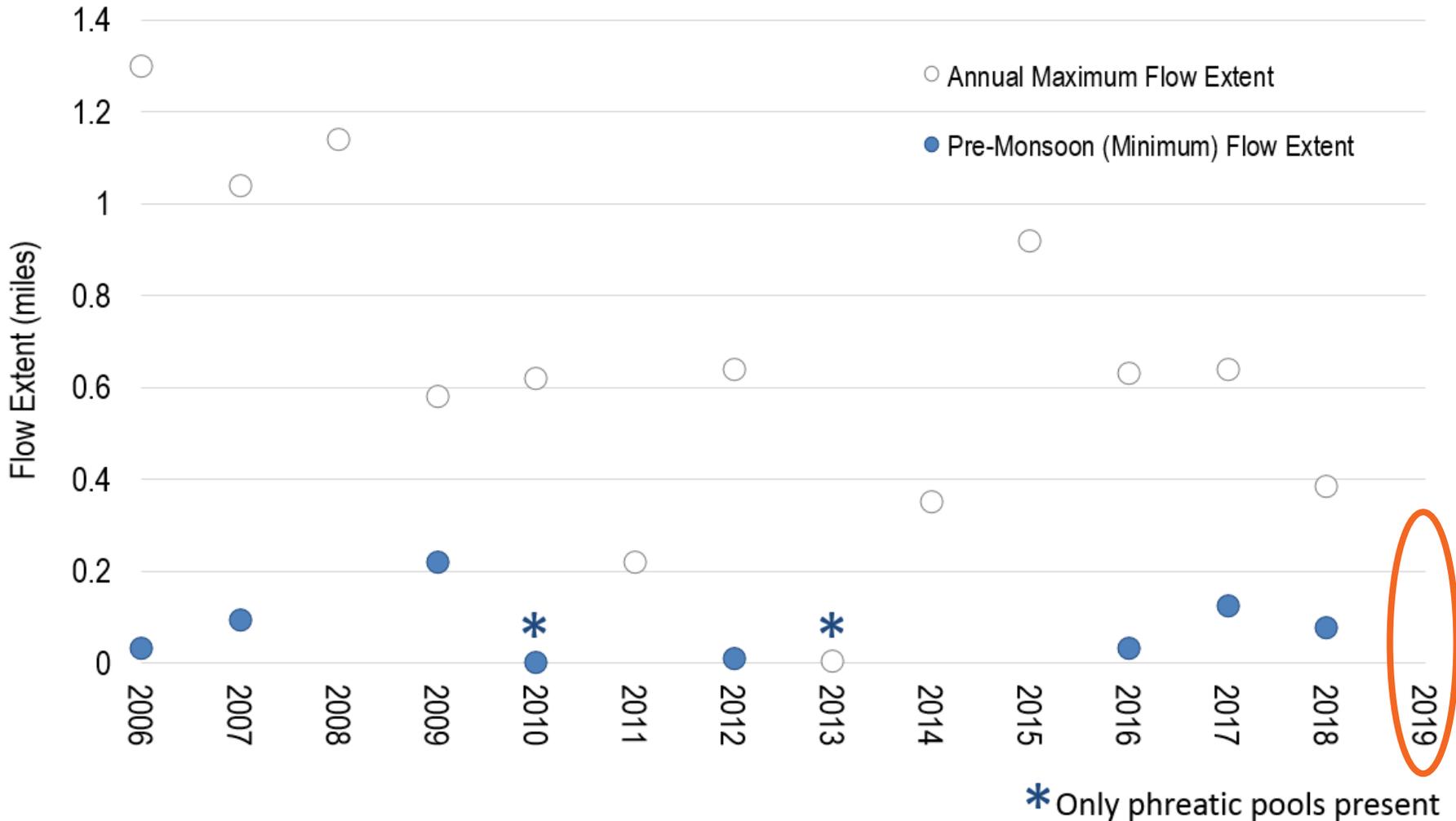
>> Pre-Monsoon “Perennial” Flows

Davidson Canyon (Upstream of I-10)



