

# **Water Resource Trends in the Cienega Watershed**

**Claire Zucker**

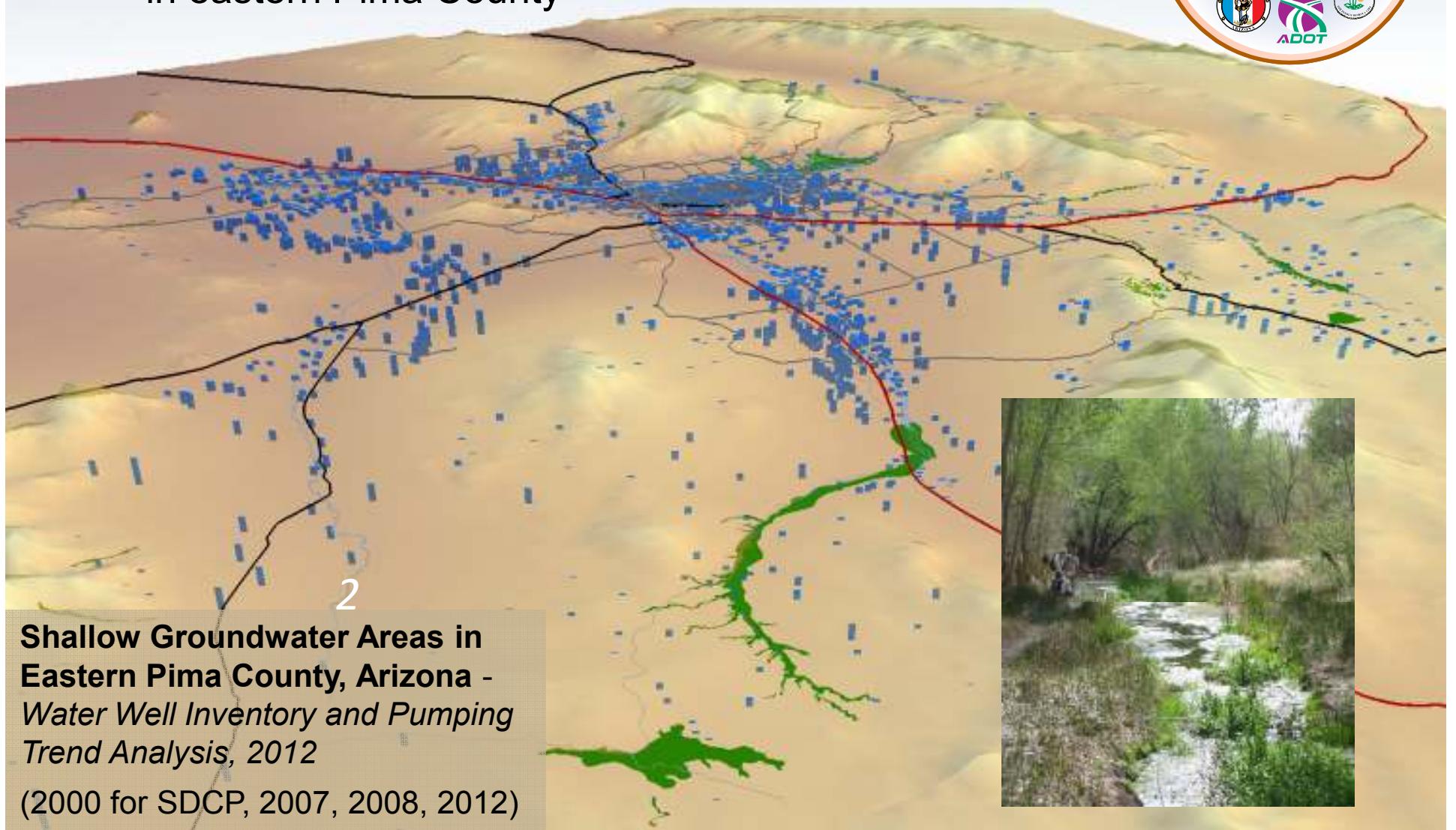
Pima Association of Governments, Sustainable Environment Program

**Brian Powell**

Pima County Office of Sustainability and Conservation

# Pima Association of Governments (PAG)

- Monitoring Lower Cienega Creek since 1989
- Overview analysis of shallow groundwater areas in eastern Pima County



# Shallow Groundwater Areas Identification



- Well data review
  - Field vegetation surveys
  - Imagery/topographic maps
- ✓ Groundwater within 50 feet of surface, but may, or may not, have surface water
  - ✓ Supplies numerous private wells
  - ✓ Important for Arizona species, rare habitat

Water providers,  
irrigation,  
mining  
 $> 35 \text{ gpm}$



Non- Exempt Wells



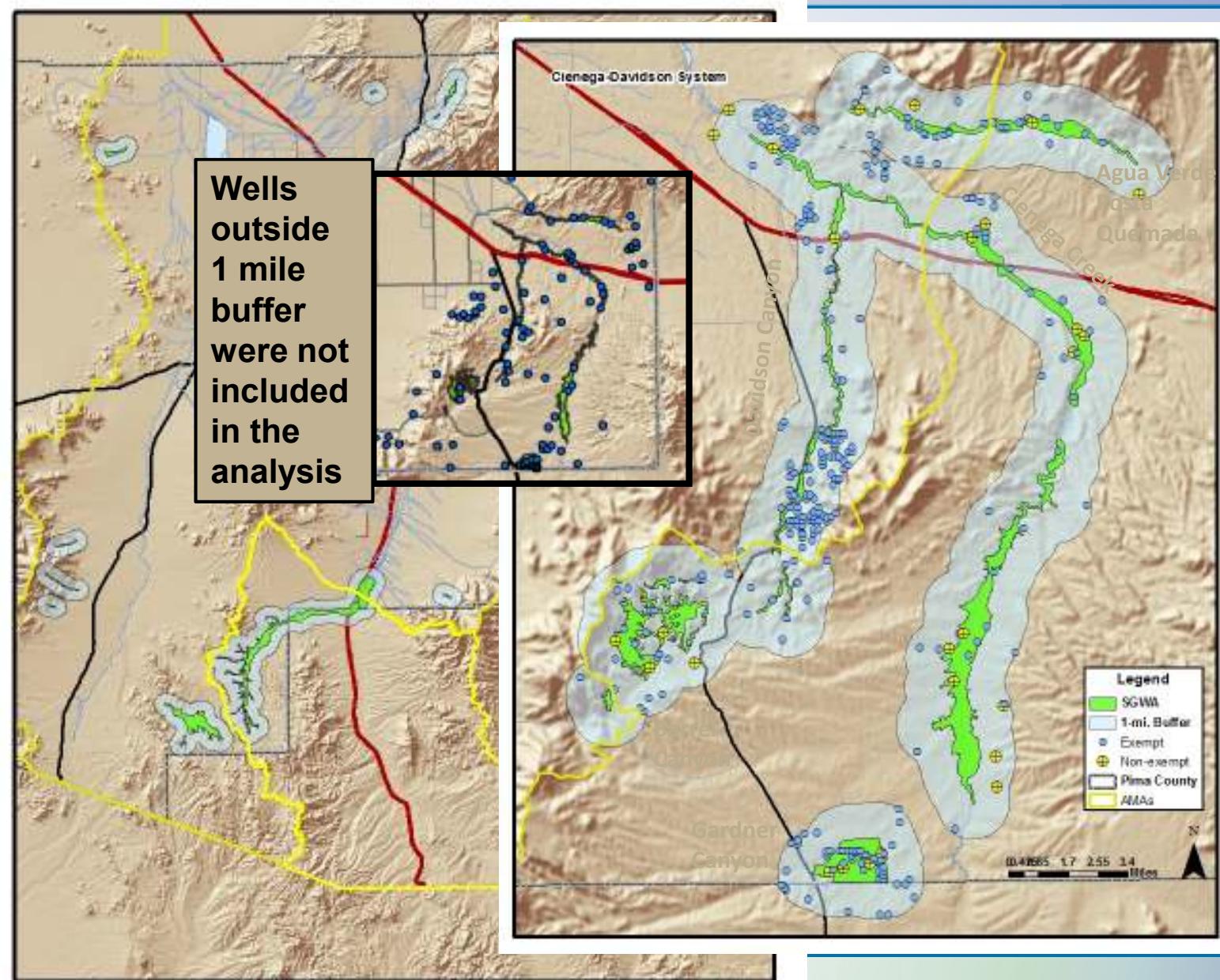
Private Exempt Wells

Private,  
residential  
 $< 35 \text{ gpm}$   
Estimate 1 AF/yr  
Limit 10 AF/yr

## 10 Shallow Groundwater Areas in Eastern Pima County

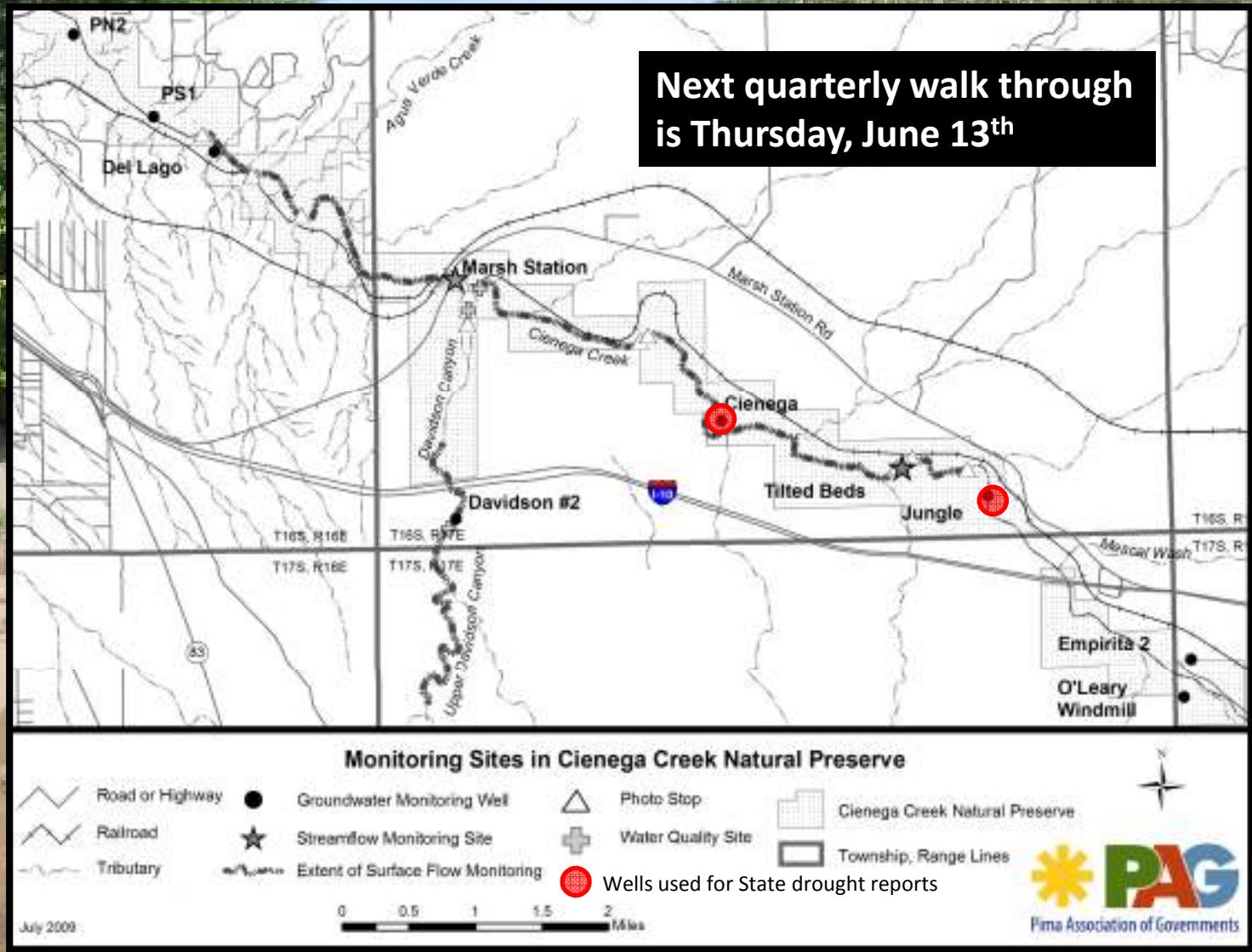
Outside the Active Management Areas (AMA)  
Non-exempt well owners do not have to report withdrawals!

