Pima Association of Governments
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MEMORANDUM

TO: Julia Fonseca and /or David Scalero,
Pima County Regional Flood Control District

FROM: Mead Mier

SUBJECT: Fiscal Year 2006-2007 Cienega Creek Natural Preserve Surface Water and Groundwater Monitoring Results

DATE: Nov 9, 2007

Background and Updates

Pima Association of Governments (PAG) has monitored the hydrology of the Cienega Creek Natural Preserve since 1989. PAG staff continued to monitor surface water and groundwater at the Preserve during the 2006-2007 Fiscal Year; July 2006 to June 2007. Stream discharge and groundwater monitoring methods and locations remained the same as in past years, with a few exceptions explained in this memo. Please refer to previous year-end reports and the 1998 comprehensive report for background and methodology information on discharge and groundwater level monitoring. Documentation of methods, forms and metadata was created during our staff transition of during FY06-07.

This memo describes work completed under PAG's 2006-2007 Overall Work Program, which includes monitoring in Cienega Creek and other areas with priority aquatic and riparian resources. The locations of the monitoring sites are shown on Figure 1. Data tables and figures showing results from the 2006-2007 monitoring year are attached. Some of the figures and tables also include data from previous fiscal years for comparison purposes. Possible indications are included at the end of this report and are referred to with asterisks throughout the report. New efforts this year included water quality measurements, repeat photography site establishment, and development of monitoring plans for a headcut study.

Streamflow

Methods

PAG took monthly streamflow measurements at the Tilted Beds site and the Marsh Station site. A USGS Pygmy Flow Meter was used for all streamflow measurements taken this fiscal year, except for August 2006 when frequent rains prohibited field work for base flow measurement. All stream discharge measurements reflect base flow conditions; measurements were not taken during or immediately after heavy rain storms. When heavy rainfall did occur at the Preserve or in the surrounding area, staff allowed

at least three consecutive days of dry weather to occur before measuring streamflow.

Streamflow data are shown on Table 1, and on Figures 2 and 3. Figure 2 shows the streamflow trends for this monitoring year and for FY05-06. Figure 3 shows discharge data from 1993 to the present.

Marsh Station
Stream discharge at the Marsh Station site ranged from less than 0.18 cfs (July 2006) to 2.82 cfs (September 2006). These were the same high and low months as in the previous year. The annual average base discharge at Marsh Station was 1.05 cfs, which is higher than the previous year's average of 0.71 cfs (Table 1). FY05-06 flows were also higher than the year prior to that. In general, the rise-and-fall patterns of streamflow during the last two years returned to a more peaked seasonal pattern than the two years prior which were less peaked than in years past*.

Tilted Beds
The Tilted Beds site was dry (zero cfs) during every monthly visit in this monitoring year, except for a trickle flow too small to measure in September 2006. This was the third consecutive year that no base flow was observed at this site for the entire monitoring year.

Groundwater Levels

Methods
Depths to groundwater were measured on a monthly basis at seven wells: Empirita 2, O'Leary Windmill, Jungle, Cienega, Del Lago 1, PS-1 and PN-2. The Davidson 2 well is a well that was monitored during the years of 1981-1994. For FY06-07, monitoring was re-launched in January 2006 and was visited a quarterly monitoring schedule. PS-1 and PN-2 wells are now monitored hourly by transducers and available on-line with ADWR (http://www.azwater.gov/web_trans/transdll.dll/EXEC/0/0ctp45l054j31y140tm3f0t5inyh) under the names D-16-16 14CAC and D-16-16 15ABD, respectively. The O'Leary well had a pump installed in June 2007, which may influence subsequent water levels.

Annual Change
Water level data for the seven monitoring wells are included on Table 2. Figure 4 shows water level data for this monitoring year and the previous year, while Figure 5 shows water level data from 1994 to the present. As seen on Table 2, all wells rose in water depth in FY06-07 with an average groundwater level 7.5 feet more than the average in FY05-06. In FY05-06, the water levels declined, but within one foot of the average in FY04-05. PN-2 remained the fastest declining well this year with its general depth to water lower than all other wells*.

Seasonal Change
Seasonal variations in water levels were observed at most monitoring wells during this monitoring year. Water levels at Davidson 2 continued to behave similarly to water levels in wells along Cienega Creek, gradually declining through the winter and spring months of 2007. September and August remained the major months revealing recharge at all wells, with another smaller increase in January or February at most wells. The two wells downstream of the dam, PS-1 and PN-2, had the largest seasonal response. The

water levels at the Del Lago well have returned to a generally quick response to recharge events, after remaining fairly stable throughout FY04-06. The Jungle, Empirita 2, and O'Leary wells experience the most gradual seasonal changes.

Extent of Surface Flow

Methods

The extents of surface flow were monitored by mapping the flows of Cienega Creek in the Preserve during walk-throughs. Annual walk-throughs were conducted during the month of June from 1999 to 2001; the current quarterly walk-through monitoring program began during the 2001-2002 monitoring year. The Cienega Creek walk-throughs begin at Jungle Rd. and continue to the Pantano diversion dam (a distance of about 8 miles), and along Davidson Canyon near its confluence with Cienega Creek. In addition, since 2005, PAG has mapped streamflow in Upper Davidson Canyon, which is south of Interstate 10 on the county's recently acquired Bar V property. The walk-throughs were conducted on a quarterly basis during the months of September, December, March, and June. The walk-through effort is completed by walking the length of the creek and marking on an aerial photograph the locations of beginning and end of flow for each flowing stream reach. The results were then digitized into a GIS by clipping the Cienega streamflow line to fit the flow start and end points. GPSed flow lines were available through Don Carter, at Pima County Natural Resources, Parks & Recreation, for verification.

Outreach and Coordination

We continued to coordinate with the Bureau of Land Management (BLM) and The Nature Conservancy (TNC) on methods of surface flow mapping to ensure that their hydrologic monitoring programs are consistent with the PAG/Pima County monitoring program. The BLM and TNC manage and monitor the upper reaches of Cienega Creek within the Las Cienegas National Conservation Area. We are also in correspondence with the BLM and about vegetation and habitat survey methods for the headcut study.

Outside agency staff and other interested individuals were invited to accompany PAG staff on quarterly walk-throughs to provide an opportunity for them to learn about Cienega Creek and Davidson Canyon and to become more familiar with some of the management issues that face the Preserve and the surrounding region. The invited agencies include Pima County Regional Flood Control District, Pima County Natural Resources, Arizona Game and Fish Department, Arizona Department of Environmental Quality, U.S. Fish and Wildlife Service, The Nature Conservancy, Sonoran Institute, University of Arizona, Cienega Corridor Conservation Council and the Master Watershed Stewards program.

This year, 2006-2007, Cienega wet/dry walks continued to be a good avenue for outreach for the Preserve and were attended by 5-9 people each time. This included six different agencies and several members of the public for a total of 16 different people with whom we coordinated this year. The agencies that attended include Pima County Parks and Rec., Pima County Regional Flood Control District, the Sonoran Institute, the Rincon Institute, and the Tucson Herpetological Society. Walkers were interested in our work and in areas related to their profession such as GIS/remote sensing, wildlife biology, hydrology, entomology, conservation, and public outreach. Several members of the public were invited through PAG networks, the Cienega Corridor Conservation Council, or Pima County contacts. A few guests participated because they live in the area and were interested in their local watershed. PAG was also able

to expand the program within our own organization by inviting our graphic designer for photography and involvement in PAG publications as well as fellow Watershed Planning staff.

Cienega Flow Length
Annual and Perennial Change
As seen on Table 3, the total length of streamflow within the Preserve during this monitoring year ranged from 3.0 miles (June 2007) to 6.1 miles (September 2006). This is more variation than last FY which only differed seasonally from 2.3 miles to 3.5 miles and flowed for a smaller distance overall. Figure 8 shows the lengths of flow in Cienega Creek since 1984. This figure illustrates the increased seasonal variation recorded since 2001 as well as overall decreased length over time. The average flowing length annually since 2001 is 3.9 miles, whereas from 1989 to 1999, it was 7.7 miles.

The summer months (May, June, and July) represent the driest time of the year in the Preserve. As seen in Figure 7, the total length of flow in the Preserve is consistently lowest in the summer (June). The largest change (decline) in streamflow extent generally occurs between the months of March and June, which coincides with the time period when evapo-transpiration rates increase and recharge rates decrease. Mapping streamflow during this time of the year conservatively identifies the perennial reaches in the Preserve. Drier years and seasons generally have intermittent segments and shorter stream reaches around the perennial segments, as seen in Figure 6.