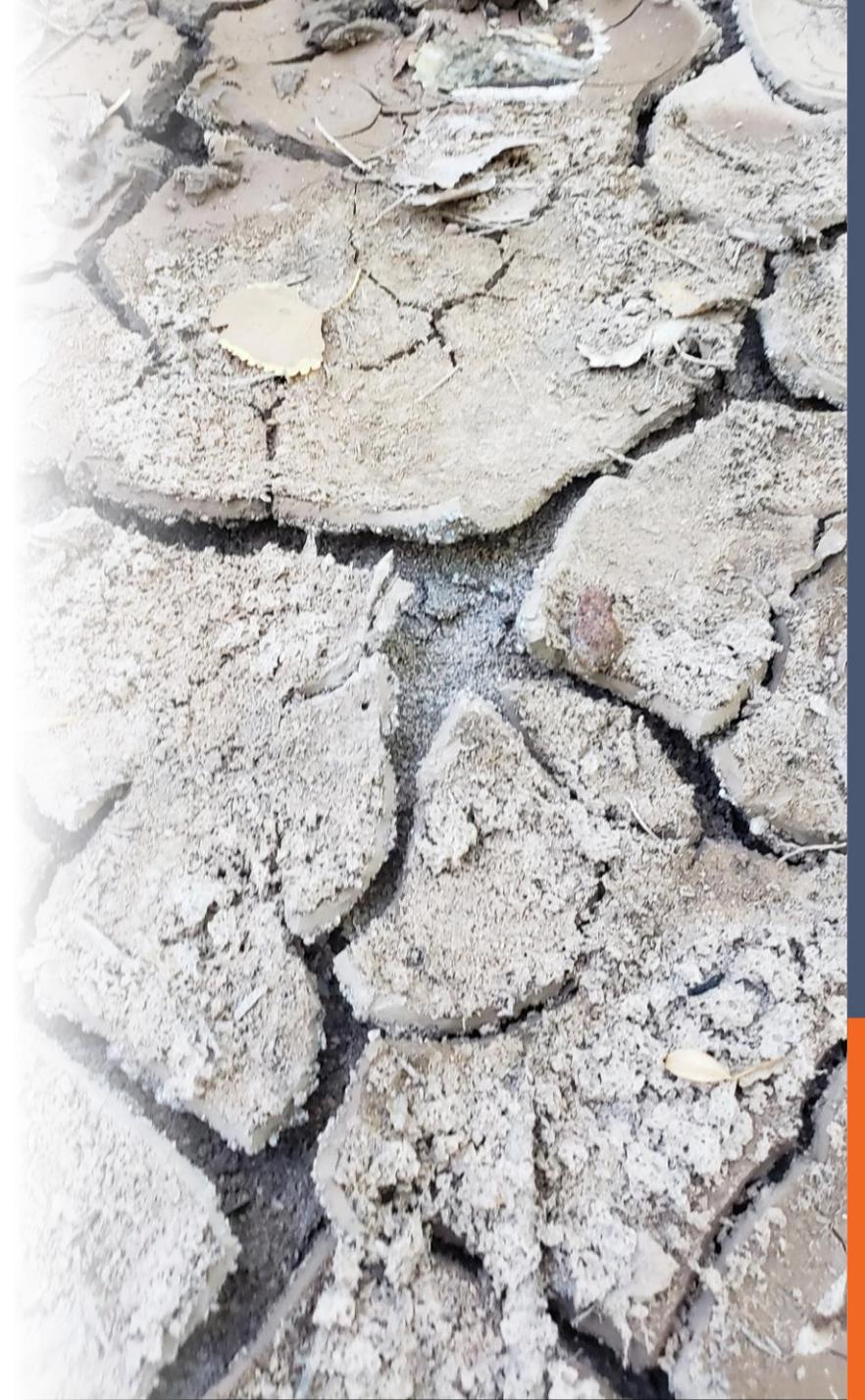
>> Pre-Monsoon "Perennial" Flows

Davidson Canyon (Upstream of I-10)