Well locations often inexact and well data, reported by the driller or owner, is generally not verified

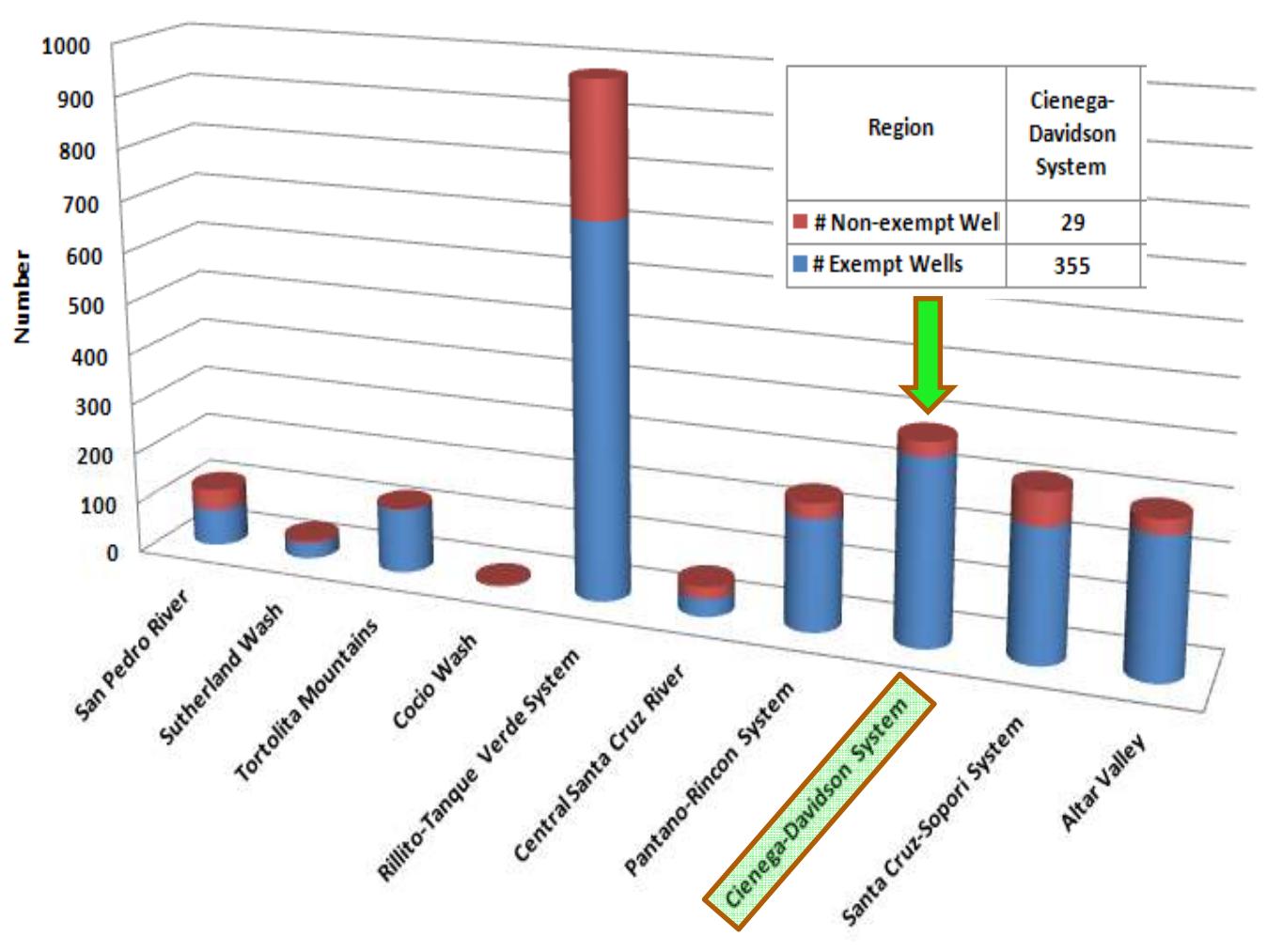


# PAG Monitoring and Drought Reporting

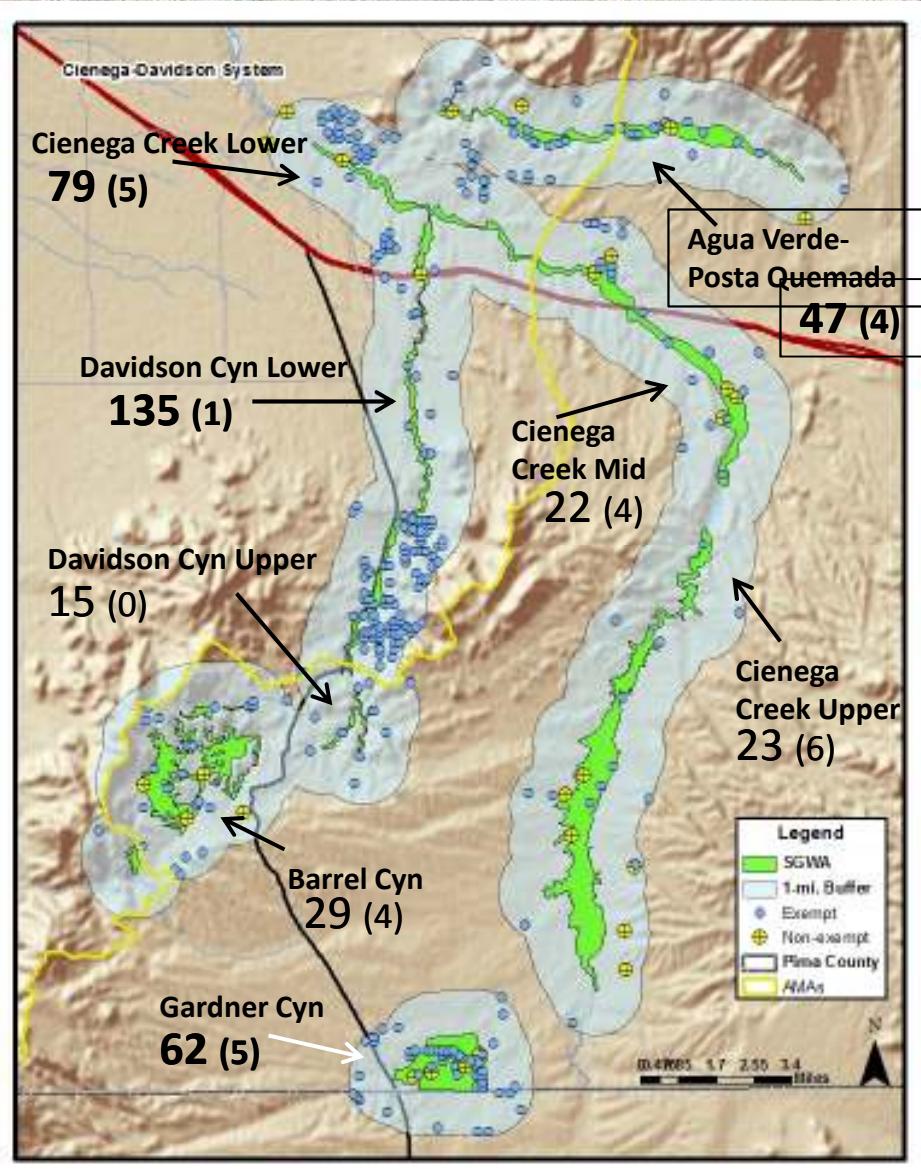
Next quarterly walk through  
is Thursday, June 13<sup>th</sup>



# Exempt/Non Exempt Comparison

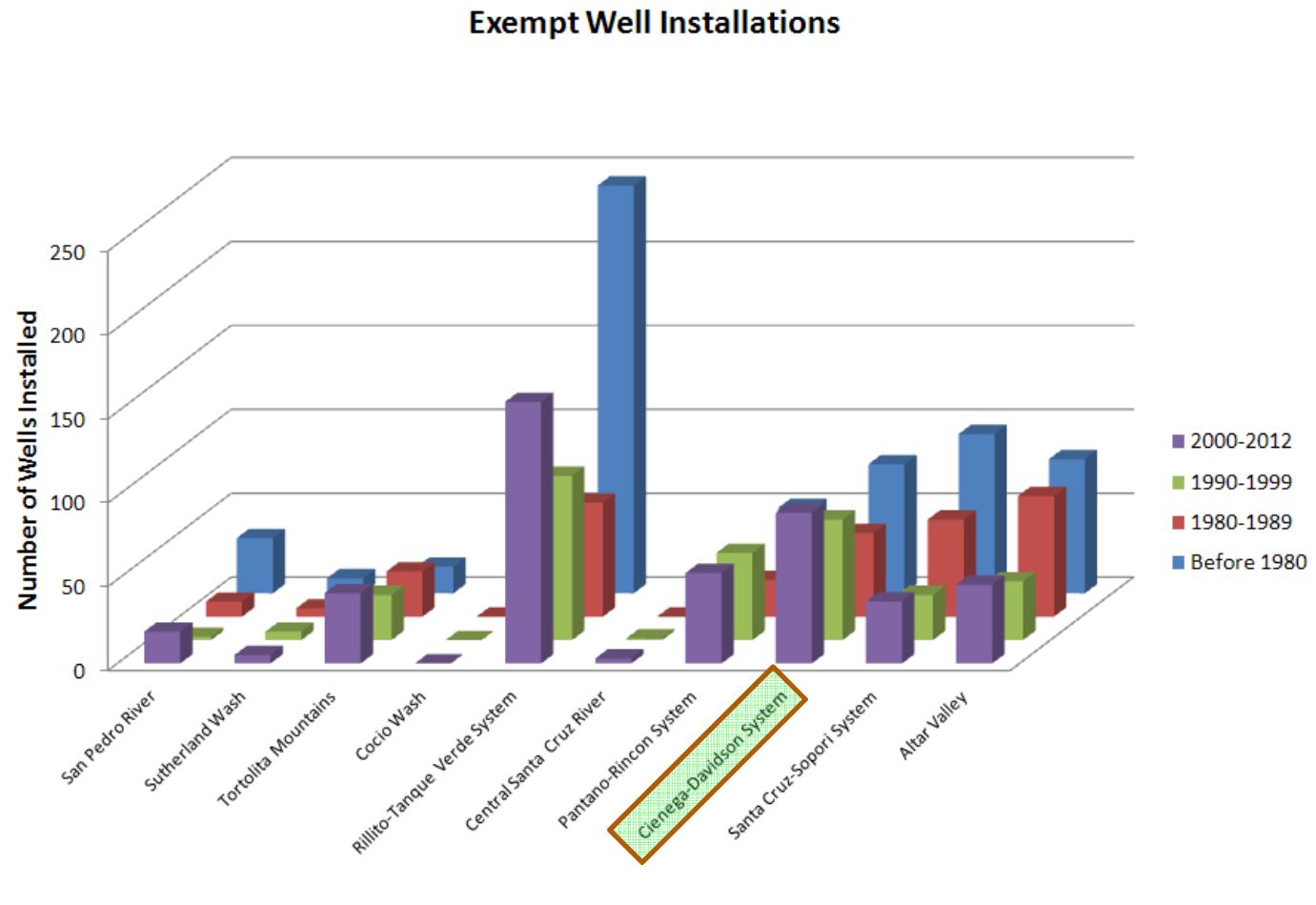


# Well locations



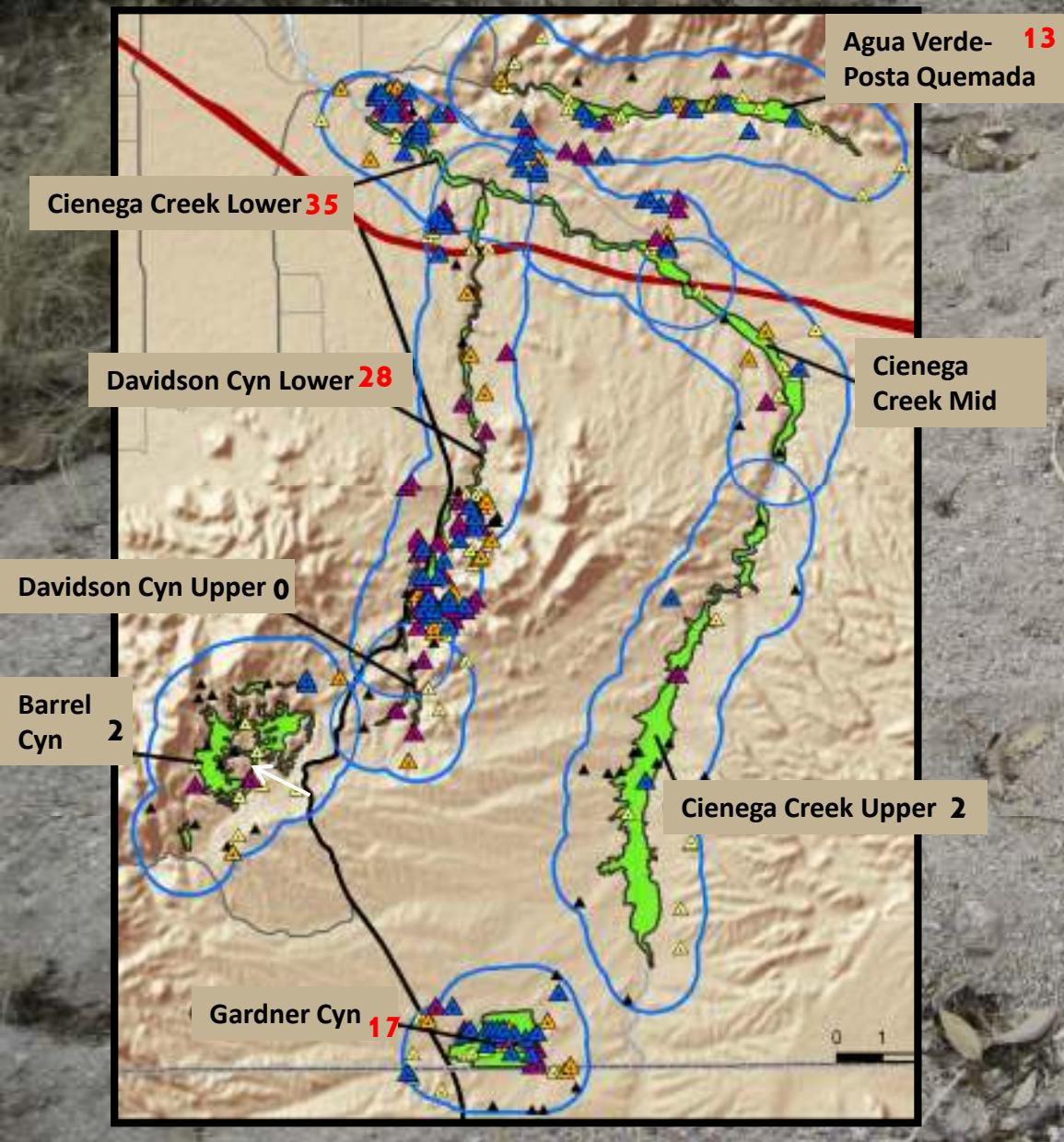
- 355 exempt
- 29 non-exempt (7.6%)
- Low well density (overall)
- Historical water data is only available for 4 of the 29 non-exempt wells

