

# Riparian Health Assessment Summary

## Monitoring Year 2018-19: 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 wildlife 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.

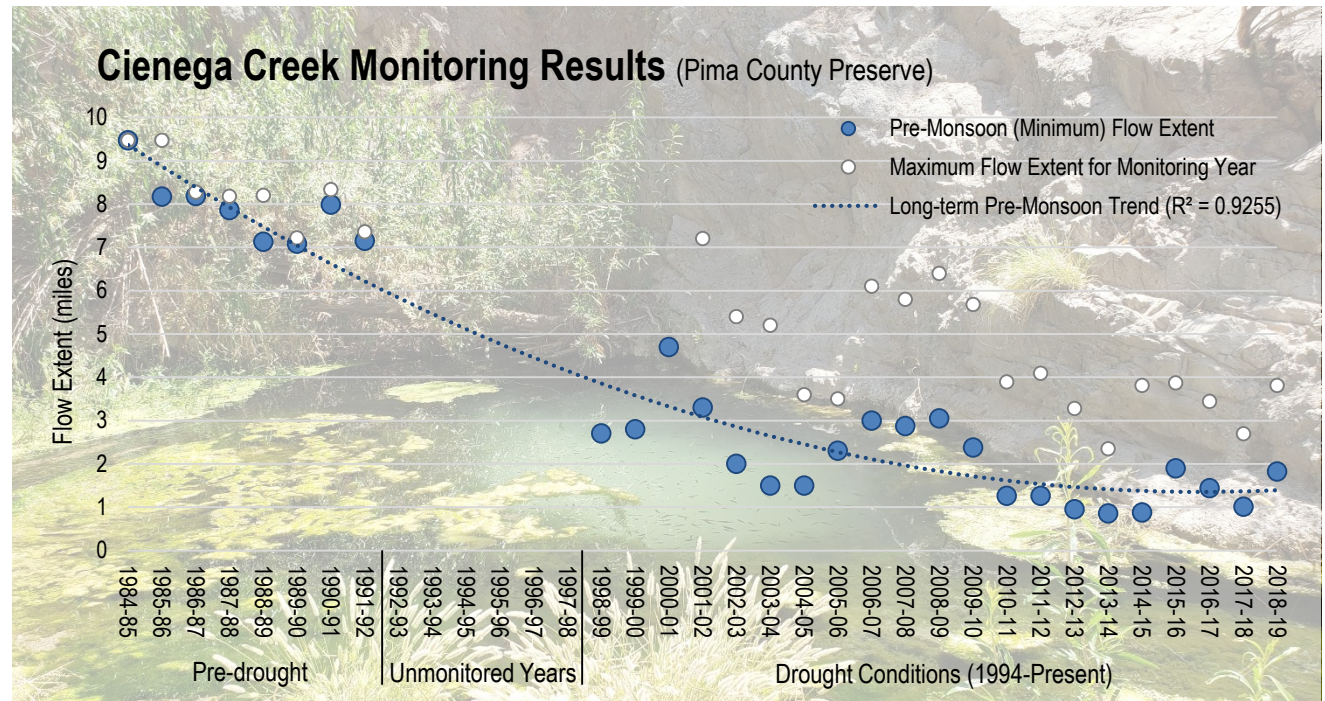
PAG has monitored riparian conditions in Pima County's Cienega Creek Natural Preserve (CCNP) since 1989. The CCNP is in the lower part of the Cienega Creek Watershed. On a quarterly basis, PAG maps baseflow in the reaches of Cienega Creek and Davidson Canyon that fall within the CCNP. The charts display 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 Monitoring Year (MY) 2018-19 (July 2018 – June 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 Creek 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 an MY 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 18 priority waterbodies identified in PAG's 208 Plan for water quality and quantity monitoring, management and



restoration. The 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. The approved 208 Plan will be posted at [bit.ly/PAG208](http://bit.ly/PAG208).