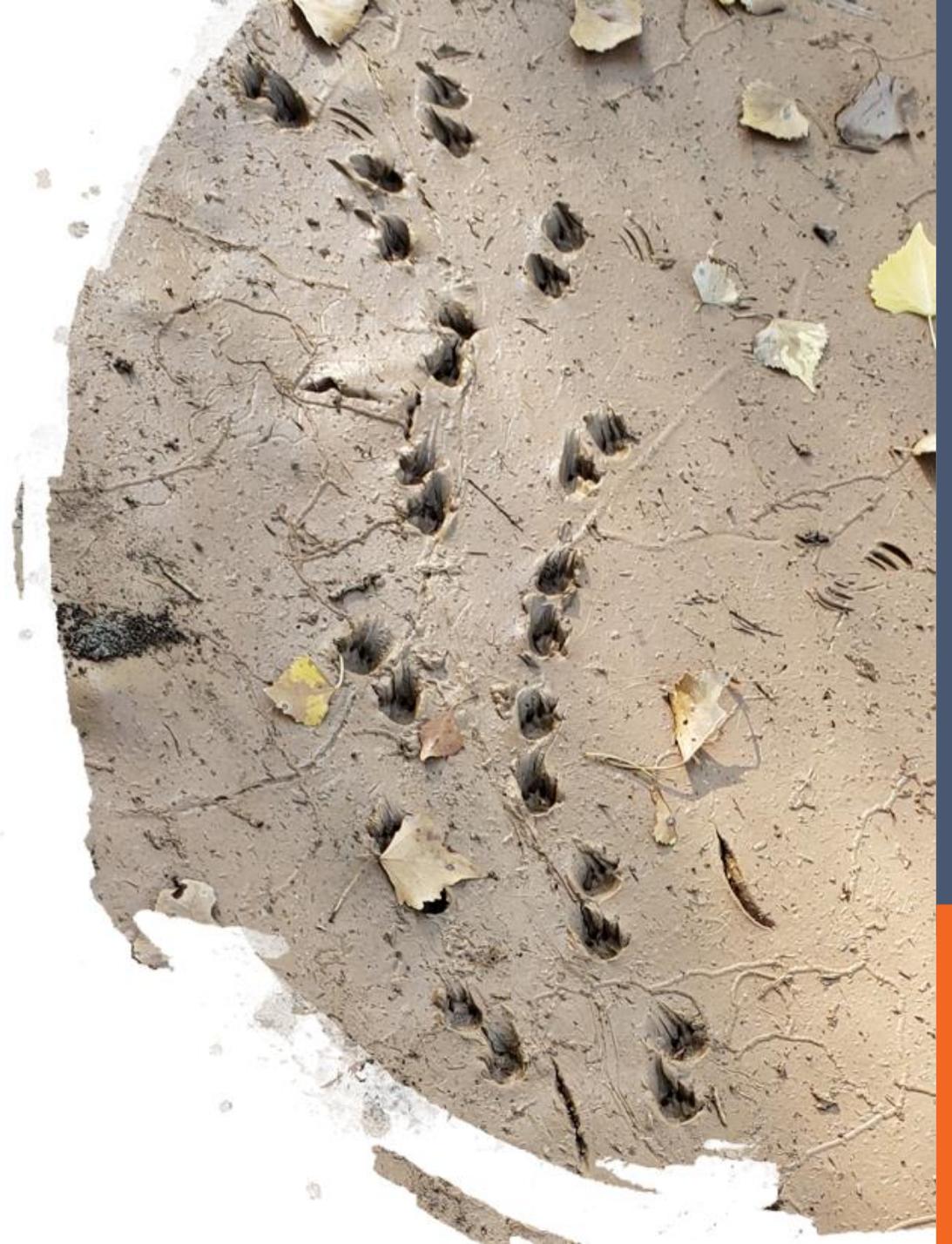
»» September 2019 Results

- Cienega Creek
 - Less flow than June (1.0 miles vs. 1.8 miles)
 - Perennial flow extent this year?
 - Only occurred once before in 2009
- Davidson Canyon
 - 0.13 miles of flow