# Drilling Trends – Exempt Wells



Almost all of the Non-Exempt wells were drilled before 1980

# Drilling and Pumping History



## Drilling History

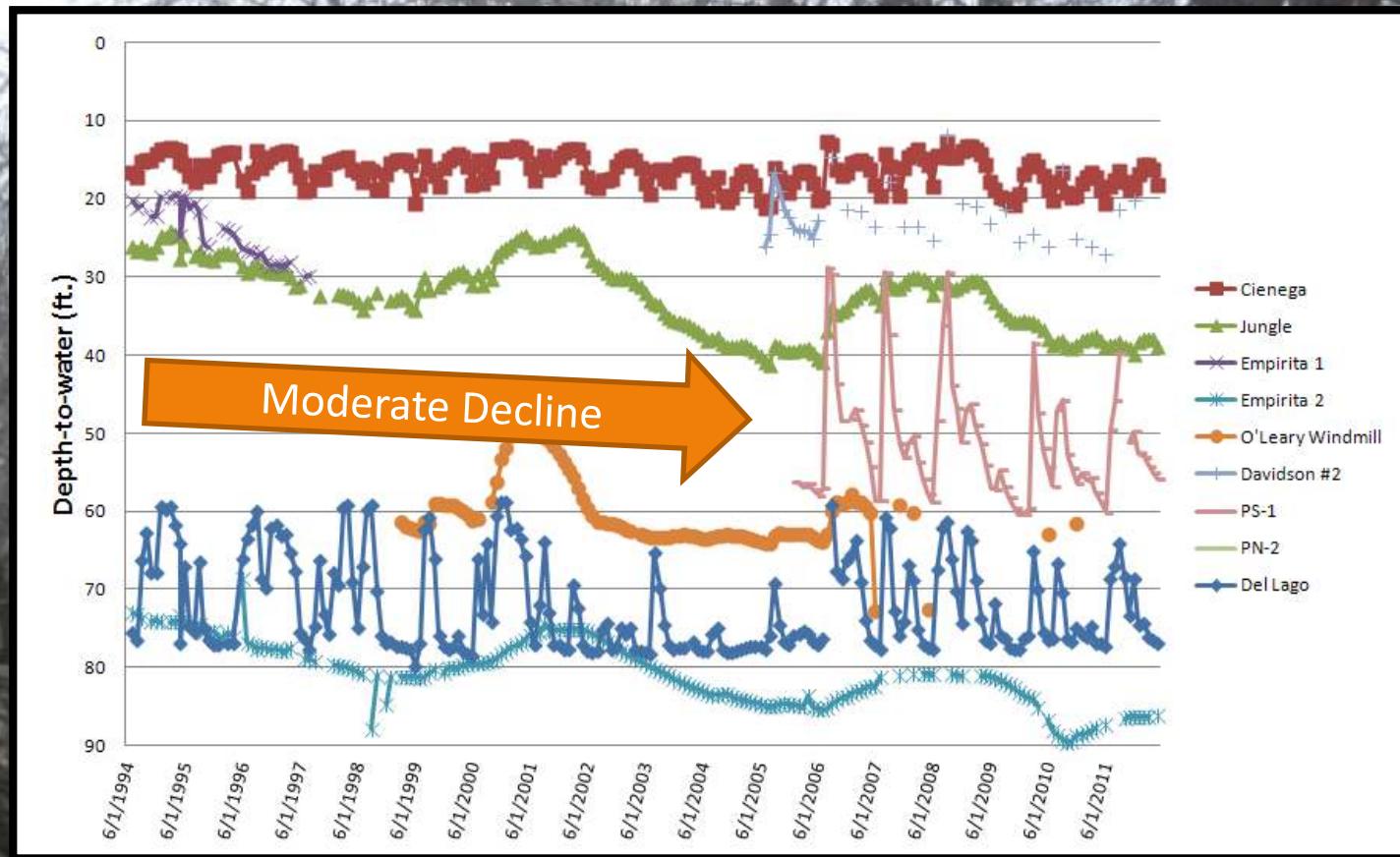
- 72 wells – date unknown
- 96 before 1980
- 53 1980-89
- 72 1990-99
- 91 after 2000 (1 non-exempt)  
(# of wells drilled since 2000  
are labeled on the map)

## Water Withdrawals

- Estimate 353 AF annually withdrawn from exempt wells (1 AF/yr)
- 501 AF withdrawn from as reported for 4 of the 29 non-exempt wells in 2010

# Groundwater Level Changes

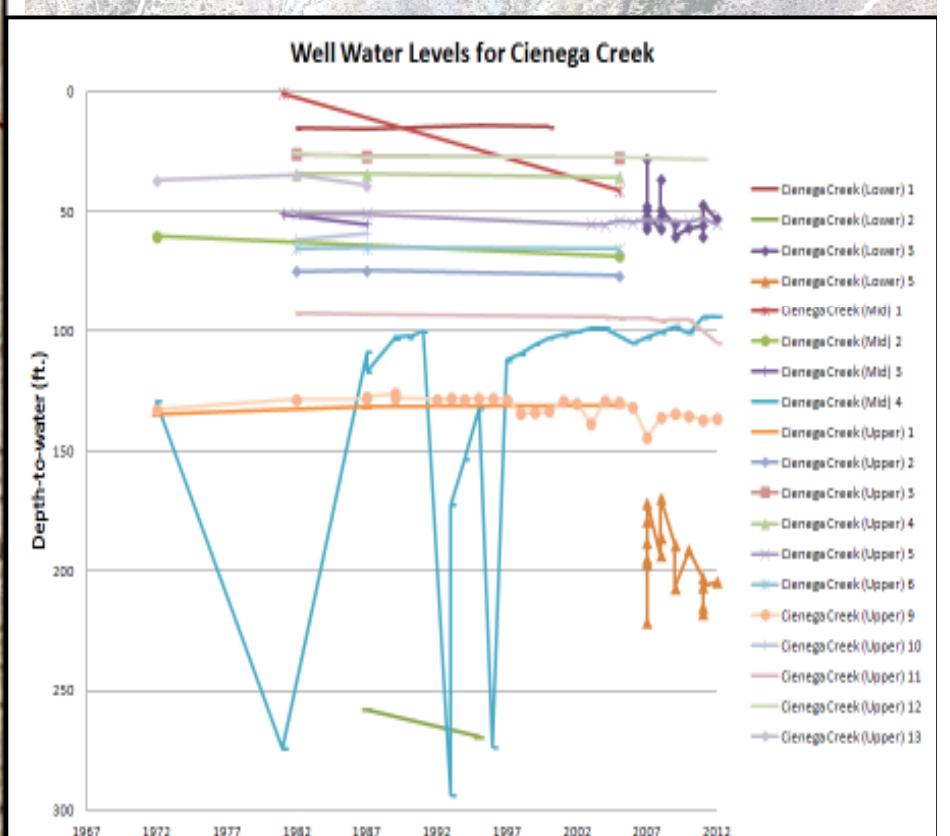
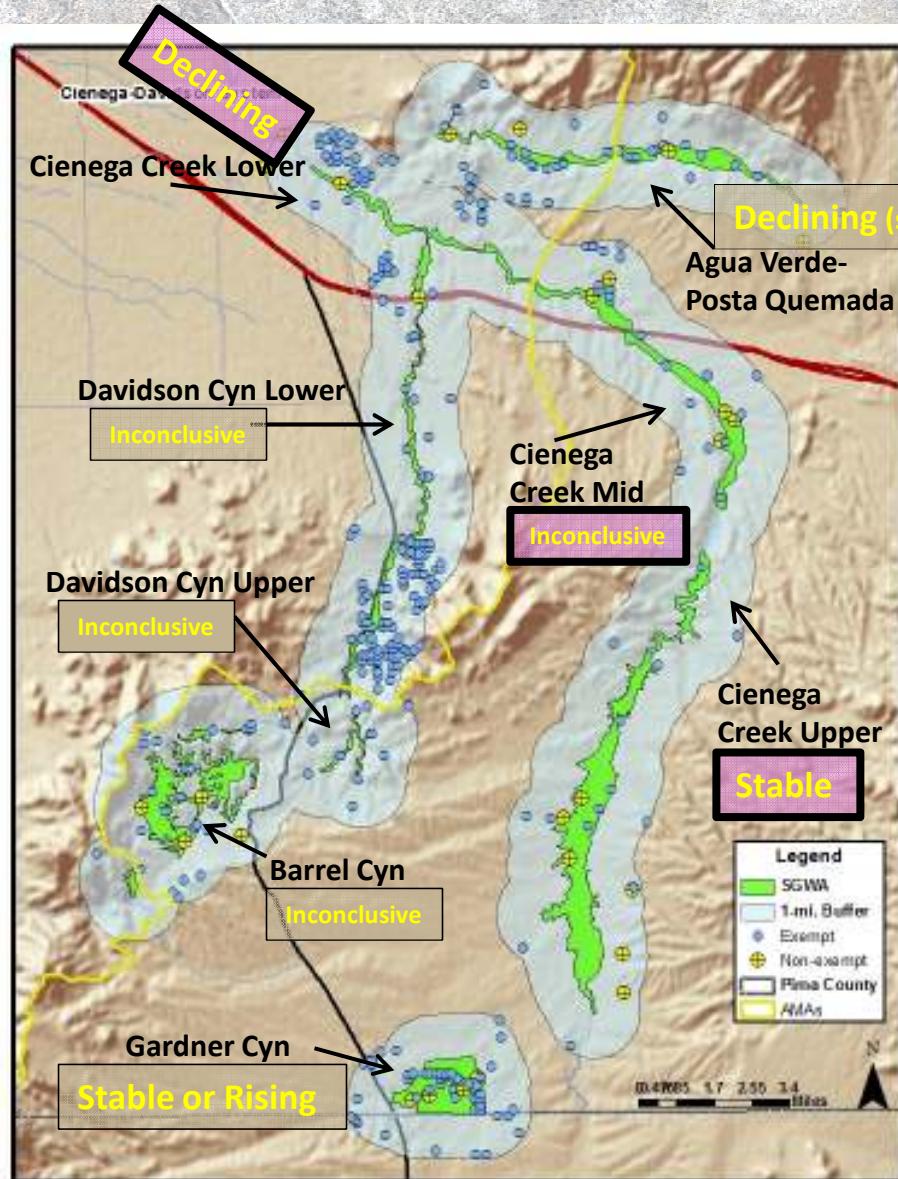
Lower Cienega Creek & Lower Davidson Canyon