Table 4 presents lengths of flows during summer months from 1984 to 2006; data were not collected from 1993 through 1998. Summer flow extents have declined substantially since the 1980s*. In July 1984, the creek flowed continuously from I-10 to the Pantano Dam; a distance of 9.5 miles. In contrast, in June 2007, the creek flowed for 3.0 miles and was segmented into several short flowing reaches, separated by dry reaches. Flow in June was longer this year than in recent years (0.4 miles more than the average since 1999) probably due to rains received in mid May 2007. Refer to the FY04-05 year-end memorandum (dated July 22, 2005) for a description of the historic data collected by Errol L. Montgomery & Associates.

Upper Davidson Canyon
Upper Davidson Canyon, located south of Interstate 10 (as seen on Figure 1), is outside the Cienega Creek Natural Preserve and therefore, its flowing reaches are discussed separately from Cienega Creek and Lower Davidson Canyon in this memorandum. The lengths of flowing reaches in Upper Davidson Canyon are shown on Table 5 and in Figure 6. While streamflows along this reach were recorded during earlier PAG studies, this is only the second year that surface flows were systematically mapped. Streamflow is generally associated with a spring at a bedrock outcrop. PAG records indicate that native fish and frogs were observed in this reach in the past. However, the channel and pools completely dried out during the summer of 2005 and PAG has not seen native fish there since that time. Lowland leopard frogs are still present along the reach. This reach of the creek is currently under stress from off-road vehicle and cattle use, but the county has made efforts to exclude these activities from the riparian area and channel by installing new signage and fencing. Although Table 5 shows that flows had more length in every quarter this year than last, the extent of streamflow in Upper Davidson Canyon has declined substantially since 2003. During the past two monitoring years, the channel was dry at the location where PAG collected surface water samples on a quarterly basis in 2002 and 2003, a distance of about three-

quarters of a mile downstream from the current flow extent.

Repeat Photography

In September 2006, PAG established 17 photo stops in FY06-07 based on frequently photographed locations with a history of digital photographs and documented location. We photograph these sites quarterly during walk-throughs. Site locations are shown in Figure 1. Photos are stored digitally at PAG. New aspects of photography include the documentation of photographed locations by description and GPS, field notes on photos, and regularity of photo repetition.

Water Chemistry:

PAG resumed water quality monitoring in January 2007, partially due to ADEQ's inclusion of Davidson Canyon in their proposal for Outstanding Arizona Waters. This year's monitoring will serve as additional baseline data, should the creek become impacted by mining development. Limestone mines can affect pH because the rock is alkaline. If calcium and sulfate combine they will create gypsum that may show up in TDS readings. We use an Ultrameter to get quarterly measurements of TDS, temperature, conductivity, and pH at four sites. In addition to the data readings we are gathering, water quality was assessed in more detail in the past. The PAG report *Water Quality of Priority Streams in Pima County* (April 2002, Appendix C) includes data for Lower Cienega Creek from 1987-1990 from Fonseca et al 1990 and water quality data from ADEQ above and below Davidson Canyon from 1998, 2000, 2001. Past PAG studies also consisted of quarterly samples from 2002 to 2003 in the reported in the PAG publication *Unique Water Nomination for Davidson Canyon* (February 2005, Appendix B) and also presented in *Contribution of Davidson Canyon to Base Flows Cienega Creek* (November 2003). The 2002-2003 water quality monitoring looked at isotopes, chemistry mostly limited to major cations and anions, and constituents including aluminum, arsenic, sulfate, nitrate, TDS and pH. In 2005, metals were sampled in a single sample in 2005 (unpublished).

The FY06-07 monitoring sites are the same locations as were sampled as in the past and are displayed in Figure 1. All sites are measured quarterly during walk-throughs at Davidson Canyon. The site below the confluence on Cienega Creek is measured monthly during streamflow monitoring. Water quality measurements are only gathered during base flow with clear water.

- Davidson Site 1 is located south of I-10, upstream of the PC ALERT stream gage, at a perennial site.
- Davidson Site 2 is located within 1000 feet up Davidson Canyon from the Cienega confluence at an intermittent site.
- Davidson Site 3 is a replacement for Davidson Site 2 that is now dry. Davidson Site 3 is located at a waterfall just downstream of a fence crossing.
- Cienega Site 1 is upstream of the Davidson confluence on Cienega Creek, within a few hundred feet at a perennial site.
- Cienega Site 2 is at Marsh Station Bridge near the streamflow monitoring site where ADEQ had over 10 years of data. This is a perennial site.

Water quality data from FY06-07 is located in the reports for the studies listed above and new data is shown in Tables 6 through 9. PAG did not detect any major changes, but we have not conducted any major analysis on the new data. Davidson Canyon had lower conductivity and TDS than Cienega Creek this year, possibly contributing to lower conductivity at the Cienega site downstream of the Davidson confluence versus the site upstream (Figures 9 and 11). The pH is compared between the sites in Figure 10. As summer approached, temperature increased at all sites with Davidson Canyon experiencing the highest fluctuation between the seasons (Figure 12). When comparing this year's minimal data with historic data, conductivity increased slightly at all sites, but more dramatically at Cienega sites (Figure 13).

Headcut Study

The Arizona Water Protection Fund approved a PAG grant to begin a two year monitoring program on the headcutting erosion feature that is migrating upstream through the preserve. Some headcut observations are included in this memo, with the actual monitoring program to begin in October 2007. The formation and migration of headcuts were first identified during the quarterly streamflow mapping exercises in 1999. Between July 2005 and September 2005, the large headcut at the railroad horseshoe reach migrated approximately 400 feet upstream and expanded in width. This presumably occurred during the large flood flows in mid-August. In FY06-07, the headcut continued to migrate several hundred feet through the marshlands at the horseshoe and grew from a depth of five feet to at least 10 feet. This suggests that the creek is out of equilibrium and is going through a period of entrenchment. The impacts these headcuts are having on the resources of the Preserve are unknown. PAG will continue to observe these features to gain a better understanding of the situation. PAG will monitor groundwater levels through piezometers, measure headcut changes in more detail, and assess habitat through riffle/pool ratios. If you have any questions or comments about the monitoring data or monitoring plan, please feel free to contact Claire Zucker by phone at 792-1093 or by email at czucker@pagnet.org.

Wildlife Observations

Pools were present at various locations along Cienega Creek during each quarterly walk-through this year. Native fish and frogs were commonly seen in most flowing stream reaches and pools. Gila topminnows were present in the railroad horseshoe reach and the Davidson Confluence/Marsh Station reach; Gila chub and red spotted toads were present in pools in the railroad horseshoe reach. Dace were seen just downstream of Tilted Beds. Fish were also observed in the Lower Davidson reach.

Other wildlife, such as coati, javelina, hawks, herons, owls, deer, turkey vulture, king fisher, mallards, pocket gopher, whipsnakes, rattlesnakes, coyote, and mud turtles were also commonly seen along the creek. In March 2007, a mountain lion was seen at the Horseshoe and bobcat tracks were seen in September 2006. In July 2006, we followed bear tracks from the Davidson confluence up to the most perennial reach upstream. Walk-through participants observed some cottonwood spotting and dying off possibly due to disease or other stress.

Activities Observed

Human related activities reported during this fiscal year included cattle in the stream bed, downed fences, ATV track throughout, hikers, skeet, fire pits, bird surveyors from the University, Sky Island Alliance monitoring, an American Rivers stream clean-up, and tamarisk removal efforts. Activities are reported in monthly memos to Pima County.