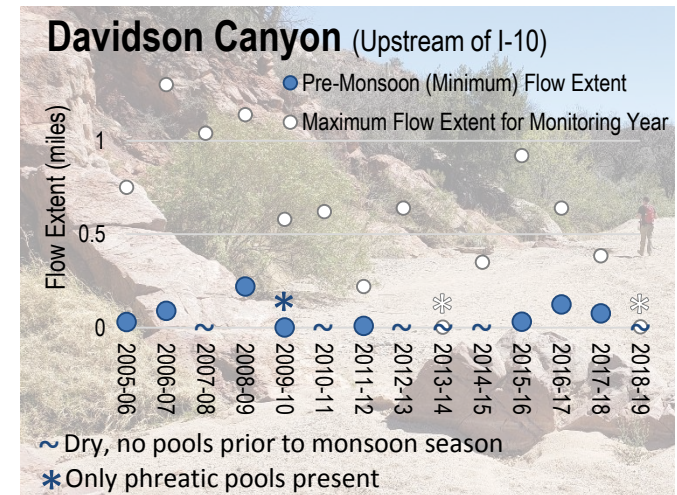
### Watershed Map Update

During MY 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 CCNP 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](http://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 print on page 4. Additional resources are available at [bit.ly/PAGWaterResources](http://bit.ly/PAGWaterResources).

# Cienega Creek Preserve

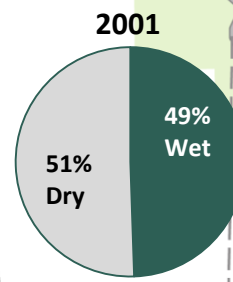
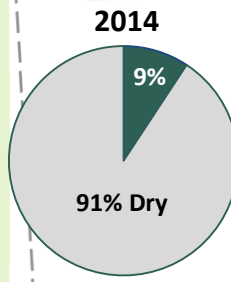
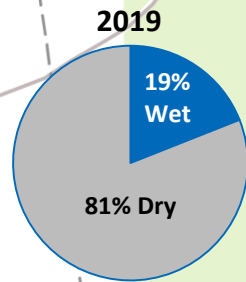
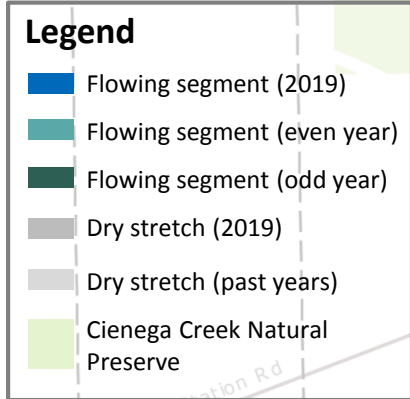
## Pre-Monsoon Flow Extent 2000 to 2019

The chart below displays changes in June pre-monsoon baseflows for Cienega Creek within the CCNP since 2000. Baseflows are groundwater-based creek flows, without the influence of recent stormwater runoff. 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 bedrock 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 2019 are shown on the map. The map displays eight of the 9.5 miles of Cienega Creek that are monitored on a quarterly basis. Perennial flow has not been observed in the upper 1.5-mile stretch in recent years. The stacked bars in the chart 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. The pie charts were generated based on June flow extents in the full 9.5-mile monitoring area, which includes a small portion of lower Davidson Canyon (not included in the linear chart).

PAG has consistently monitored flow extents within the Cienega Creek Preserve since 1989, as is necessary to provide reliable trend analysis. Results are reported to ADWR for compilation into state records.

PAG's annual riparian health assessment reports and resources are available at [bit.ly/PAGCienega](http://bit.ly/PAGCienega).