5 foot  
declines  
since 2000

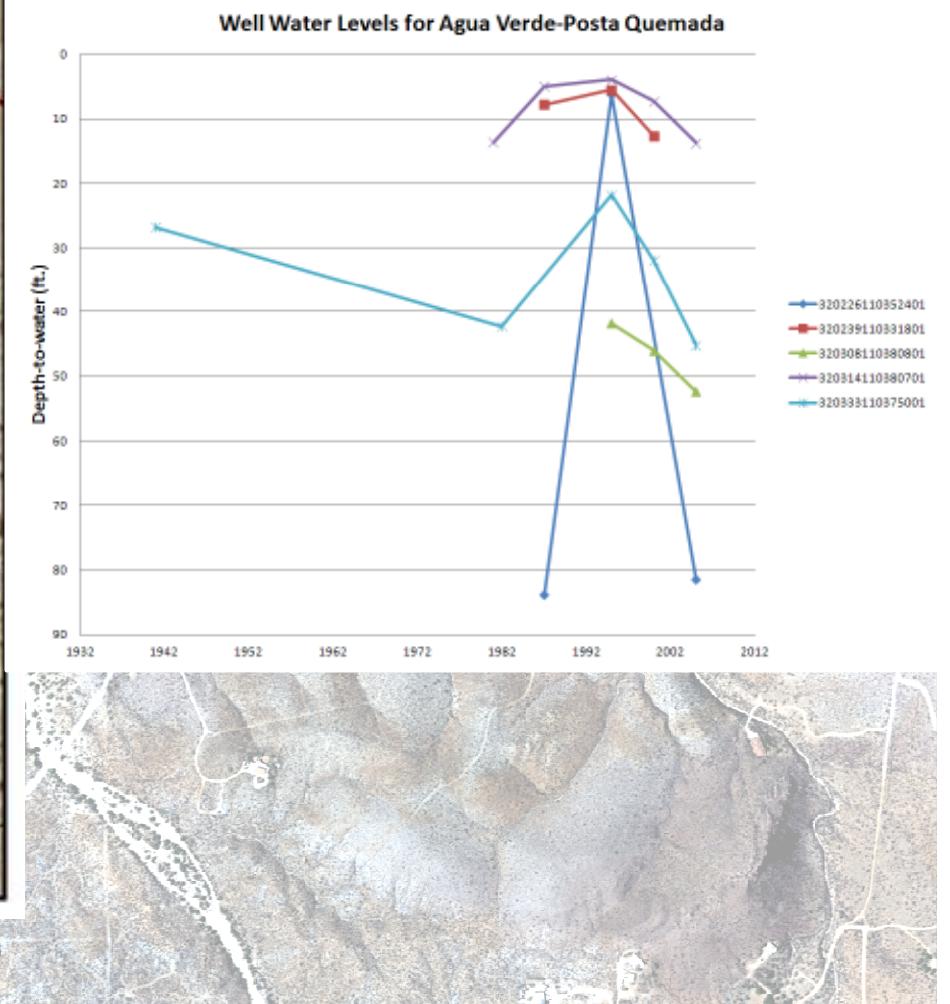
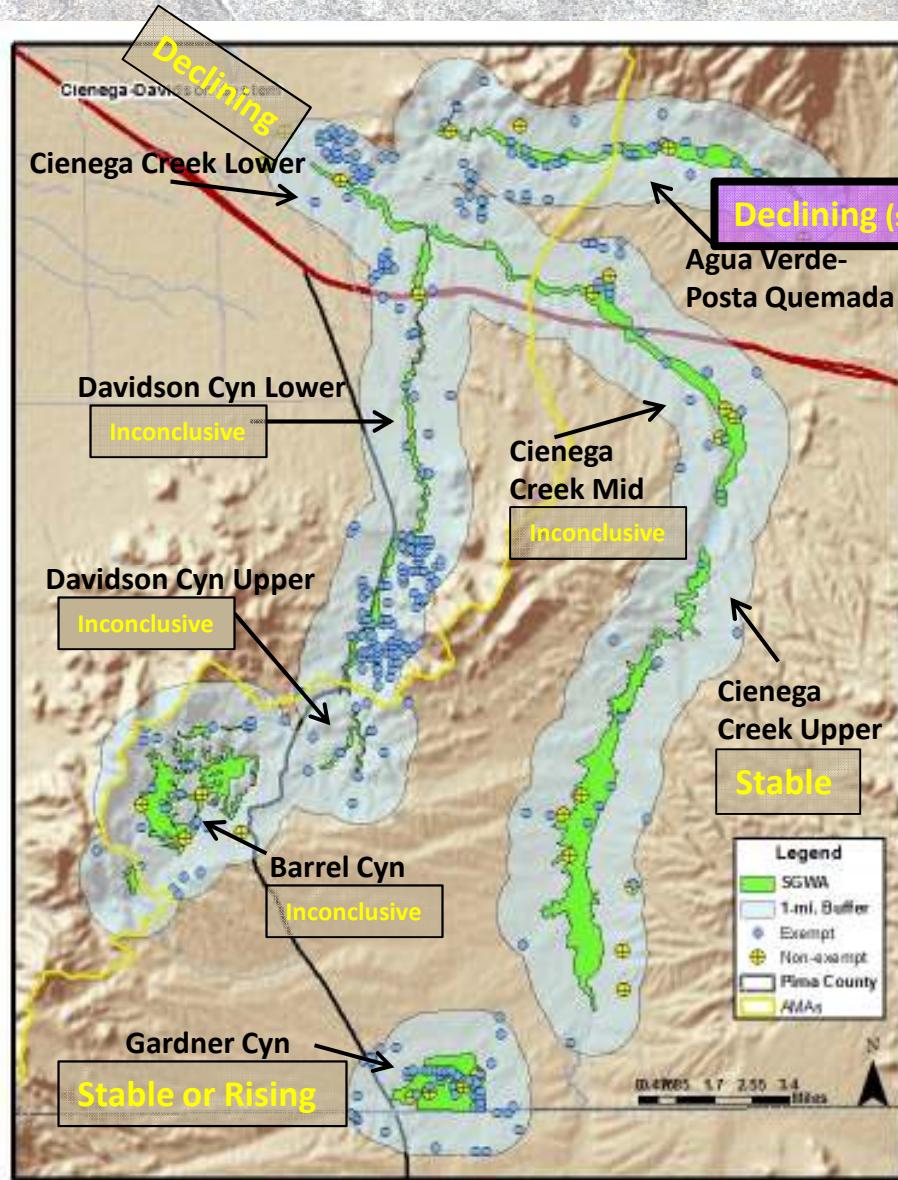
Groundwater  
levels  
parallel  
trends in  
surface flow  
extent and  
flow quantity

# Water levels throughout the watershed



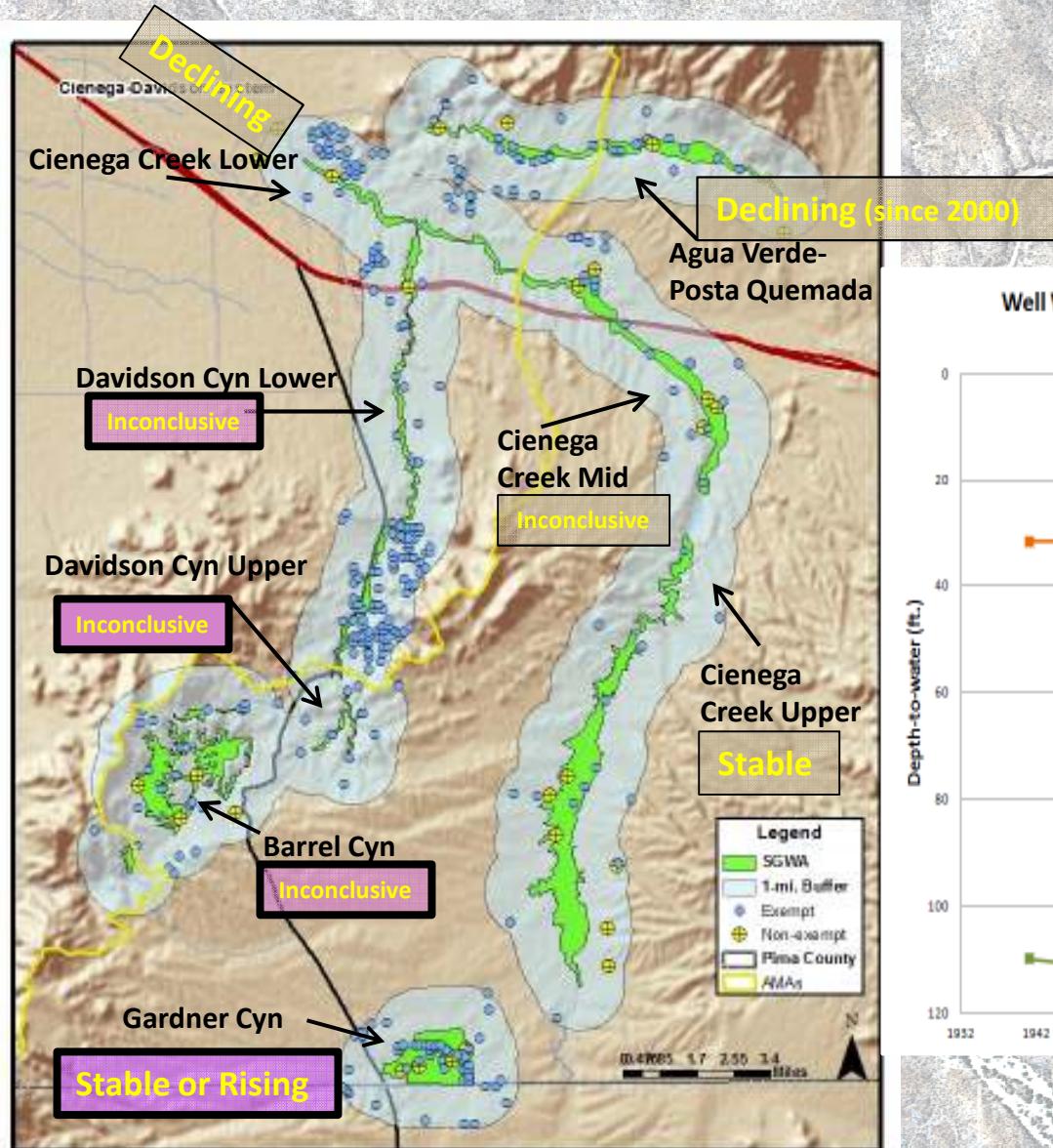
BLM now monitors groundwater  
in Las Cienegas (Upper Cienega)

# Water levels throughout the watershed

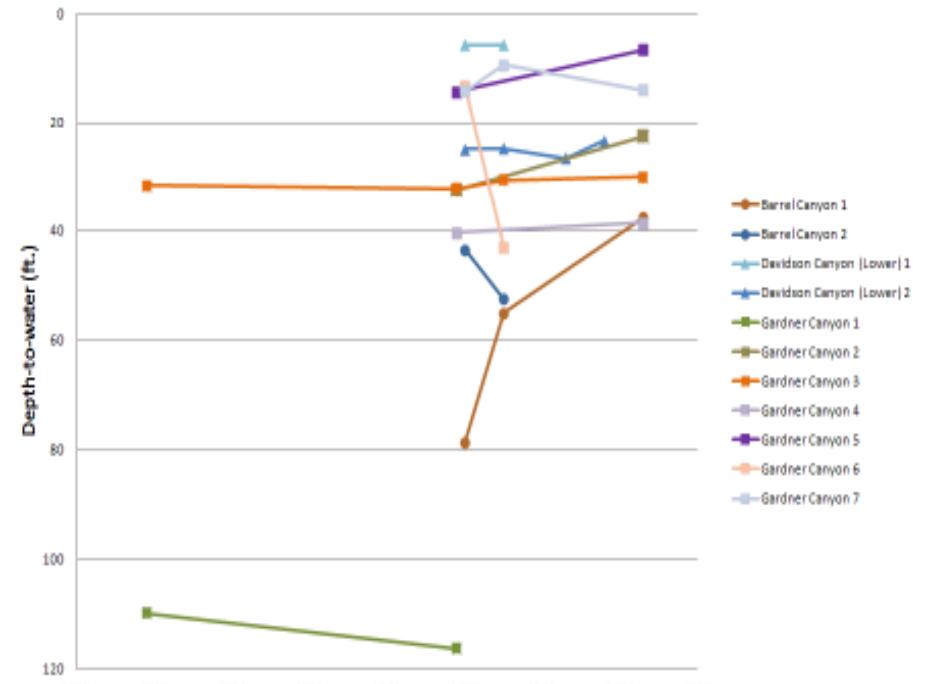


47 (4) Total (non-exempt)