>> Lessons

- Downward trend in Cienega flows
- Value of quarterly monitoring
- Sensitivity to climate variability





Next Steps

- Spreading the Word
- On-the-Ground Efforts
- December Walk

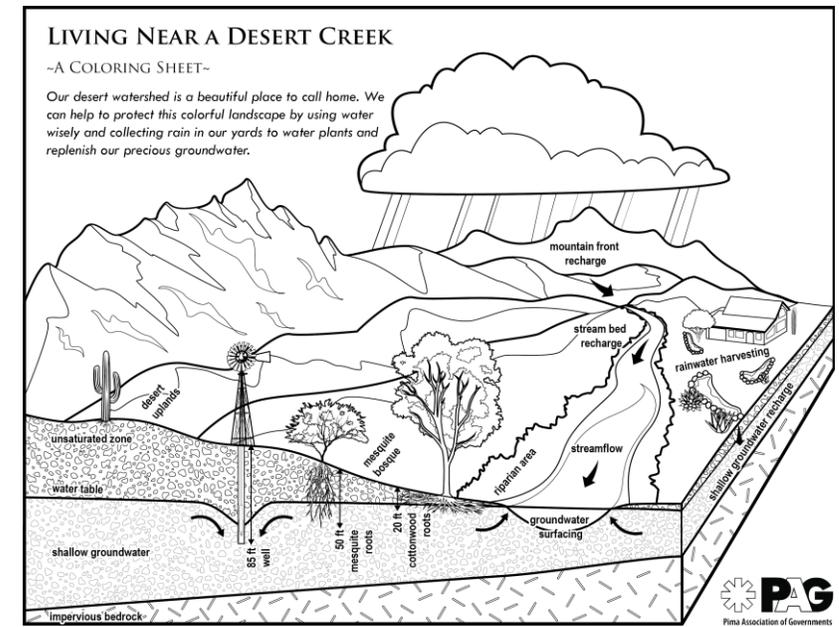
>> Spreading the Word

• Materials

- Maps
- Reports
- Coloring Sheets

• Partners

- Pima County
- Vail Preservation Society
- Vail School District
- Bureau of Land Management
- Watershed Management Group
- Cienega Watershed Partnership



Riparian Health Assessment, 2019

Perennial flows increase in Cienega Creek, but are absent from Davidson Canyon

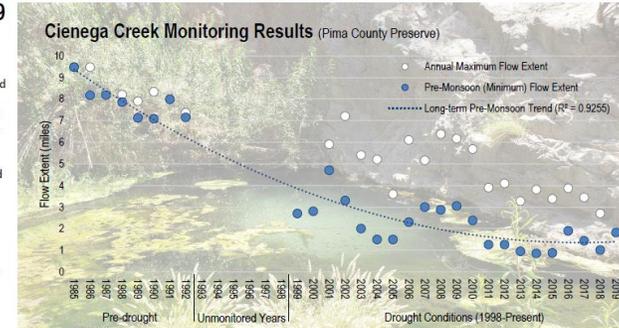
Cienega Creek is one of the few remaining perennial lowland streams in our region. Cienega Creek and Davidson Canyon are stunning examples of what many of our riverbeds could look like if similar preservation efforts are employed. These shallow groundwater-dependent systems and Outstanding Arizona Waters are key water sources to support habitat and rural residents alike. However, declining flows observed over the past two decades provide a reminder of the ecosystem's vulnerability to declining water tables.

PAG has monitored riparian conditions in Pima County's Cienega Creek Natural Preserve (CCNP) since 1989. The CCNP is in the lower part of the Cienega Creek Watershed. On a quarterly basis, PAG maps baseflow in the reaches of Cienega Creek and Davidson Canyon that fall within the CCNP. The charts display the time of year that is usually driest (May/June) to reflect the minimal perennial (year-round) extent of surface water. The annual maximum flow extents reflect the larger aquatic habitat supported by baseflows during wetter seasons.