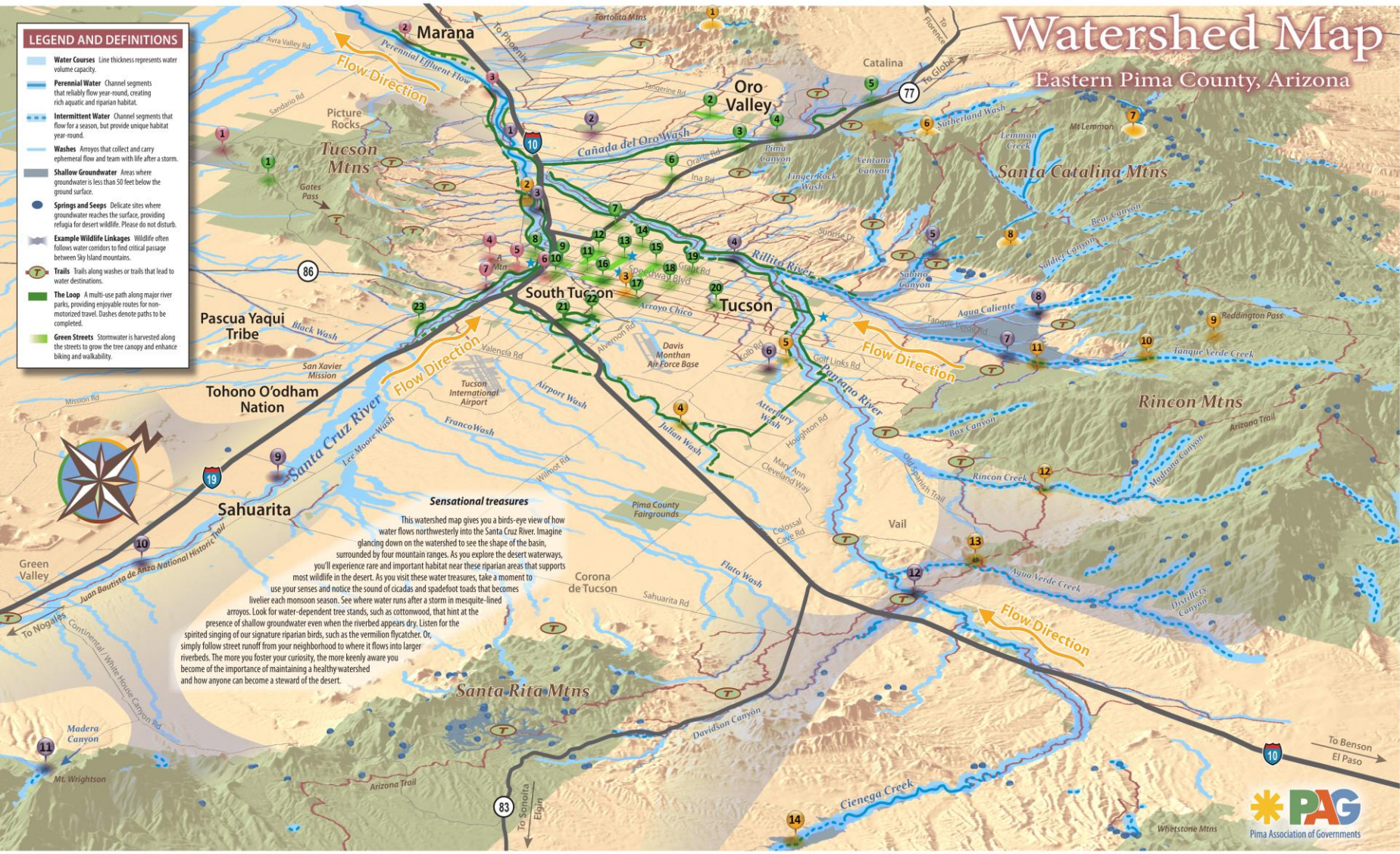
Green streets help manage stormwater Cienega Creek with perennial flow. Limited visitation permitted Cottonwood trees rely on shallow groundwater Vermilion Flycatchers thrive in riparian corridors Storm clouds rolling over the Tucson Basin at sunset during monsoon season Biking along river parks Coati dwell in woodlands along streams Riparian areas support watchable wildlife Agua Caliente Springs

# LEGEND AND DEFINITIONS

- Water Courses** Line thickness represents water volume capacity.
- Perennial Water** Channel segments that reliably flow year-round, creating rich aquatic and riparian habitat.
- Intermittent Water** Channel segments that flow for a season, but provide unique habitat year-round.
- Washes** Arroyos that collect and carry ephemeral flow and team with life after a storm.
- Shallow Groundwater** Areas where groundwater is less than 50 feet below the ground surface.
- Springs and Seeps** Delicate sites where groundwater reaches the surface, providing refugia for desert wildlife. Please do not disturb.
- Example Wildlife Linkages** Wildlife often follows water corridors to find critical passage between Sky Island mountains.
- Trails** Trails along washes or trails that lead to water destinations.
- The Loop** A multi-use path along major river parks, providing enjoyable routes for non-motorized travel. Dashes denote paths to be completed.
- Green Streets** Stormwater is harvested along the streets to grow the tree canopy and enhance biking and walkability.