# Water levels throughout the watershed



Well Water Levels for Barrel Canyon, Davidson Canyon, and Gardner Canyon



## **Needs:**

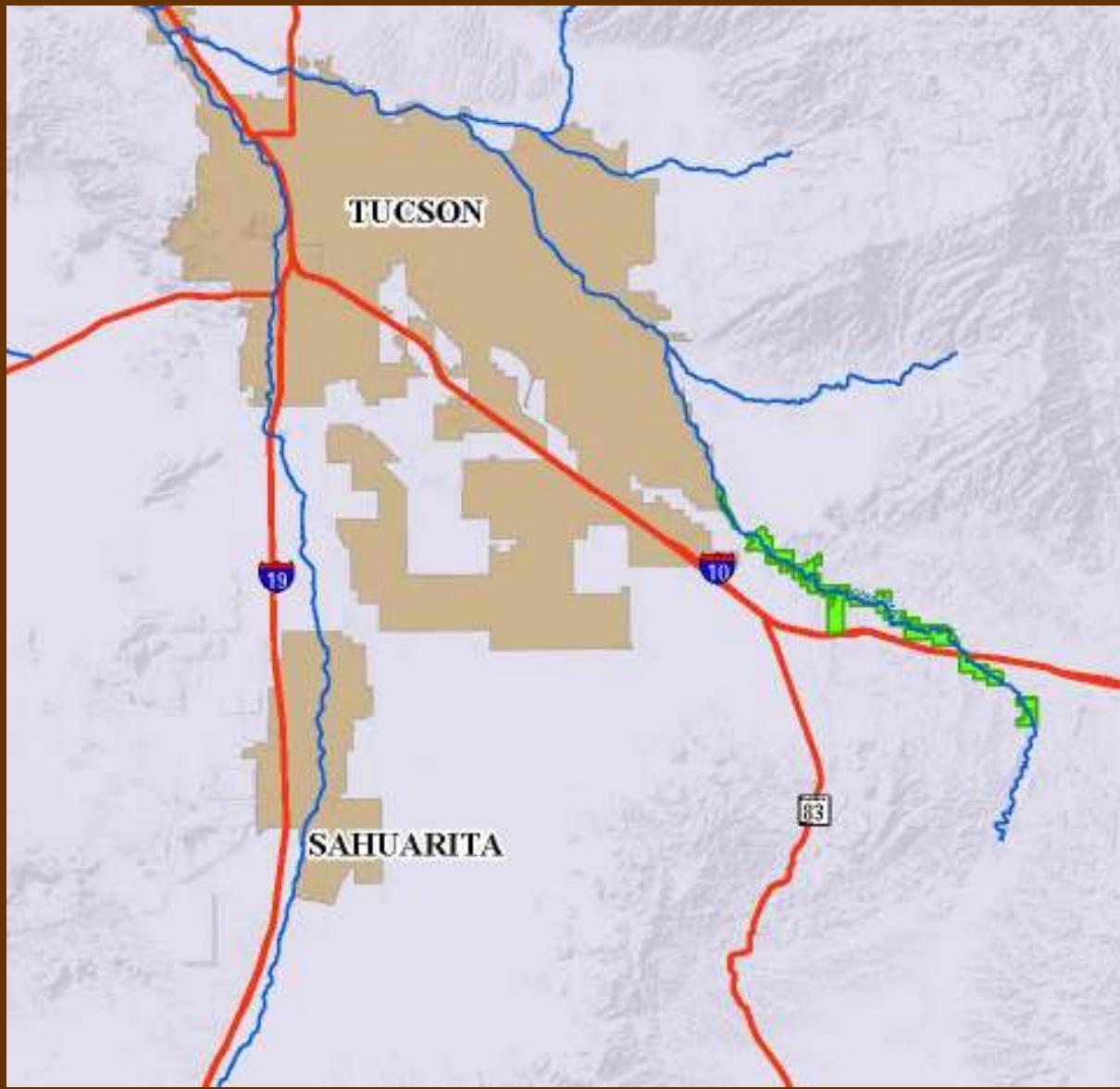
**Additional consistent monitoring to establish groundwater level trends**

**Coordination with land managers, residents, and private land holders to monitor drought**

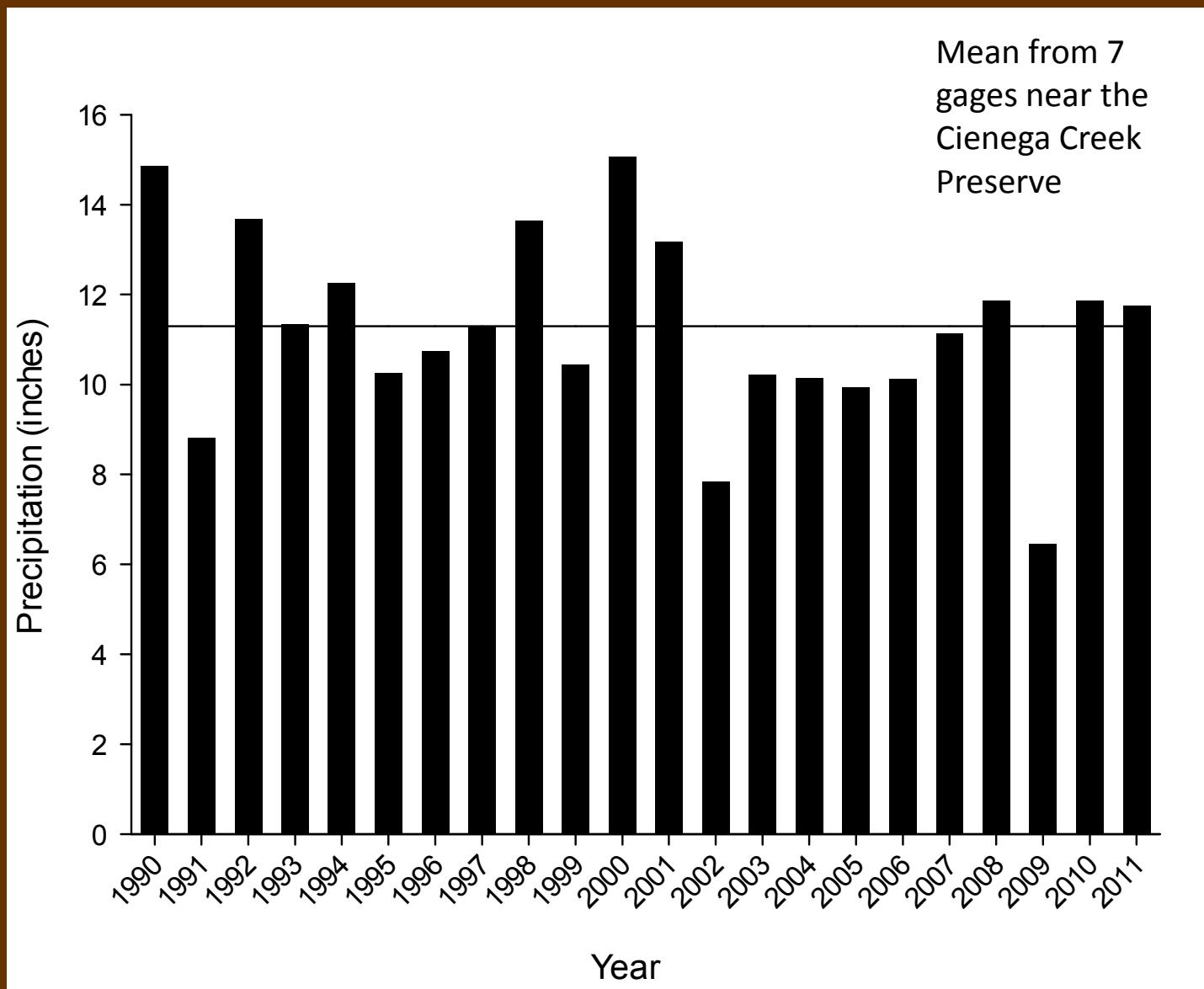
**Changes in water production reporting requirements especially for non-exempt wells outside the AMA**