*Possible Indications

The more peaked seasonal patterns in stream discharge seen at Cienega Creek may indicate a change in recharge events and/or snow pack in the surrounding mountains. The reason for PN-2 being the fastest declining well with its general depth to water lower than all other wells may be due to bedrock surface elevation. The gradual drying trend in Cienega flow lengths since 1984 seen in Table 4 is probably the result of the current drought.

cc: David Scalero
Amy Loughner

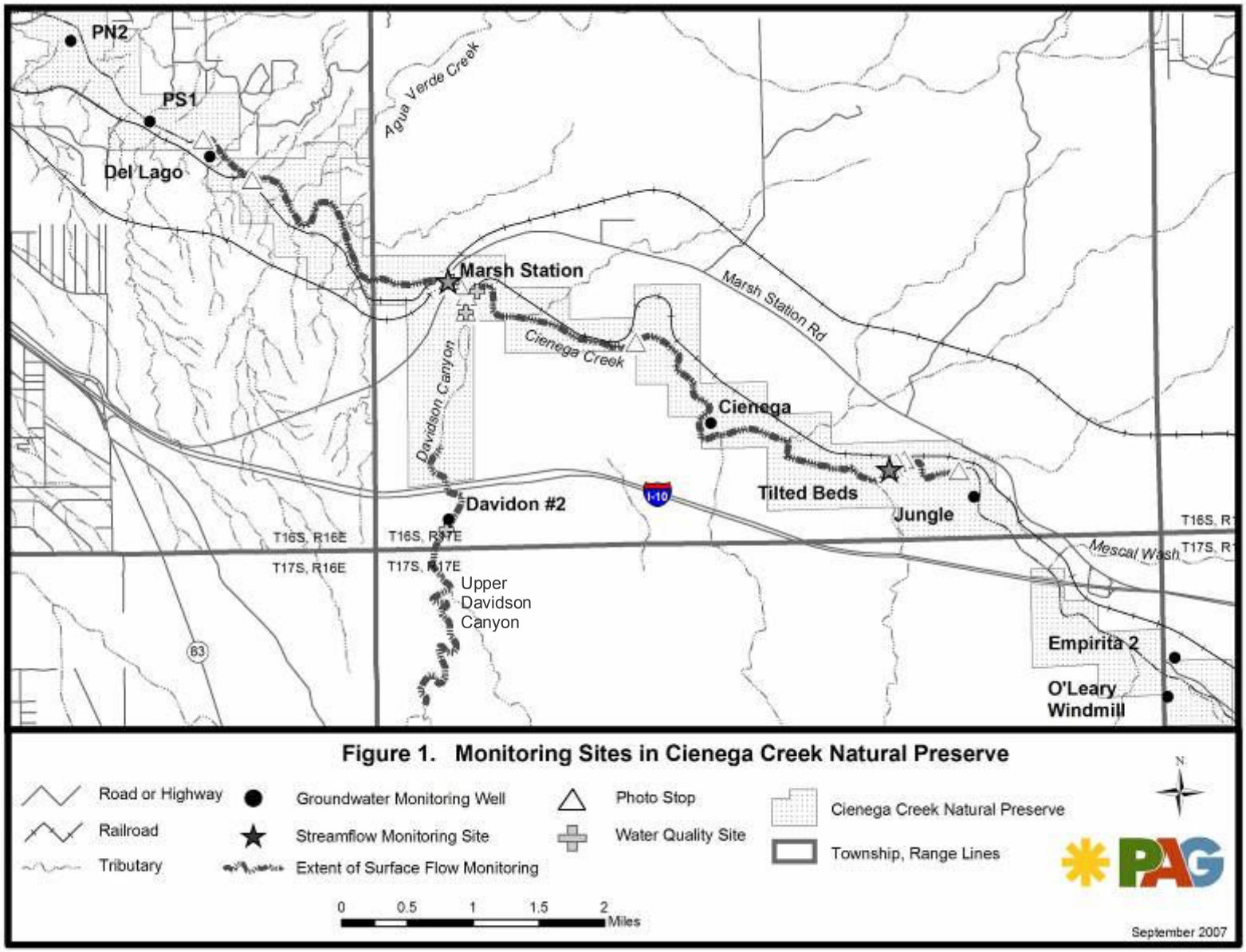


Figure 1. Monitoring Sites in Cienega Creek Natural Preserve

Table 1. Cienega Creek Discharge, July 2006 – June 2007

DATE	FLOW (cfs) Marsh Station	FLOW (cfs) Tilted Beds
July 2006	0.18	0
August 2006	NA [1]	0
Sept 2006	2.82	NA [2]
October 2006	1.38	0
November 2006	1.05	0
December 2006	0.940	0
January 2007	1.170	0
February 2007	1.120	0
March 2007	1.220	0
April 2007	1.020	0
May 2007	0.550	0
June 2007	0.250	0
2005-2006 AVERAGE	0.71	0
2006-2007 AVERAGE	1.06	0
CHANGE [3]	+ .35	0

PAG measured all flows with USGS Pygmy Flow Meter.
[1] Consistent rains prohibited base flow measurement.
[2] Trickle flow too small to measure with pygmy meter.
[3] Difference between 2006-2007 average and 2005-2006 average.
"+" = increase in discharge
"-" = decrease in discharge

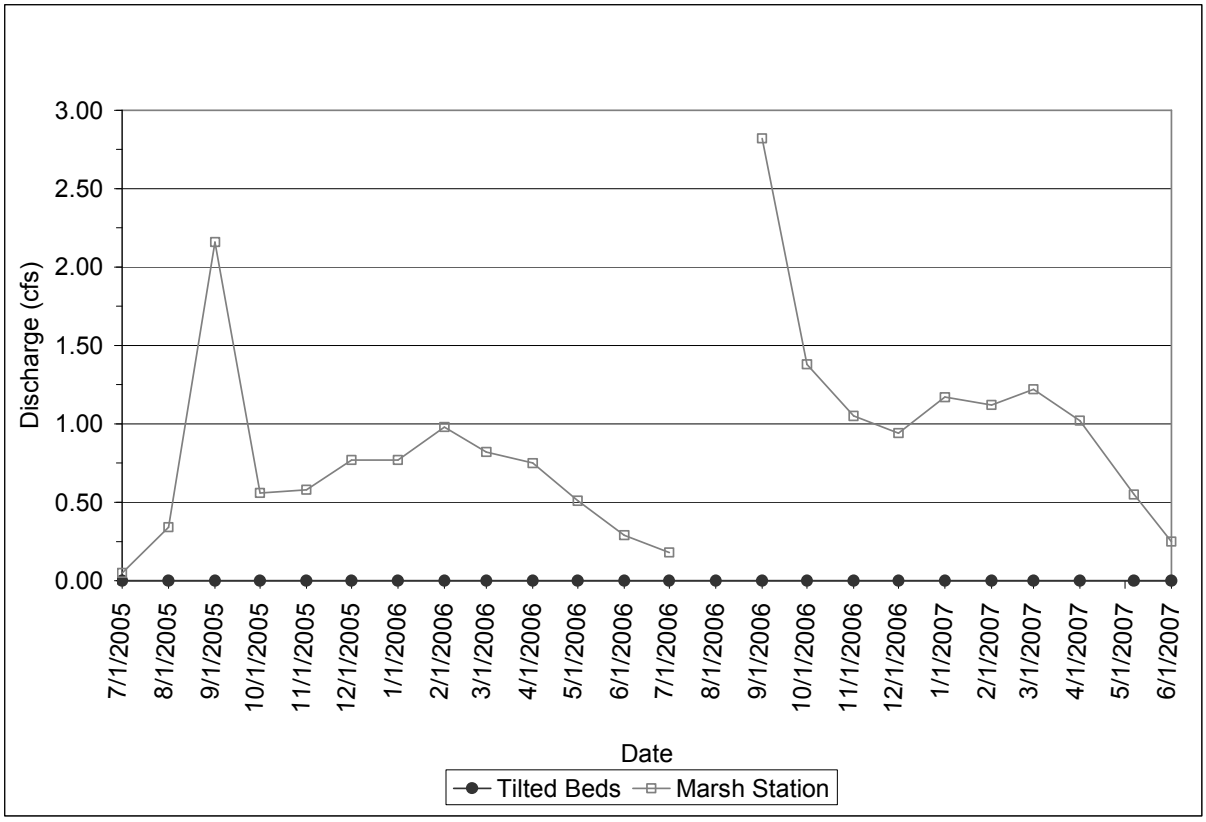


Figure 2. Cienega Creek Streamflow, July 2005 – June 2007. **No data available for August 2006.*