# Watershed Map

## Eastern Pima County, Arizona



**Sensational treasures**

This watershed map gives you a bird's-eye view of how water flows northwesterly into the Santa Cruz River. Imagine glancing down on the watershed to see the shape of the basin, surrounded by four mountain ranges. As you explore the desert waterways, you'll experience rare and important habitat near these riparian areas that supports most wildlife in the desert. As you visit these water treasures, take a moment to use your senses and notice the sound of cicadas and spadefoot toads that becomes livelier each monsoon season. See where water runs after a storm in mesquite-lined arroyos. Look for water-dependent tree stands, such as cottonwood, that hint at the presence of shallow groundwater even when the riverbed appears dry. Listen for the spirited singing of our signature riparian birds, such as the vermilion flycatcher. Or, simply follow street runoff from your neighborhood to where it flows into larger riverbeds. The more you foster your curiosity, the more keenly aware you become of the importance of maintaining a healthy watershed and how anyone can become a steward of the desert.

# Sustaining our watershed heritage

Our region has the longest history in North America of continuous cultivation of the land. This is possible due to our heritage of precious desert waters that also support renowned wildlife diversity.

As our communities grew, however, groundwater pumping and drought lowered the level of our groundwater table that had sustained creeks and sensitive riparian areas. Urban development also influenced the watershed by causing more runoff, erosion and heat. Stormwater runoff can carry pollutants from urban areas to desert washes, where contaminants accumulate in important wildlife habitat. Fortunately, the story doesn't end there.

Regional restoration and conservation efforts have made a positive impact on the watershed, placing our communities on the map as leaders in sustainability. Year-round flows, habitat and fish have returned to the Santa Cruz River in new areas through beneficial use of treated effluent. Streets designed with green infrastructure help to mimic natural washes by capturing stormwater to sustain vegetation. This process breaks down pollutants in soils, saves water, improves infiltration, provides cool tree shade, calms traffic and makes neighborhoods more vibrant. Visit restoration demonstration sites and our desert waterways to discover their sustaining role in our communities.

# Santa Cruz River - then and now



1954, Arizona Daily Star



Flows restored with high quality effluent



Flowing rivers attract ecotourists and birders

- Watchable Riparian Wildlife**
- 1 Santa Cruz bat and bird viewing area  
Ina Rd. Bridge, East of Silverbell, Perennial flow  
3835 W. Hardy Rd.
  - 2 Tucson Audubon Society Mason Center  
3835 W. Hardy Rd.
  - 3 Sweetwater Wetlands  
2551 W. Sweetwater Dr.
  - 4 Swan Wetlands  
North end of Columbus Blvd. at Rillito River
  - 5 Sabino Canyon Recreation Area  
5700 N. Sabino Canyon Rd., Perennial flow
  - 6 Attabury-Lyman Bird and Animal Sanctuary  
8280 E. Escalante Rd.

- 7 Tanque Verde Creek  
North of Speedway on Wentworth
- 8 Agua Caliente Park  
Roger Rd. / Soldier Trail
- 9 Sahuarita Water Reclamation Facility  
2201 S. Old Nogales Hwy., N. of Qal Crossing Blvd.
- 10 Green Valley Wastewater Treatment Facility  
2201 S. Old Nogales Hwy., N. of Qal Crossing Blvd.
- 11 Madera Canyon, Madera Canyon Rd.
- 12 Cienega Creek Natural Preserve  
Gabe Zimmerman Trailhead  
Permit required, Perennial flow

- Green Infrastructure Demonstrations**
- 1 Arizona-Sonora Desert Museum  
Naranja Rd., right-of-way harvesting  
North side of Naranja Rd. between  
La Cholla Blvd & La Cañada Rd.
  - 2 Villa Balboa subdivision  
Linda Vista Blvd. & Valle Del Oro Rd.
  - 3 Wildlife Crossing  
Oracle Road Overpass,  
RTA project
  - 4 Wildlife Crossing  
Big Wash Underpass,  
RTA project
  - 5 Tohono Chul Park

- 7 Super Target, 4400 N. Oracle Rd.  
Tucson Commercial Rainwater  
Harvesting Ordinance site
- 8 Manzo Elementary
- 9 Dunbar-Spring GREEN STREETS  
University Blvd. / 9th Ave.
- 10 Scott Avenue GREEN STREETS  
Broadway to 14th St. LID Case Study  
and Return on Investment Study site.
- 11 UA Visitor Center  
N.W. corner University Blvd. & Euclid Ave.