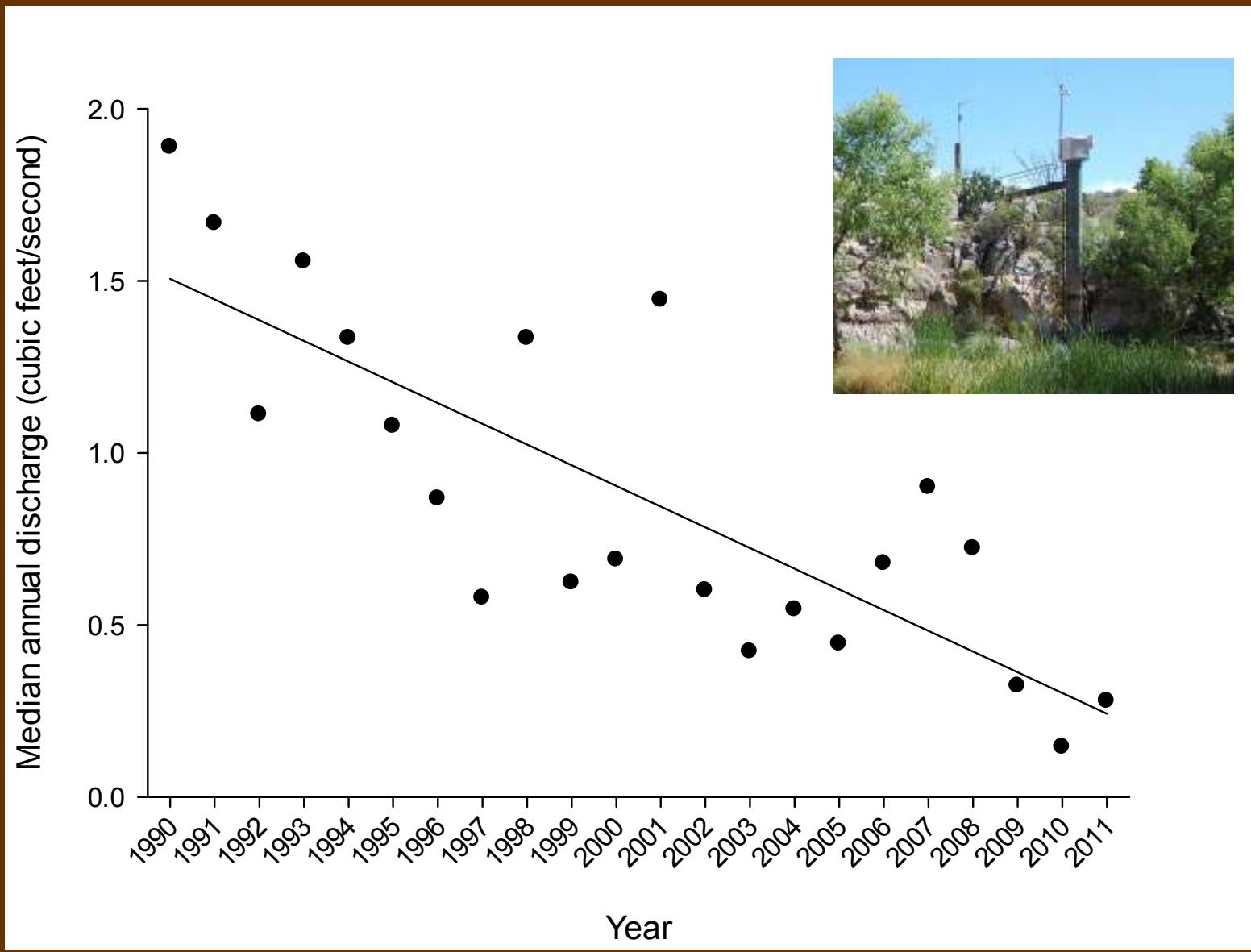
# Cienega Creek Natural Preserve



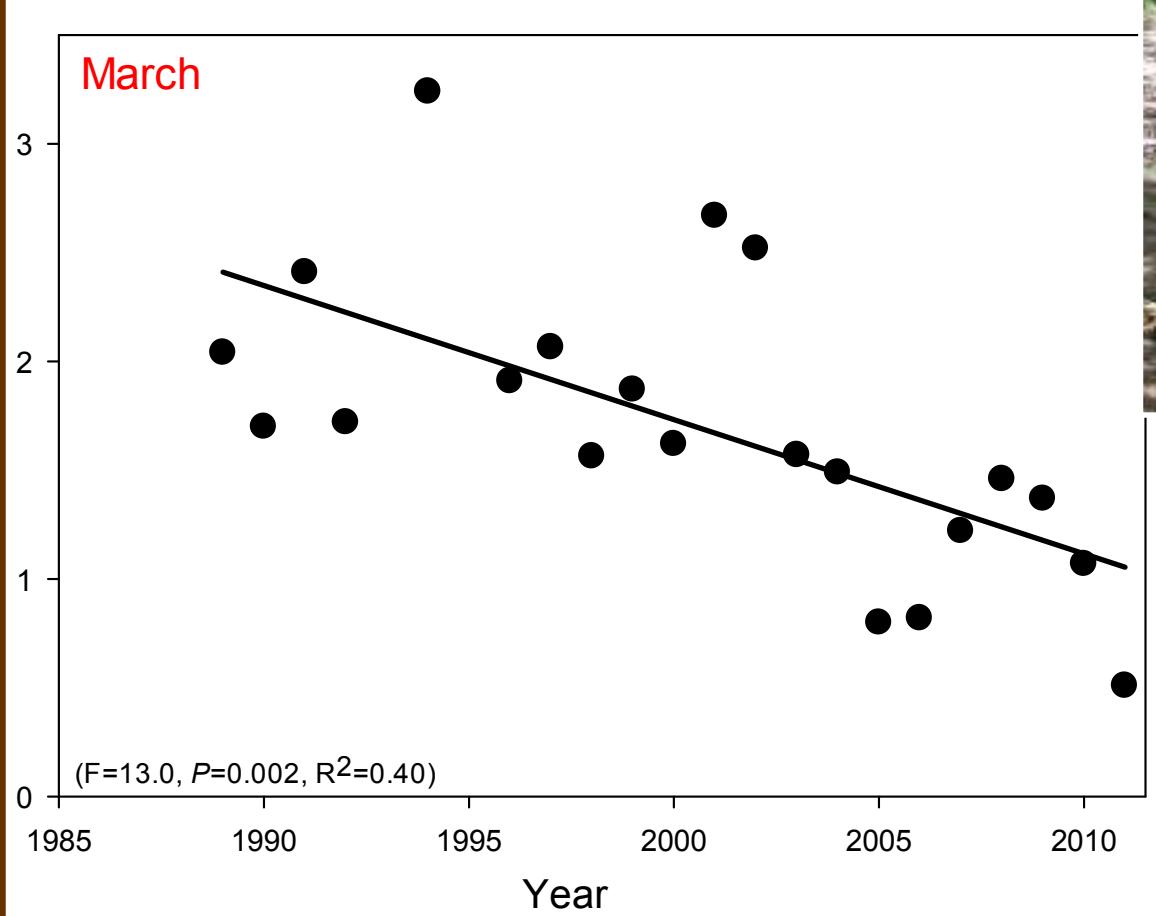
# Precipitation Near CCNP



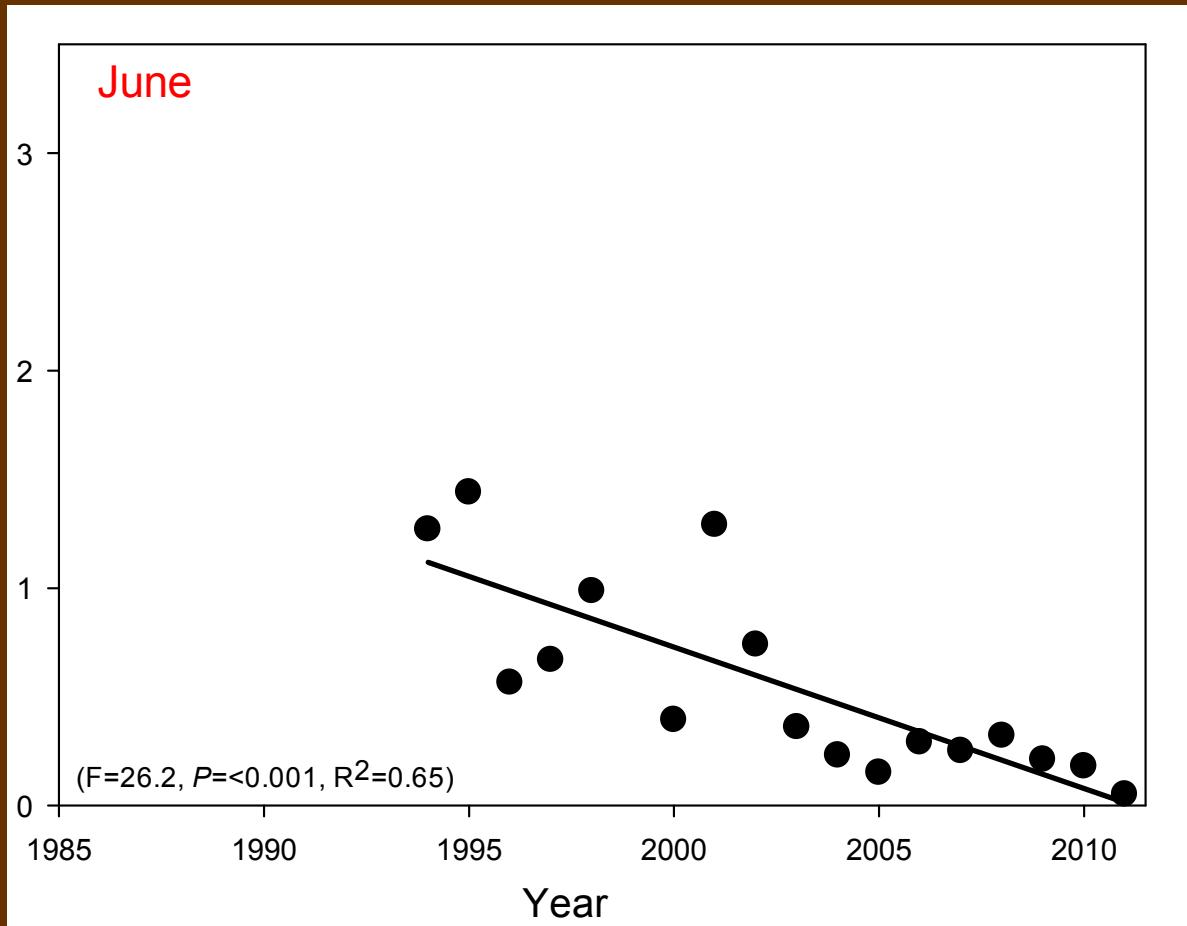
# Change in Discharge-Pantano Gage



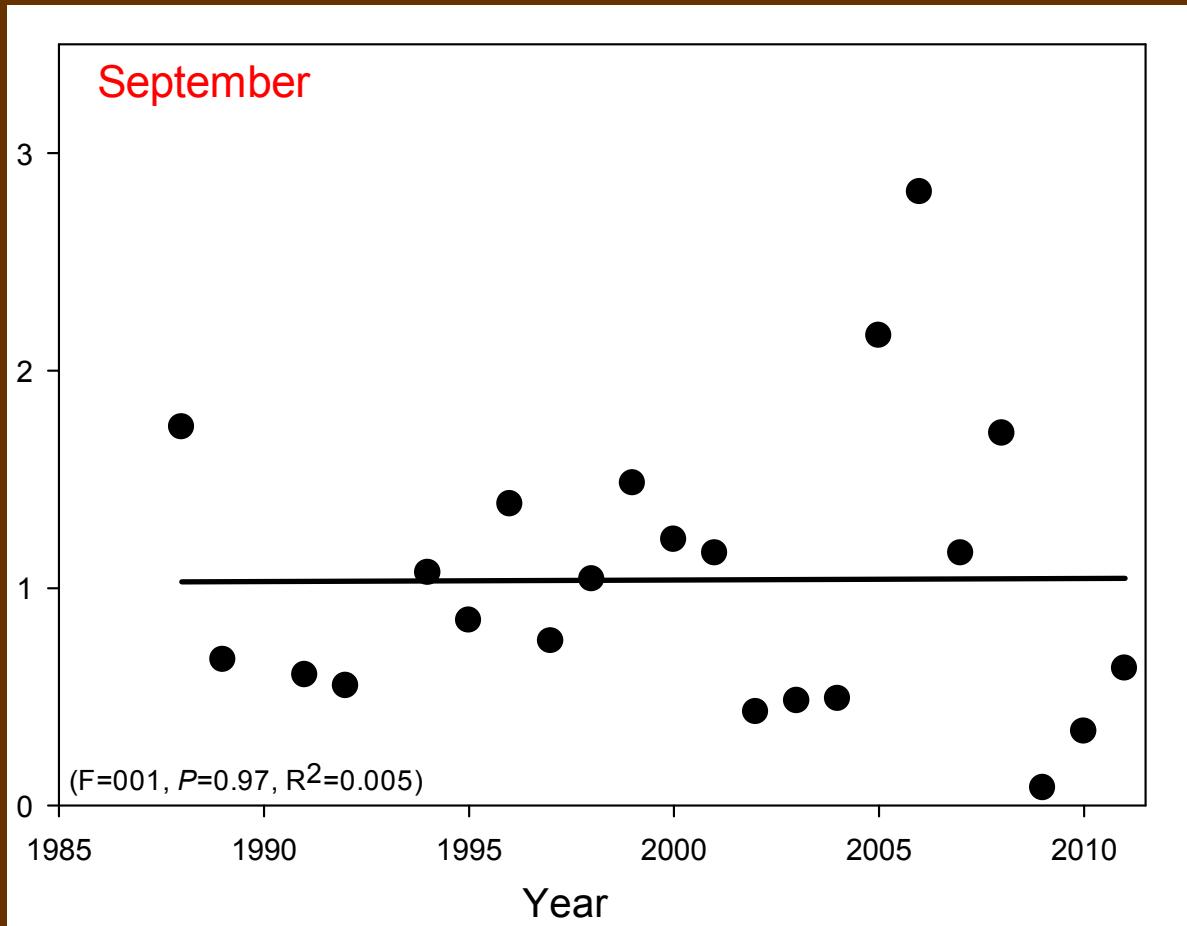
# Flow-Marsh Station



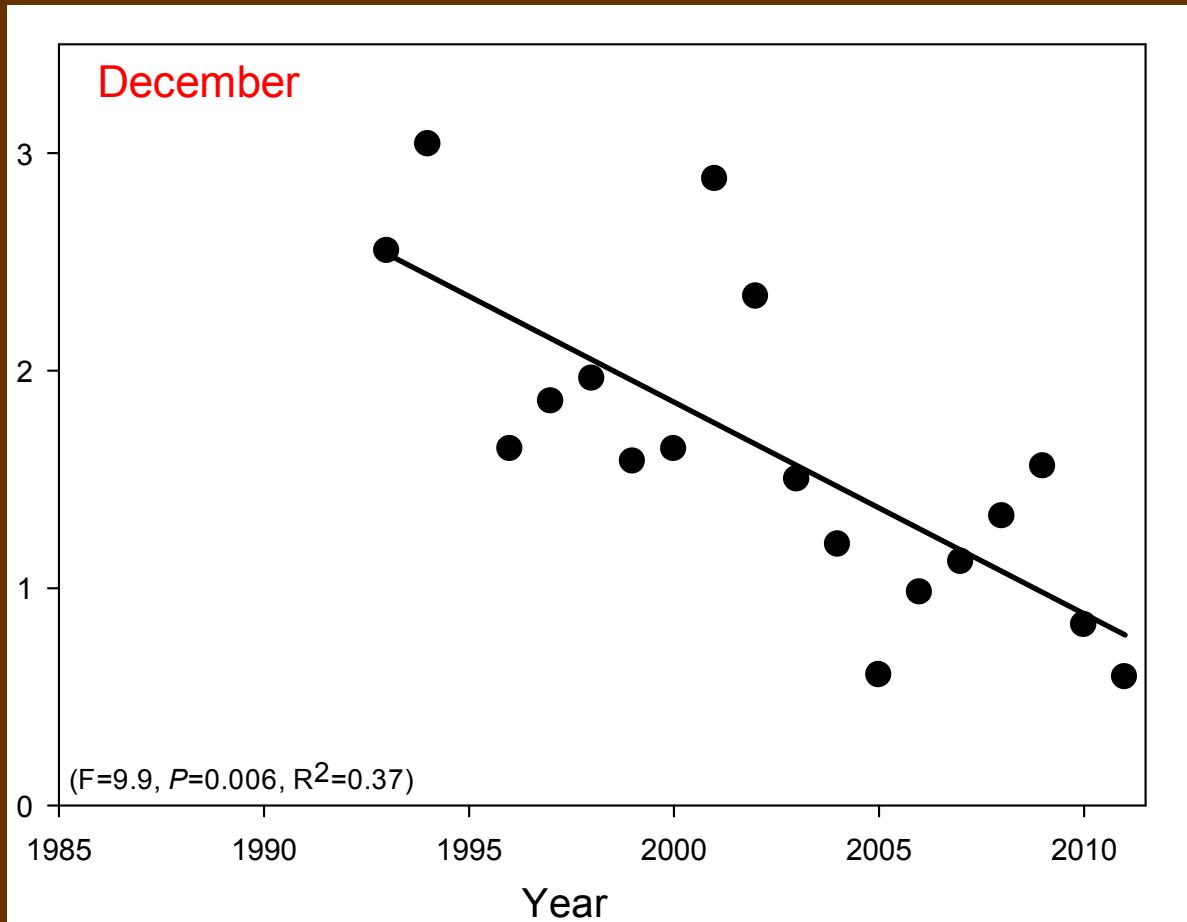