In 2019, PAG observed an increase in Cienega Creek's perennial flow extent, with June flows along 19 percent of the 9.5-mile monitoring extent. This was the third greatest June flow for Cienega in the past ten years. As shown on the linear comparison chart on page 2, the flowing stretch near the Marsh Station Road crossing was longer and less segmented than in recent years. In addition, the upper stretch of the creek saw greater total flows than have been observed in nearly a decade. Davidson Canyon, however, was dry in June 2019, closing out a monitoring year with below average seasonal flows. This follows three years of sustained year-round flows.

Areawide Water Quality Management Plan Update
PAG is in the process of updating its Areawide Water Quality Management Plan, known as the 208 Plan. The 208 Plan directs implementation of water quality management activities within PAG's Designated Planning Area in Pima County by setting policies, procedures and goals to address both point- and non-point sources of pollution.

Cienega Creek and Davidson Canyon are among the priority waterbodies identified in PAG's 208 Plan for water quality and quantity monitoring, management and restoration. To

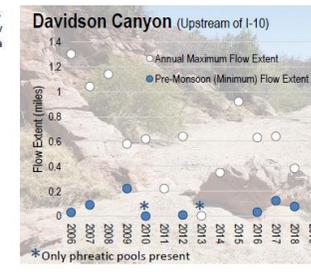


208 Plan strongly discourages the discharge of pollutants to these waterbodies. In addition, the draft 208 Plan now includes links to data sources for water quality in Cienega Creek and Davidson Canyon, along with descriptions of management strategies for both waterways.

Watershed Map Update
In Fiscal Year 2017-18, PAG received a 604(b) grant from ADEQ to draft a regional green infrastructure plan with the specific goal of addressing *E. coli* impairment in a stretch of the Santa Cruz River in Tucson. Along with the draft plan, the grant funded an update to PAG's Watershed Map of Eastern Pima County.

The watershed map features the Cienega Creek Natural Preserve as a watchable riparian wildlife destination and highlights perennial stretches of Cienega Creek and Davidson Canyon. A preview of the watershed map is shown on page 3. To download the full map, visit: bit.ly/PAGWatershedMap

Shallow Groundwater Educational Resources
As reflected in the PAG's 208 Plan, 2012 Shallow Groundwater Report and 2017 Resolution Supporting our Heritage of Desert Waters, PAG encourages the ongoing protection of our region's shallow groundwater areas. To

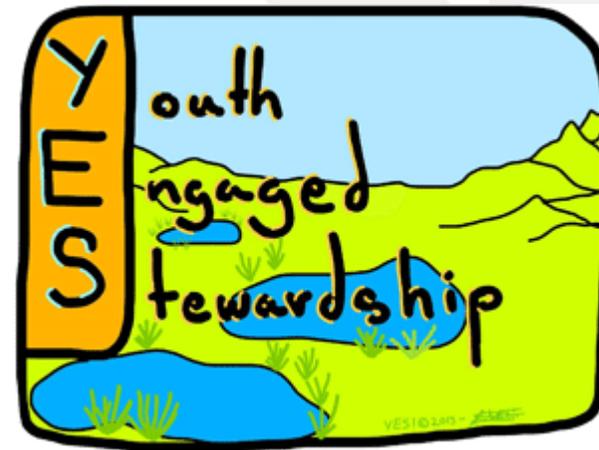


encourage the public to live mindfully in these areas, PAG has created a coloring sheet to illustrate how shallow groundwater systems are impacted by pumping and recharge. The coloring sheet is available to view and print on page 4.



»» On-the-Ground Efforts

- Cienega Watershed Partnership
 - PAG works with CWP through...
 - ✓ Data-sharing
 - ✓ Coordinated monitoring
 - ✓ Watershed Health Indicators Report
 - ✓ Advising landowner engagement efforts
- Youth Engaged Stewardship, YES!
 - Stewardship and leadership training
 - Expanding to Pima County



»» December Walk

- All are welcome!
- Join our email list



Thank you!

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