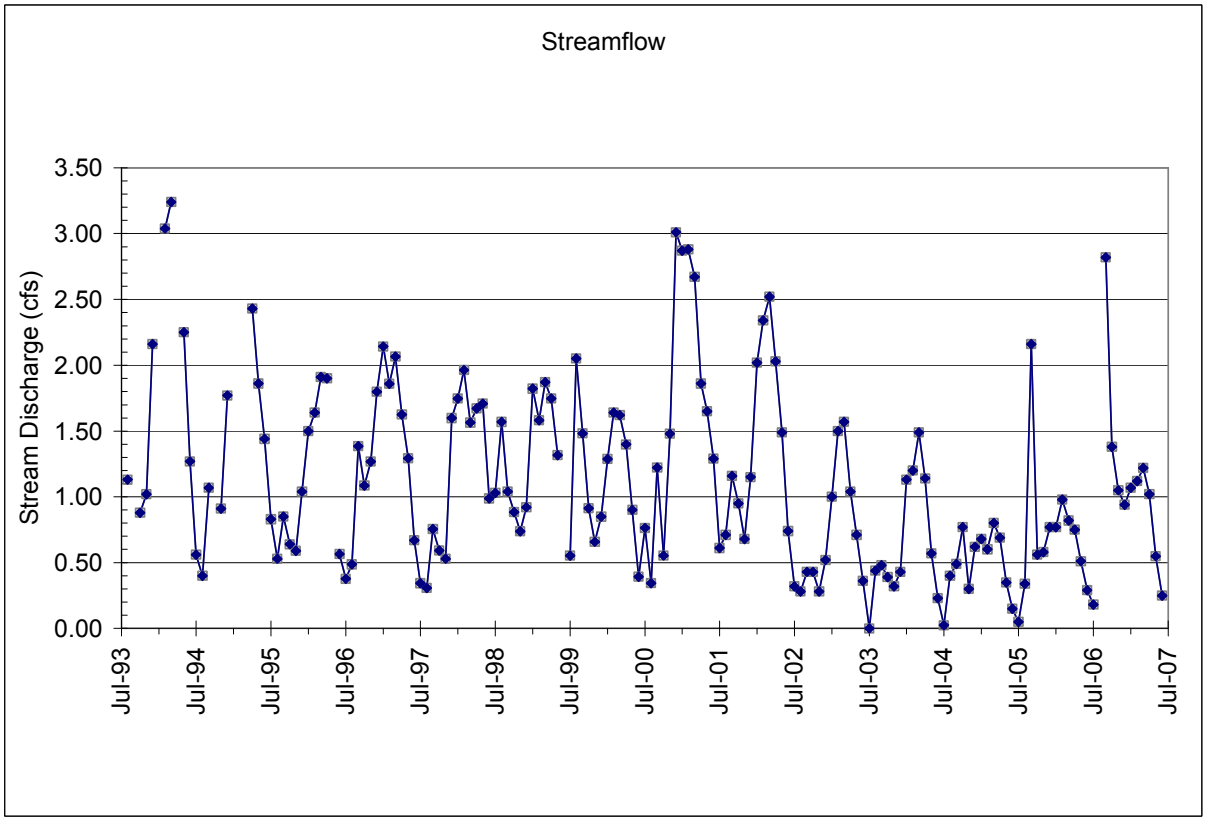


Figure 3. Cienega Creek Streamflow, July 1993 – July 2007.

Table 2. Depths to Water in Cienega Creek Natural Preserve Monitor Wells, July 2006 – June 2007

DATE	DEL LAGO 1 (feet)	CIENEGA (feet)	JUNGLE (feet)	EMPIRITA 2 (feet)	O'LEARY WINDMILL (feet)	DAVIDSON #2[1] (feet)	PS-1 (feet)	PN-2 (feet)
7/11/06	76.40	19.76	40.84	85.42	63.93		57.04	226.59
8/10/06	NA[2]	12.70	36.96	85.22	62.95		28.82	226.22
9/14/06	59.17	13.16	33.71	84.66	60.05	14.70	29.70[3]	183.12
10/13/06	67.55	16.20	34.67	84.20	58.75		43.57	168.88
11/17/06	68.71	17.10	34.37	83.85	58.90		48.45	173.52
12/5/06	66.25[3]	16.75	33.99	83.73	58.85	21.40	NA[2]	NA[2]
1/17/07	65.57	15.41	33.00	83.35	57.90		48.12	181.57
2/7/07	63.70	15.20	32.55	83.10	58.70		46.92	184.42
3/6/07	69.10	15.10	32.01	82.96	58.84	21.60	49.00[4]	188.10[4]
4/10/07	73.96	15.43	31.54	82.60	59.35		51.15	193.43
5/11/07	76.60	16.33	31.70	82.38	60.12		54.27	194.92
6/5/07	77.18	18.22	32.58	82.50	72.76	23.50	58.60	196.75
2005-2006 AVERAGE	75.63	18.29	39.64	84.82	63.19	22.87	56.87	222.34
2006-2007 AVERAGE	69.47	15.95	33.99	83.66	60.93	20.30	46.88	192.50
CHANGE [5]	6.16	2.34	5.65	1.16	2.26	2.57	9.99	29.84

Note: All depths are feet below land surface
[1] Measured quarterly.
[2] Inaccessible during this month of monitoring.
[3] Measured within one week of other well monitoring due to temporary inaccessibility.
[4] Monitored by ADWR from this point on.
[5] Difference between 2006-2007 average and 2005-2006 average.
"+" = rise in water level
"-" = drop in water level

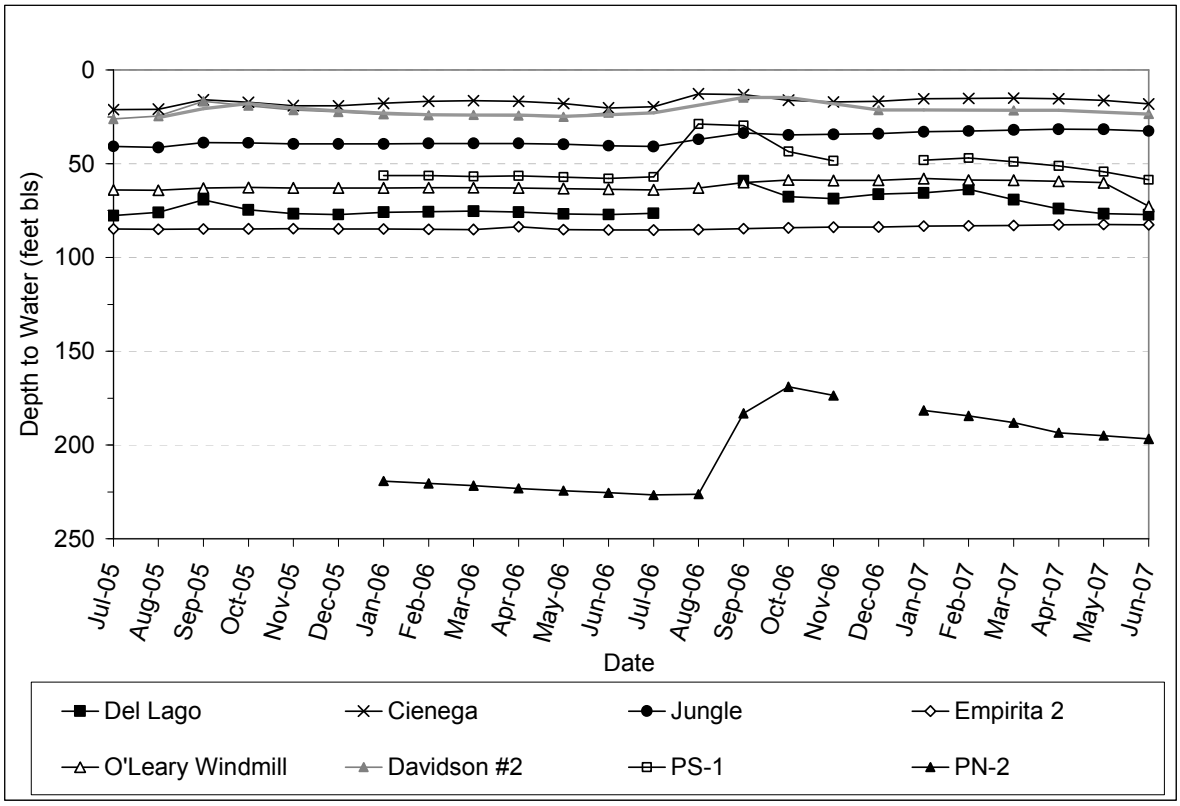


Figure 4. Depths to Groundwater in Cienega Creek Natural Preserve, July 2005 – June 2007. Data is not available for some months due to inaccessibility.