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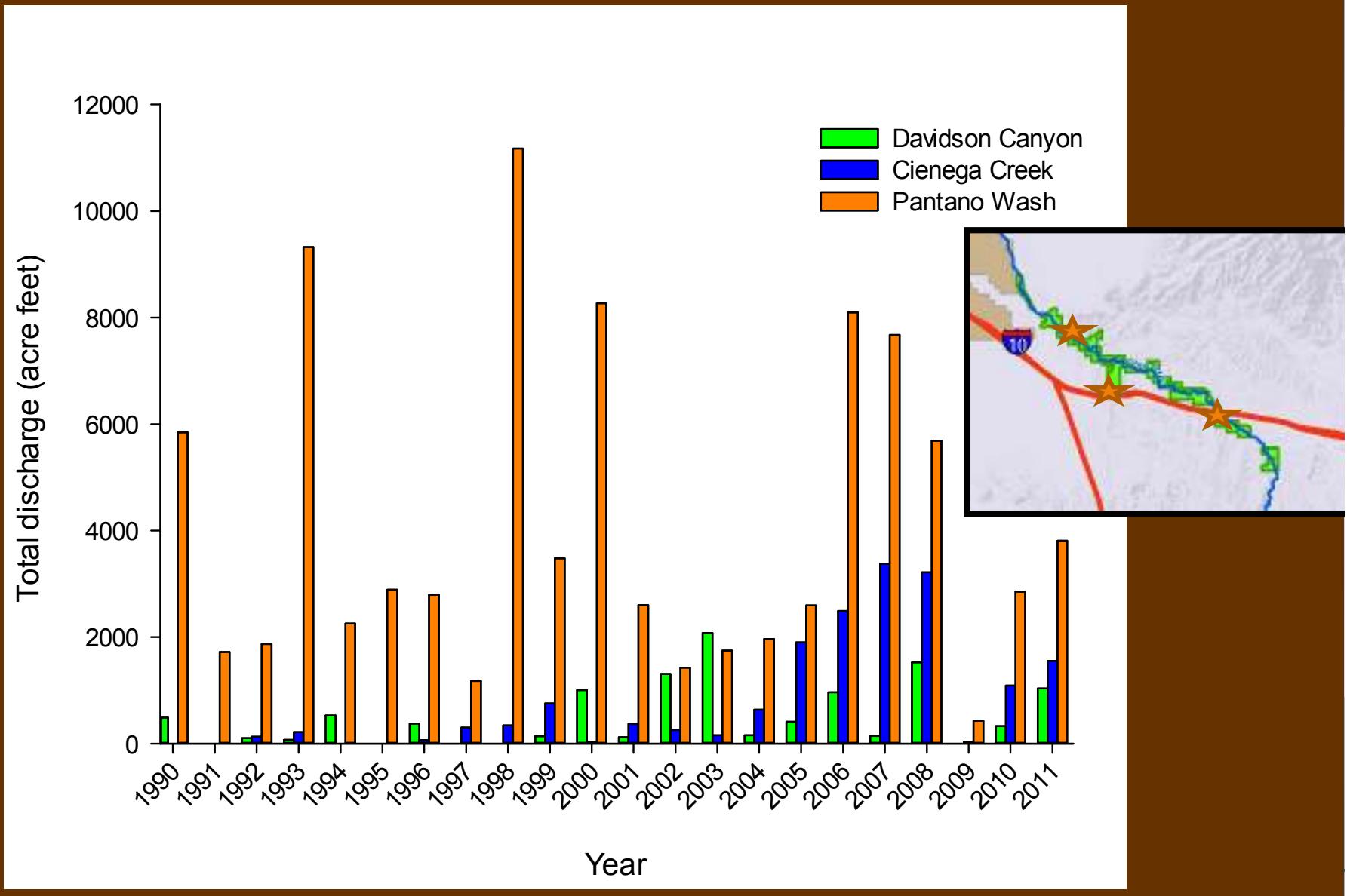
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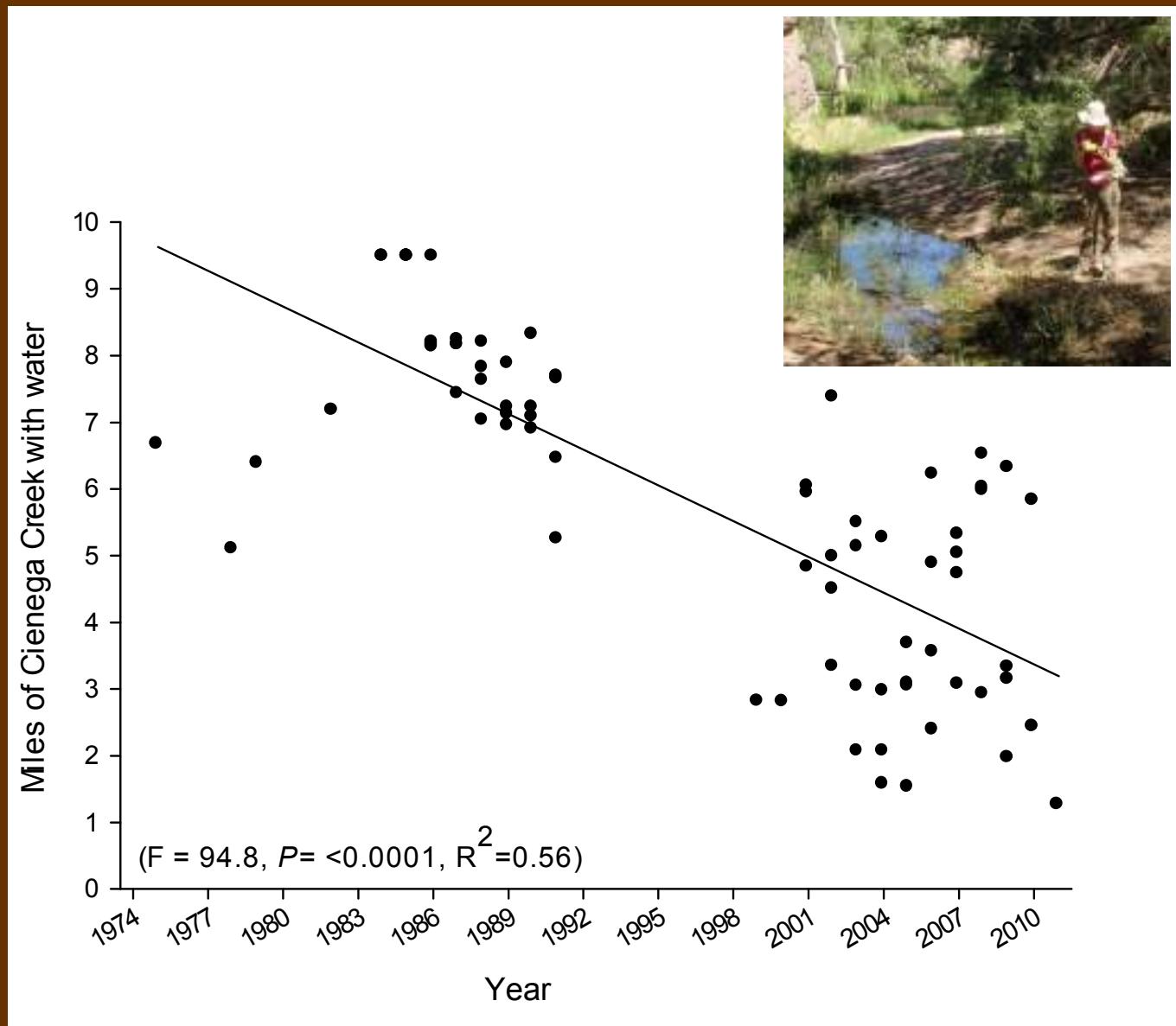
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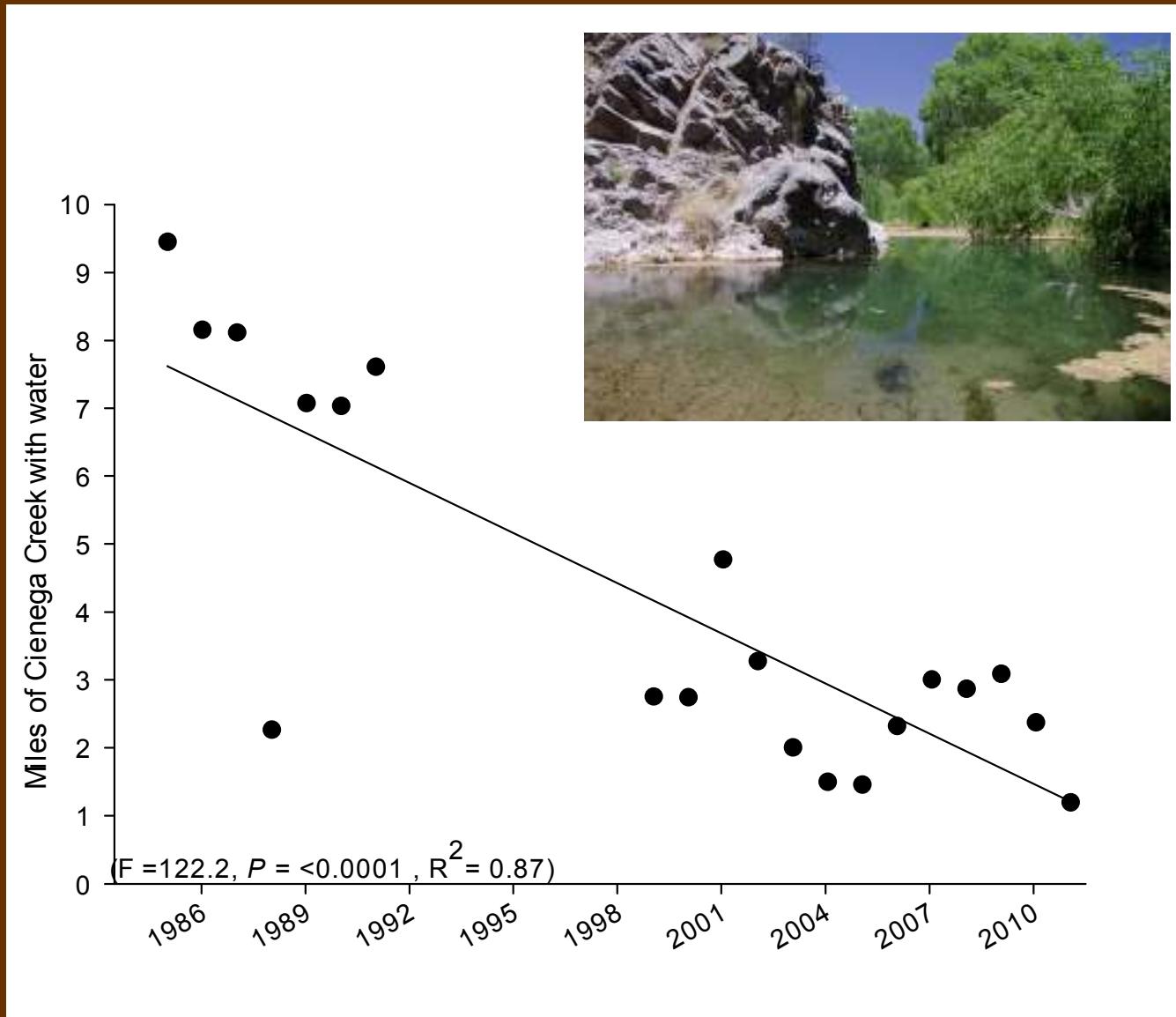
# Total Discharge

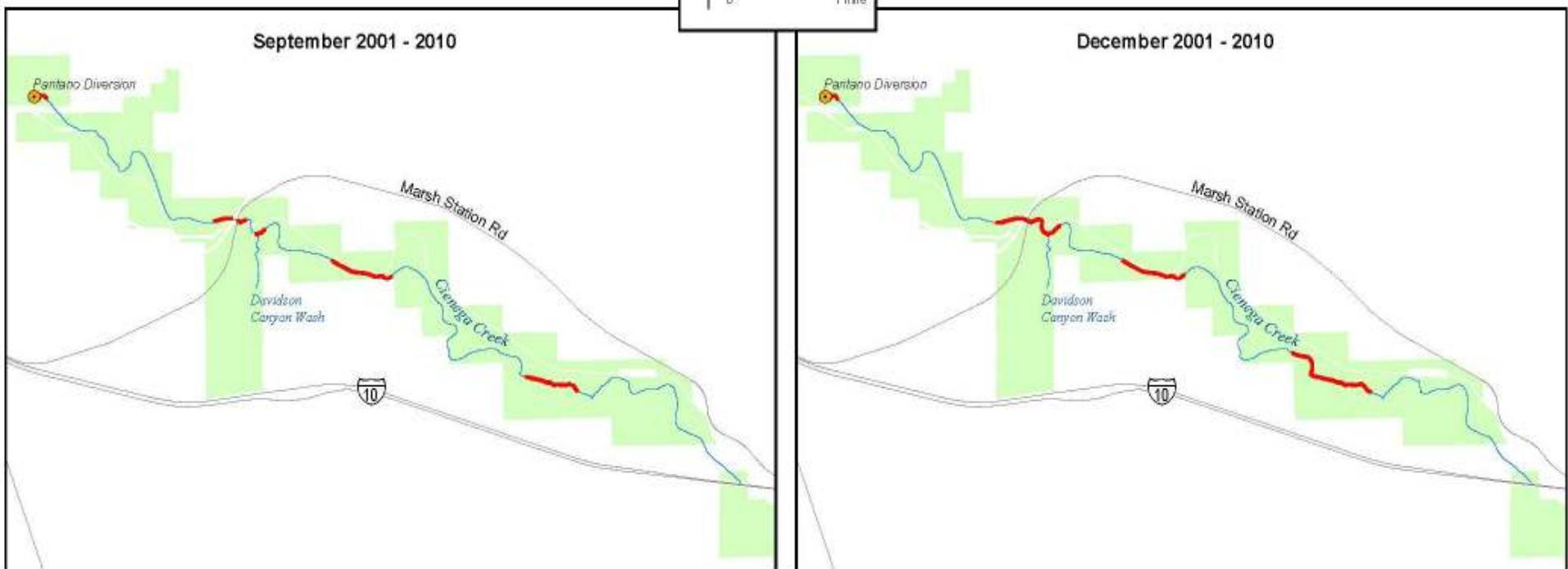
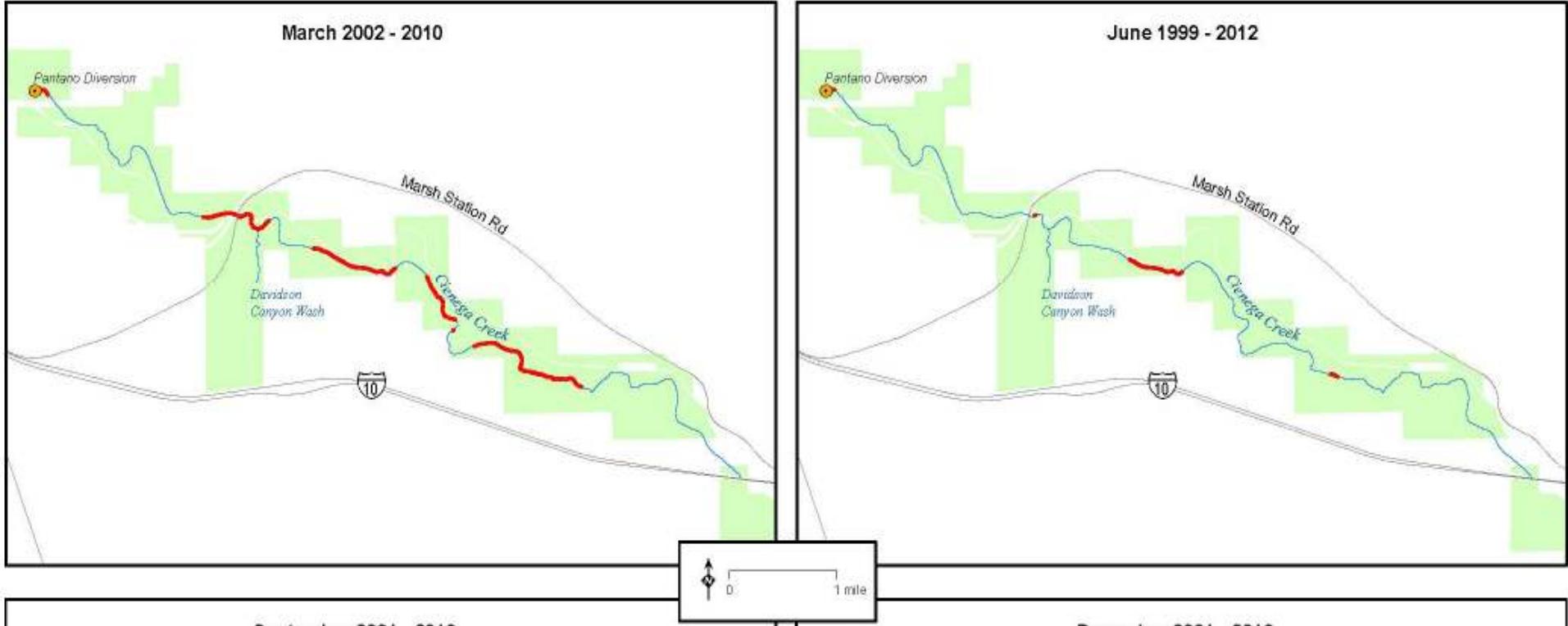