- 12 4th Ave. & Elm St. GREEN STREETS
- 13 Vine Ave. GREEN STREETS  
Between Grant Rd. & Speedway Blvd.
- 14 The Nature Conservancy of Arizona  
1510 E. Fort Lowell Rd.
- 15 Treat Ave. GREEN STREETS  
Grant Rd. to Speedway Blvd.
- 16 Rincon Heights GREEN STREETS  
9th & 10th Streets Tucson Blvd.
- 17 Reid Park Zoo
- 18 Watershed Management Group

- 19 Tucson Botanical Gardens
- 20 Highland Vista Park  
Water harvesting basins
- 21 Kino Environmental Restoration Project  
Kino Sports Complex, 2500 E. Ago Way
- 22 Nuestra Tierra Learning Garden  
Community Food Bank
- 23 Midvale Park Neighborhood Water  
Harvesting Area: Vestel Dr. near the  
Santa Cruz River
- ★ Tucson Ward Offices 1, 2, 3 & 6

- Waterways**
- 1 Wild Burro Trail  
North End of Dove Mountain Blvd.
  - 2 Silverbell Lake  
Christopher Columbus Park  
4600 N. Silverbell Rd.
  - 3 Arroyo Chico Wash Greenway  
3100 - 3400 E. Arroyo Chico
  - 4 Julian Wash Greenway  
South of Valencia Rd. on Kolb Rd.
  - 5 Atterbury Wash, Lakeside Park  
Golf Links Rd. / Sarnoff Drive  
Conserve/Enhance site

- 6 Romero Pools at Catalina State Park  
Southwest of Montrose Pools
- 7 Marshall Gulch Trailhead  
End of Mt. Lemmon Hwy.
- 8 Seven Falls on Bear Canyon Trail  
Sabino Canyon Recreation Area or  
Bear Canyon Rd. Trail, N. of Snyder Rd.
- 9 Chiva Falls  
Off Redington Rd.
- 10 Tanque Verde Falls  
S. of Redington Rd., Perennial flow

- 11 Douglas Spring-Bridle Wreath Falls  
End of E. Speedway Blvd., Overpass  
permit required in Saguaro National Park
- 12 Rincon Creek  
Arizona Trail passage #8 via  
Hope Camp Trail
- 13 Posta Quemada Wash Trail,  
Colossal Cave Mountain Park
- 14 Las Cienegas National  
Conservation Area  
Hwy 83 & Empire Ranch Rd.

- Natural & Cultural Water Heritage**
- 1 Serpentine Walls on Desert Discovery  
Trail, Saguaro National Park West,  
1930's CCC check dams, near Sas  
Picnic Area
  - 2 Marana Heritage River Park  
12375 N. Heritage Park Drive
  - 3 De Anza National Historic Trail  
Spanish expedition followed the river  
in 1775. Trailhead at El Rio Preserve.
  - 4 Tumacacori Hill Desert Laboratory  
Historic cistern renovation and prehistoric  
water-harvesting trincheras
  - 5 El Ojito Historic Spring  
by La Paila Museum  
420 S. Main St.
  - 6 Mission Garden  
Restoration of 18th century garden  
4,000-year-old flood plain agriculture
  - 7 Paseo de las Iglesias  
Ajo Way to Silverlake Road  
Bank protection, ecosystem in  
river park. Prehistoric pit house  
1800s Silver Lake. Dam support  
mill, swimming, bath houses,  
fishing.

Fishing at Sahuarita Lake



Sonoran Mud Turtle, a native stream-dweller



Looking southwest at the Tucson region's Santa Cruz River Basin



Scott Ave. provides resilient tree shade



Lowland Leopard Frogs, a protected species



Keep our waterways clean. Always scoop poop along The Loop!



Tanque Verde Falls



El Rio Preserve in Marana



Gila Topminnow, an endangered resident of perennial waterways





# LIVING NEAR A DESERT CREEK

## ~A COLORING SHEET~

Our desert watershed is a beautiful place to call home. We can help to protect this colorful landscape by using water wisely and collecting rain in our yards to water plants and replenish our precious groundwater.