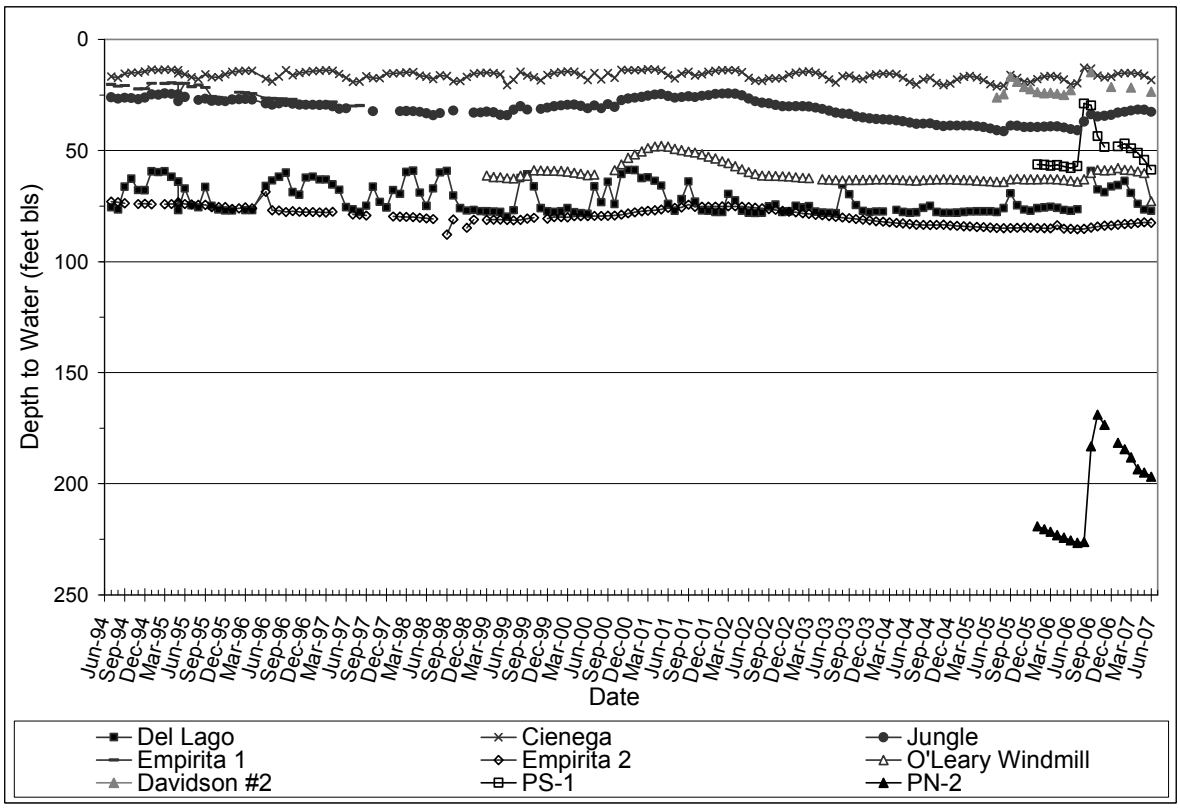


Figure 5. Depths to Groundwater in Cienega Creek Natural Preserve, June 1994 – June 2007.

Table 3. Lengths of Flowing Reaches in Cienega Creek Natural Preserve, Measured Quarterly, September 2006– June 2007

Flowing Reach	**Length of Flowing Reach (feet)**			
	September (9/22/06)	**December** (12/14/06)	**March** (3/9//07)	**June** (6/15/07)
Cienega Creek Reach A	6937	2929	3017	906
Cienega Creek Reach B	270	510	4251	1204
Cienega Creek Reach C	6789	6966	8218	374
Cienega Creek Reach D	3443	2075	4381	4294
Cienega Creek Reach E	6119	5187	5084	4635
Cienega Creek Reach F	5429	4447	375	1258
Cienega Creek Reach G	2008	586	422	3189
Cienega Creek Reach H		1391		
Lower Davidson Canyon Reach A	1146	466	175	0
Lower Davidson Canyon Reach B		394		
TOTAL	**32143 ft. (6.1 miles)**	**24951 ft. (4.7 miles)**	**25923 ft. (4.9 miles)**	**15860 ft. (3.0 miles)**

Reaches are not numbered in sequence; they are not associated with any one fixed portion on the creek. Lower total number of reaches generally indicates less interrupted flow.

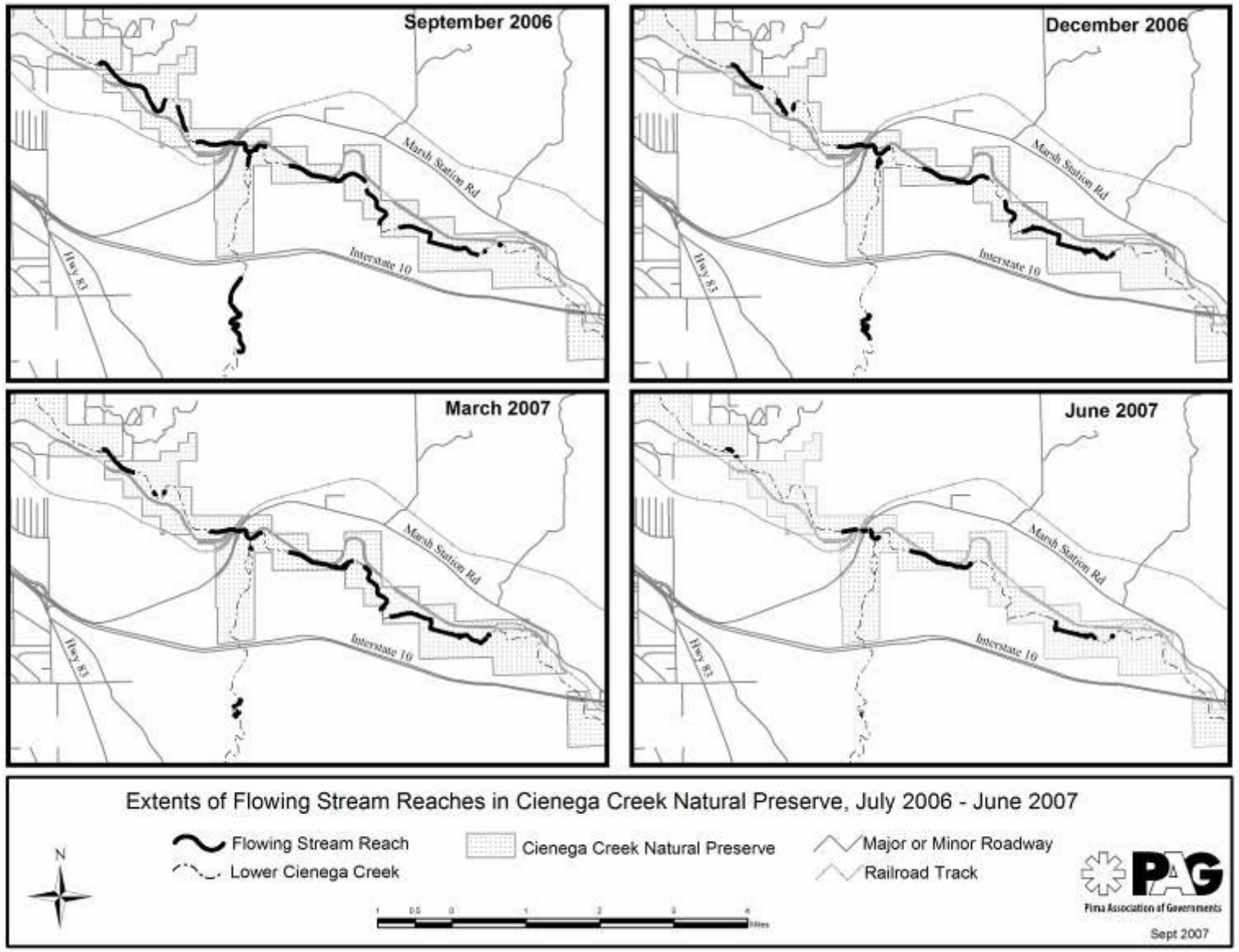


Figure 6. Extents of Flowing Stream Reaches in Cienega Creek Natural Preserve and Davidson Canyon, September 2006 – June 2007.