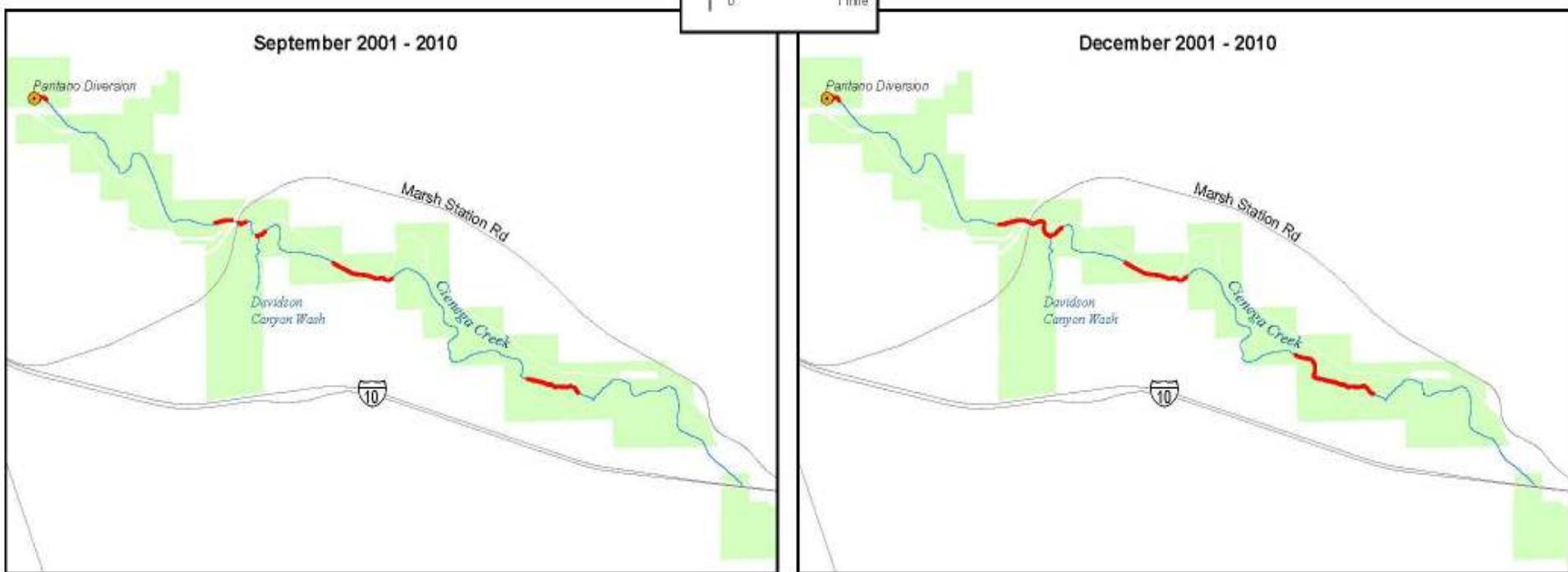
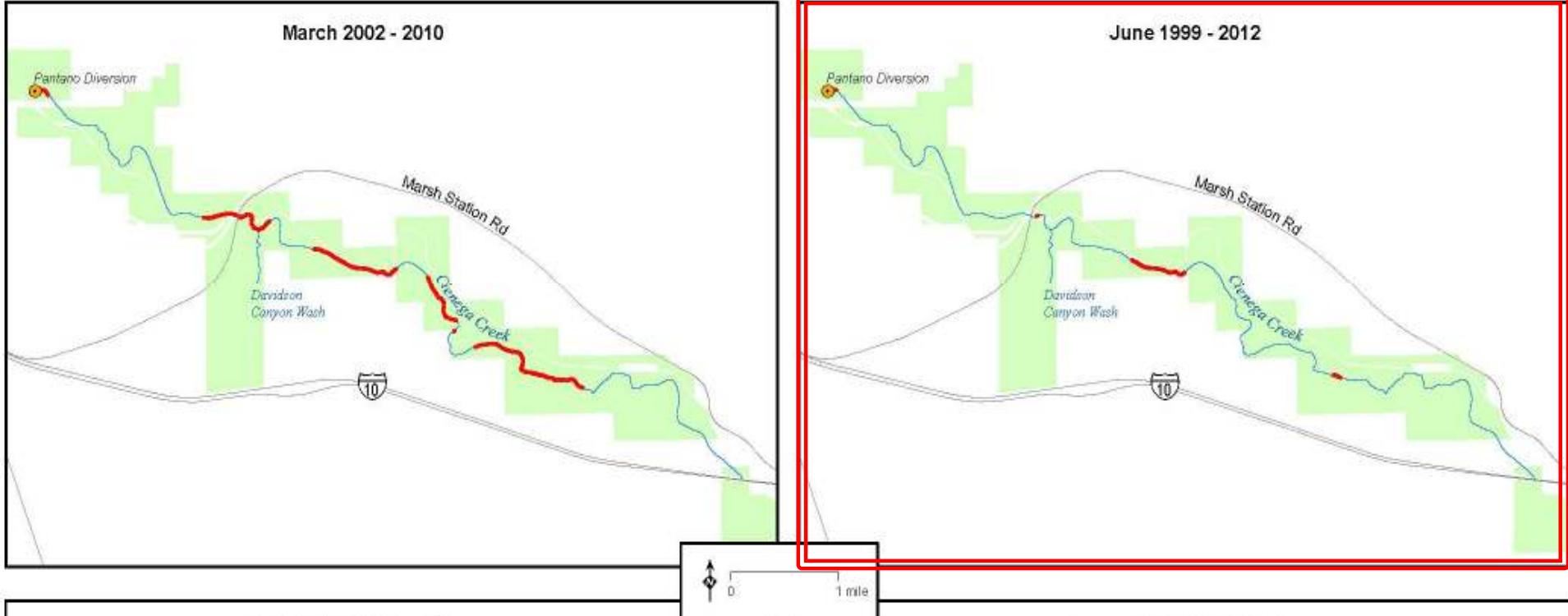
# Streamflow Extent: All Seasons

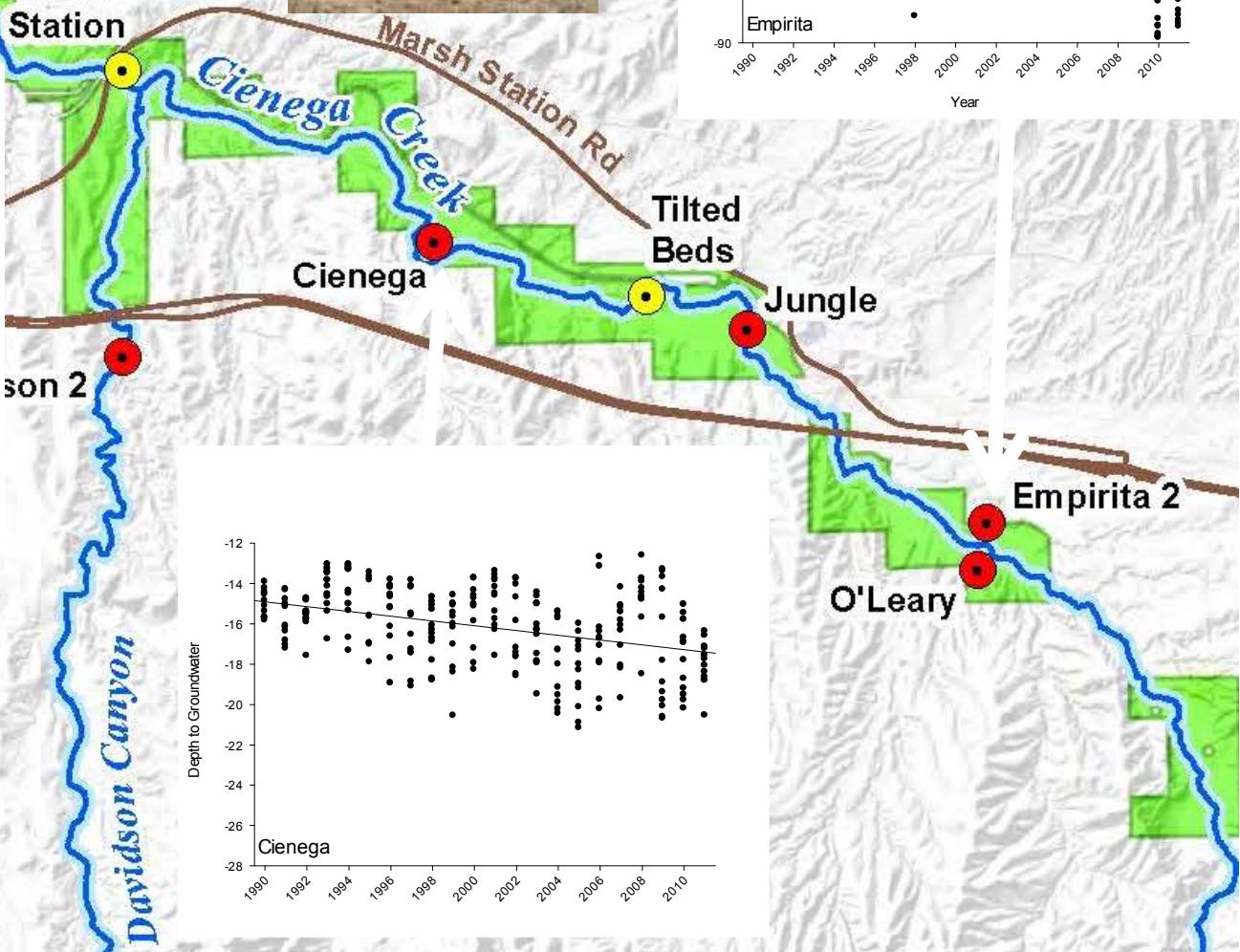
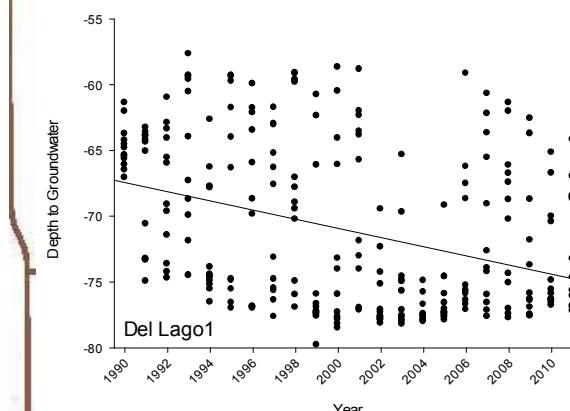
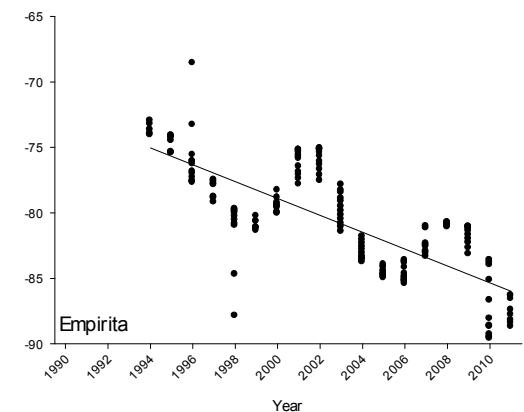


# Streamflow Extent: Dry Summer









# Ecological Thresholds