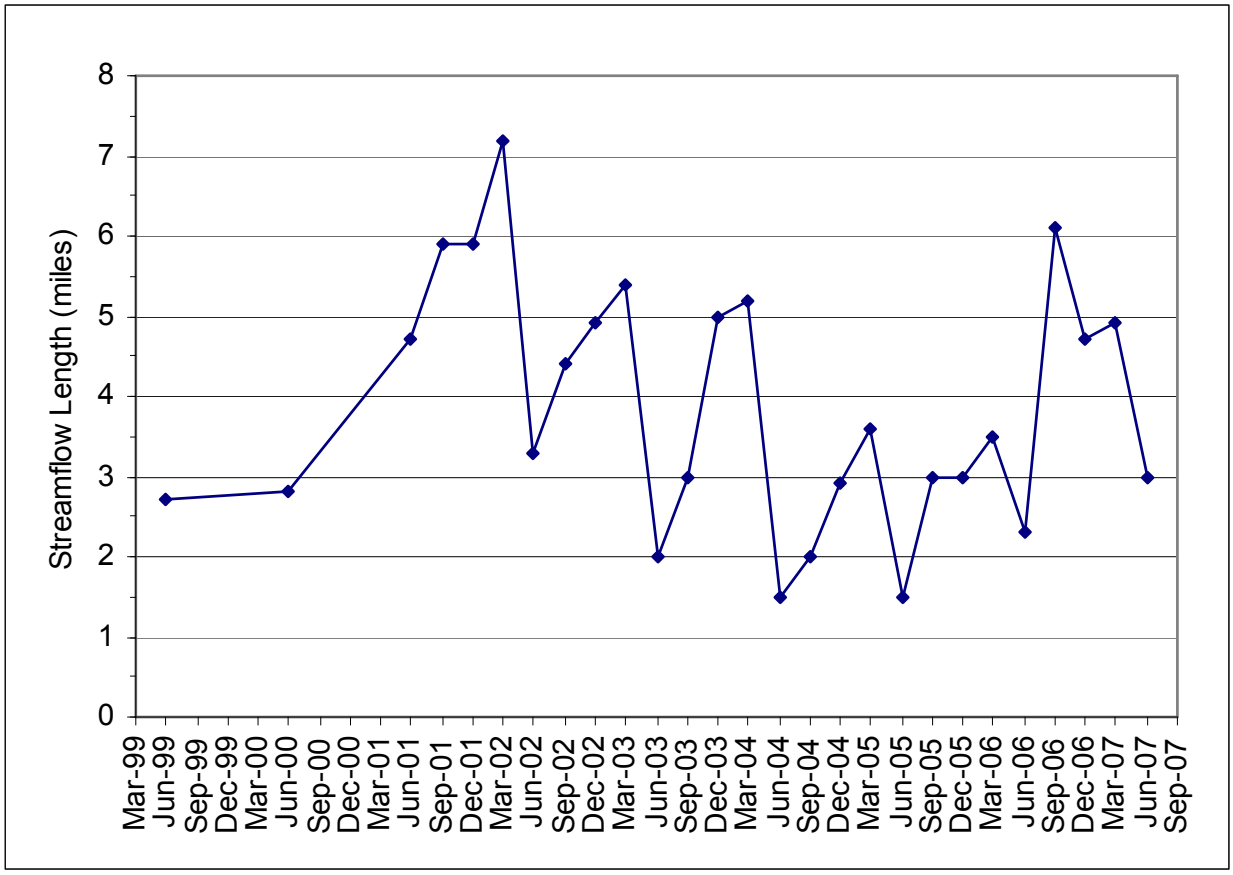


Figure 7. Lengths of Streamflow in Cienega Creek Natural Preserve, 1999-2007.

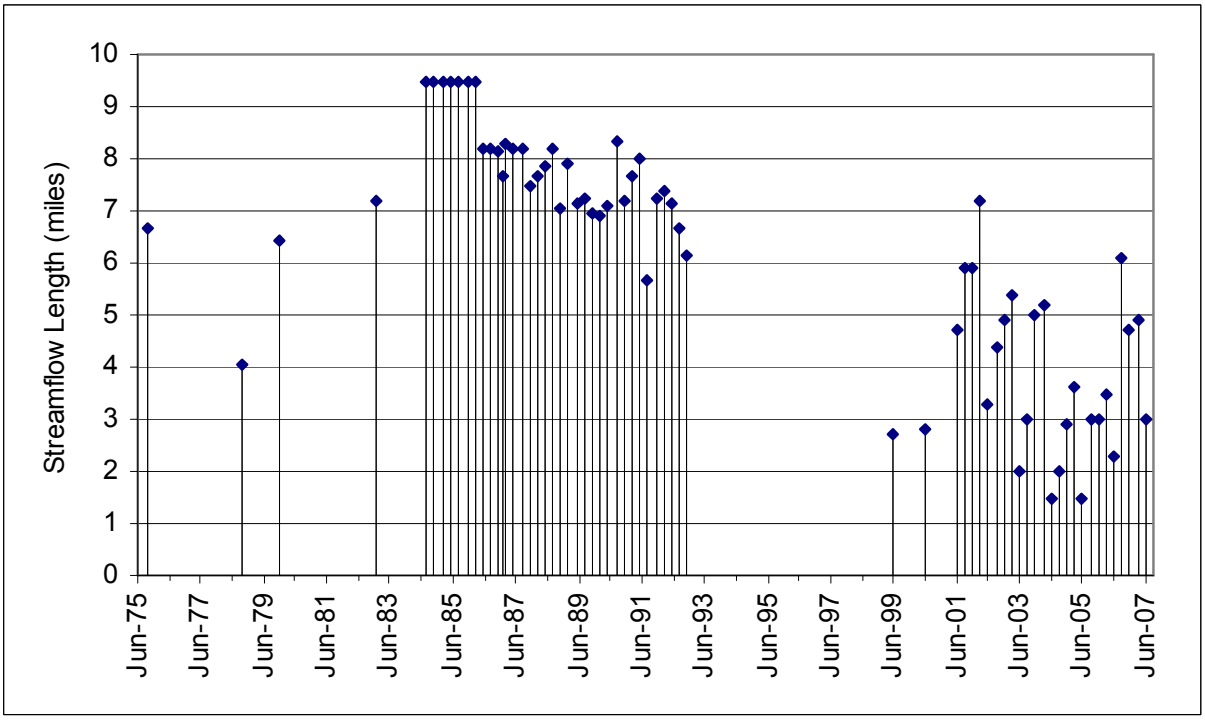


Figure 8. Lengths of Streamflow in Cienega Creek Natural Preserve, 1975-2007. *Length not measured 1993-1998.*

Table 4. Total Lengths of Flow in Cienega Creek Natural Preserve, Summer months, 1984 – 2007

Year	Length	Source
July 1984	50,000 ft. (9.5 miles)	Errol L. Montgomery & Associates, Inc.
May 1985	50,000 ft. (9.5 miles)	
May 1986	43,140 ft. (8.2 miles)	
May 1987	43,200 ft. (8.2 miles)	
May 1988	41,500 ft. (7.9 miles)	
May 1989	34,640 ft. (6.6 miles)	
May 1990	37,400 ft. (7.1 miles)	
May 1991	42,160 ft. (8.0 miles)	
May 1992	37,740 ft. (7.1 miles)	
No data 1993-1998		
June 1999	14,290 ft. (2.7 miles)	PAG
June 2000	14,590 ft. (2.8 miles)	
June 2001	24,950 ft. (4.7 miles)	
June 2002	17,220 ft. (3.3 miles)	
June 2003	10,630 ft. (2.0 miles)	
June 2004	8,145 ft. (1.5 miles)	
June 2005	7,865 ft. (1.5 miles)	
June 2006	12,025 ft. (2.3 miles)	
June 2007	15,860 ft. (3.0 miles)	

Length of creek channel from Interstate 10 to Pantano Dam equals 50,000 ft. (9.5 miles).

Table 5. Lengths of Flowing Reaches along Upper Davidson Canyon, Measured Quarterly, September 2006– June 2007

Flowing Reach	Length of Flowing Reach (feet)			
	September (9/14/06)	**December** (12/5/06)	**March** (3/6//07)	**June** (6/5/07)
Upper Davidson Canyon Reach A	5013	786	159	483
Upper Davidson Canyon Reach B	1941	879	379	
Upper Davidson Canyon Reach C		447	166	
Upper Davidson Canyon Reach D			387	
FY06-07 TOTAL	**6954 ft (1.3 miles)**	**2112 ft (.40 miles)**	**1091 ft (.21 miles)**	**483 ft (.09 miles)**
FY05-06 TOTAL	**3935 ft (.75 miles)**	**455 ft (.09 miles)**	**180 ft (.03 miles)**	**170 ft (.03 miles)**

Reaches are not numbered in sequence; they are not associated with any one fixed portion on the creek. Lower total number of reaches generally indicates less interrupted flow. Upper Davidson Canyon reaches mapped on different dates than Cienega Creek and Lower Davidson Canyon reaches due to the length of time required to complete both streams. View the FY05-6 report for further sampling dates.

Water Quality Data from Cienega Watershed (Jan. 2007 – Jun 2007)

Table 6.

Cienega 1 – Upstream of Davidson		
Date	3/9/07	6/15/07
Cond. (uS)	1336	1343
pH	7.05	7.42
TDS (ppm)	942.2	948.1
Temp. (F)	67.6 F	68.6

Table 7.

Cienega 2 – Marsh Station						
Date	1/17/07	2/7/07	3/9/07	4/10/07	5/11/07	6/5/07
Cond. (uS)	NA	1263	1274	1288	1269	1275
pH	7.74	7.69	7.77	7.63	7.65	7.52
TDS (ppm)	873.3	887.8	894.4	905.9	892.2	896.3
Temp. (F)	59.8 F	64.7 F	69.5 F	69.0 F	71.2 F	74.2

Table 8.

Davidson 3 – South of I-10		
Date	3/6/07	6/5/07
Cond. (uS)	864.4	862.9
pH	7.46	7.52
TDS (ppm)	596.7	595.3
Temp. (F)	60.6 F	73.1

Table 9

Davidson 2 – Near Confluence		
Date	3/9/07	6/15/07
Cond. (uS)	793	NA (Dry)
pH	7.0	NA (Dry)
TDS (ppm)	545.3	NA (Dry)
Temp. (F)	68.3 F	NA (Dry)

Figure 9. Specific Conductivity in the Cienega Watershed

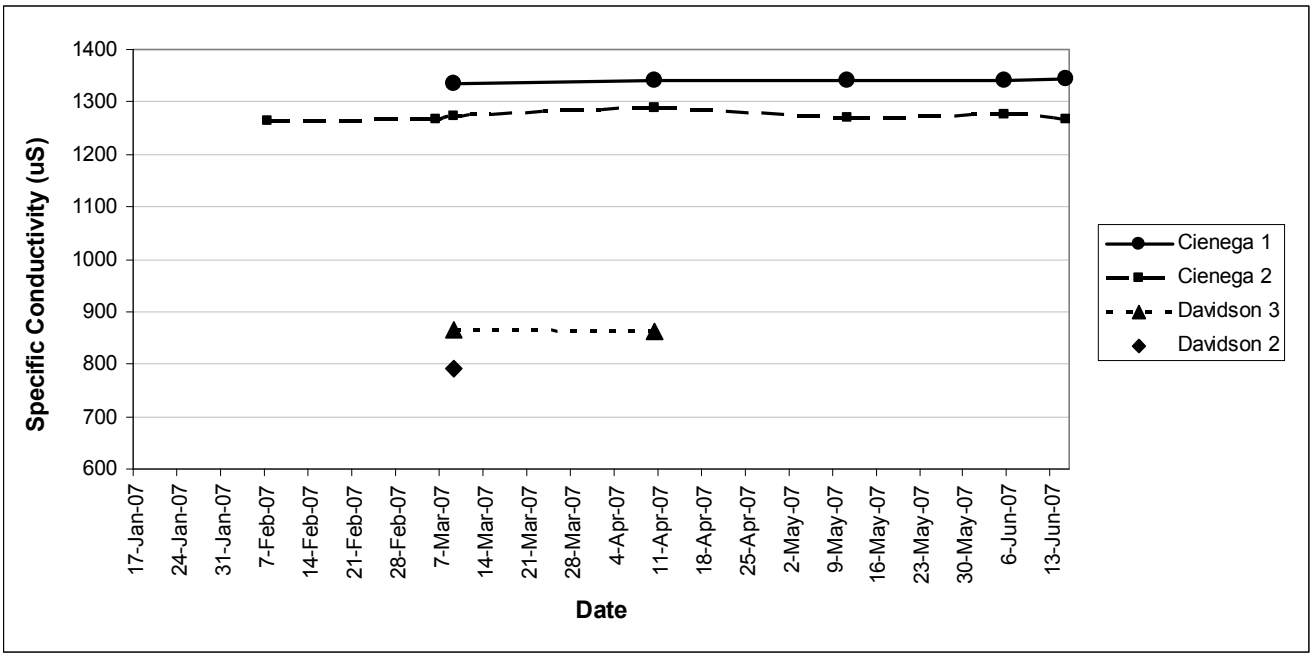


Figure 10. pH in the Cienega Watershed

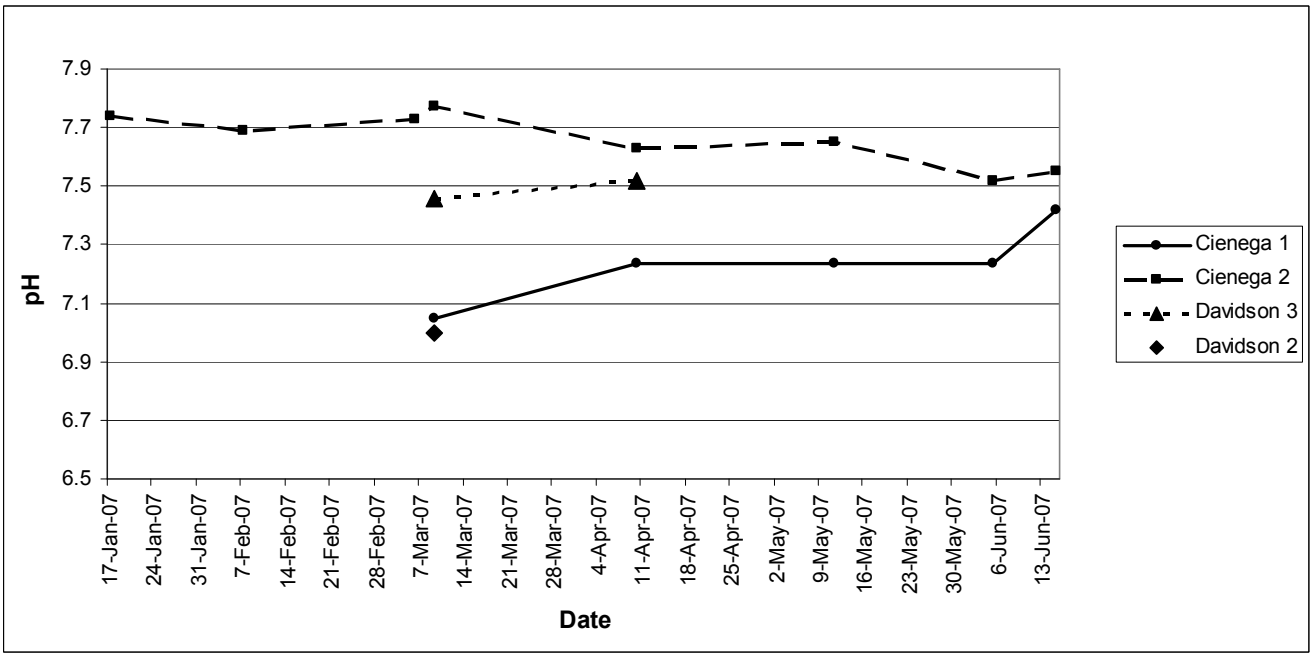


Figure 11. Total Dissolved Solids in the Cienega Watershed

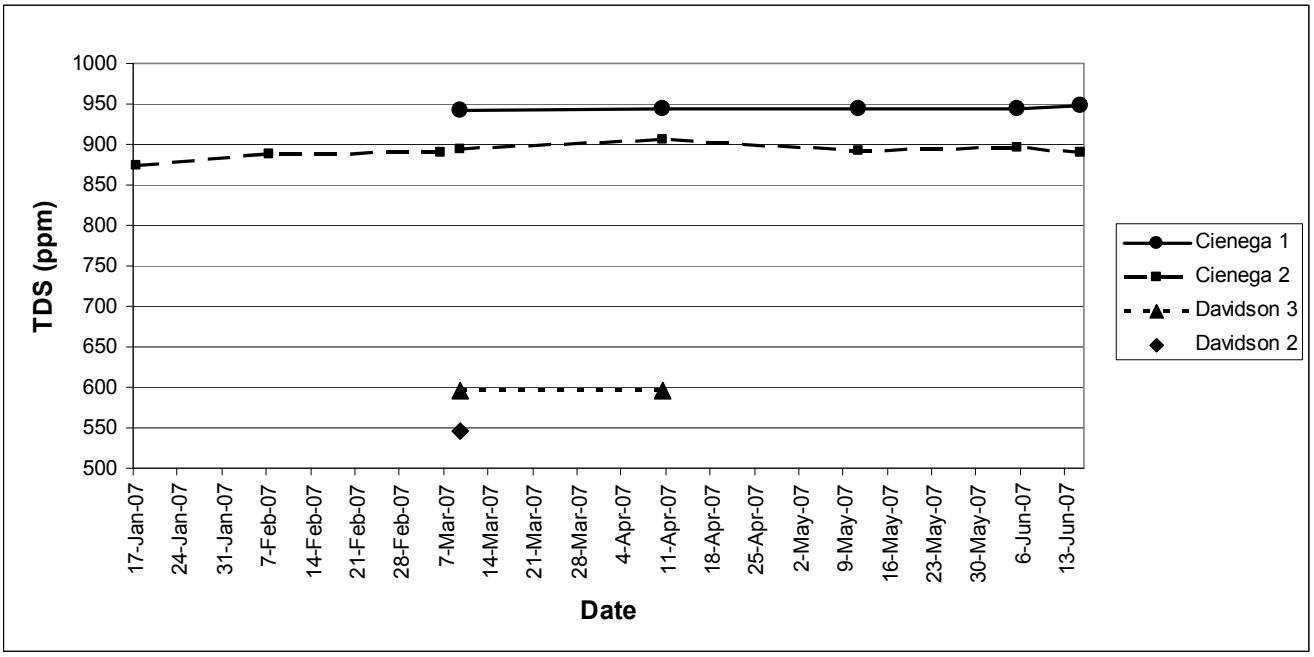


Figure 12. Stream Temperature in the Cienega Watershed

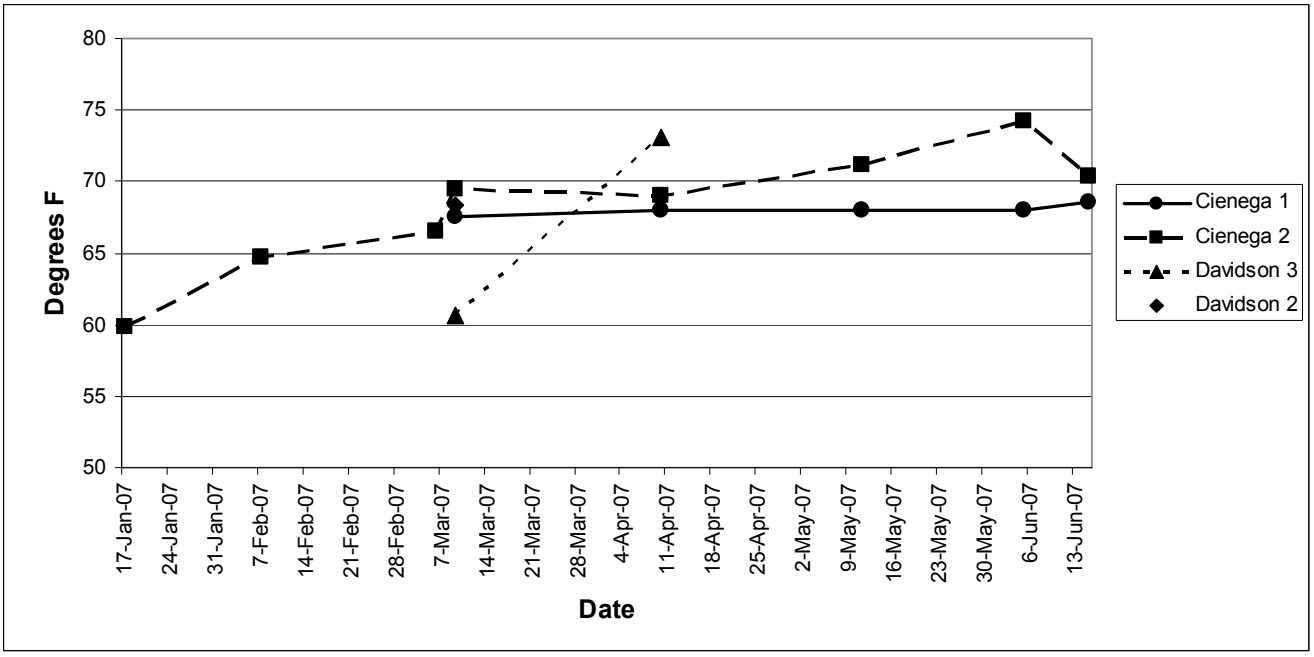
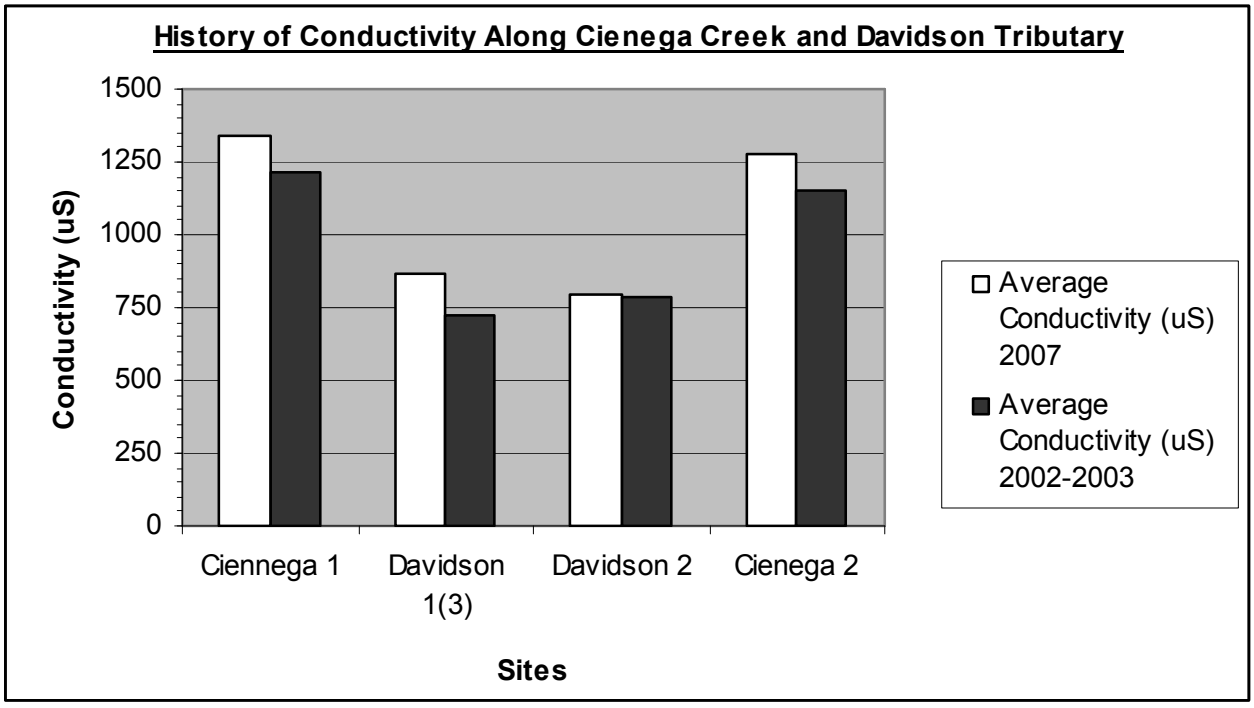


Figure 13. Historic Conductivity Data



*Davidson 3 serves as a replacement for the Davidson 1 site since March 2007.