

**EPHEMERAL CHANNEL
RECHARGE
&
ET from NEAR-CHANNEL
VEGETATION**

PROBLEM: Runoff transmission losses in ephemeral channels can be measured and modeled relatively well within Walnut Gulch. However, direct measurements of the partition of runoff transmission losses being used by near-channel vegetation and reaching deep groundwater are generally not available.

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APPROACH

NEAR CHANNEL ET:

Sap flux density using the heat pulse velocity technique with shallow wells in a perched, ephemeral aquifer at Walnut Gulch Flume 2.

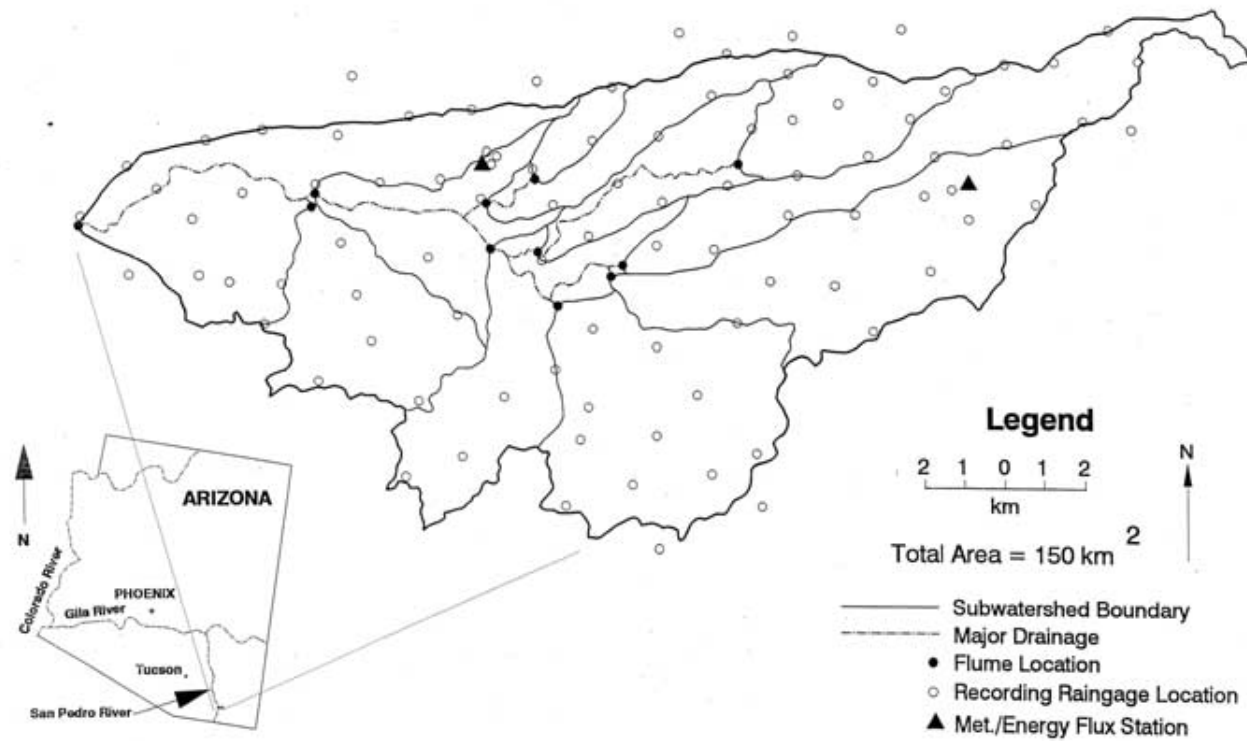
REGIONAL AQUIFER RECHARGE:

Comparison of stable isotope (deuterium and ¹⁸O) composition of surface water event runoff at flume 6 to deep well groundwater at wells upstream and downstream of the flume.

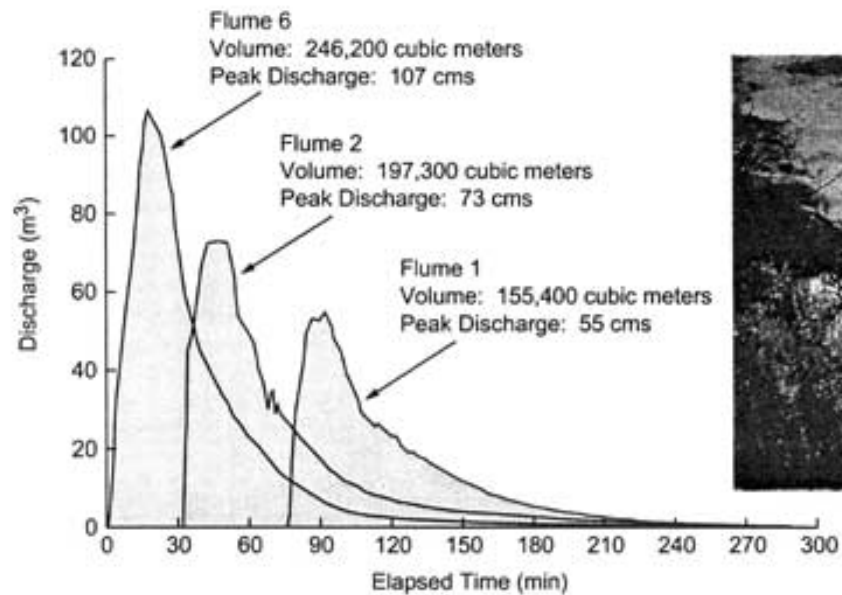
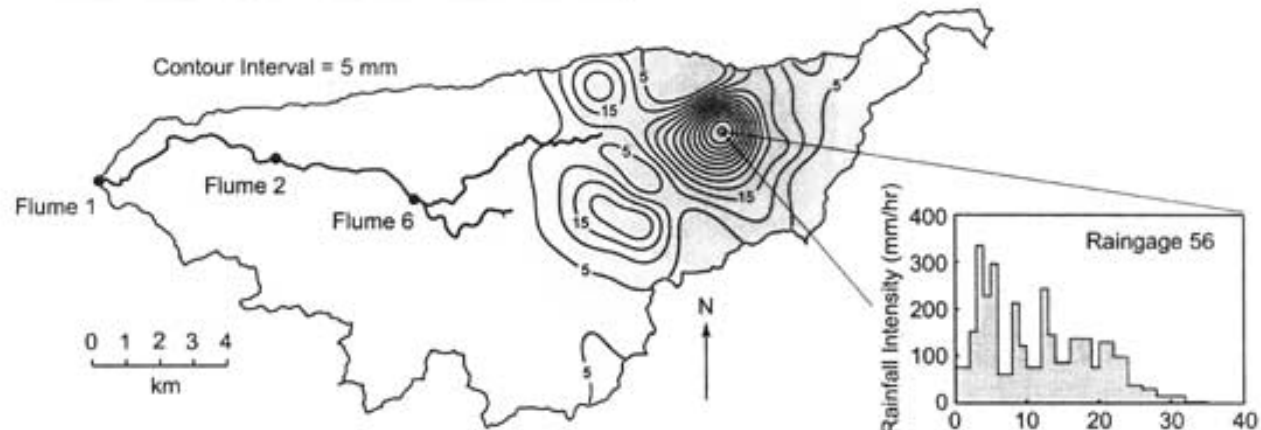
+ Cl
+ Tritium

USDA-ARS WALNUT GULCH EXPERIMENTAL WATERSHED

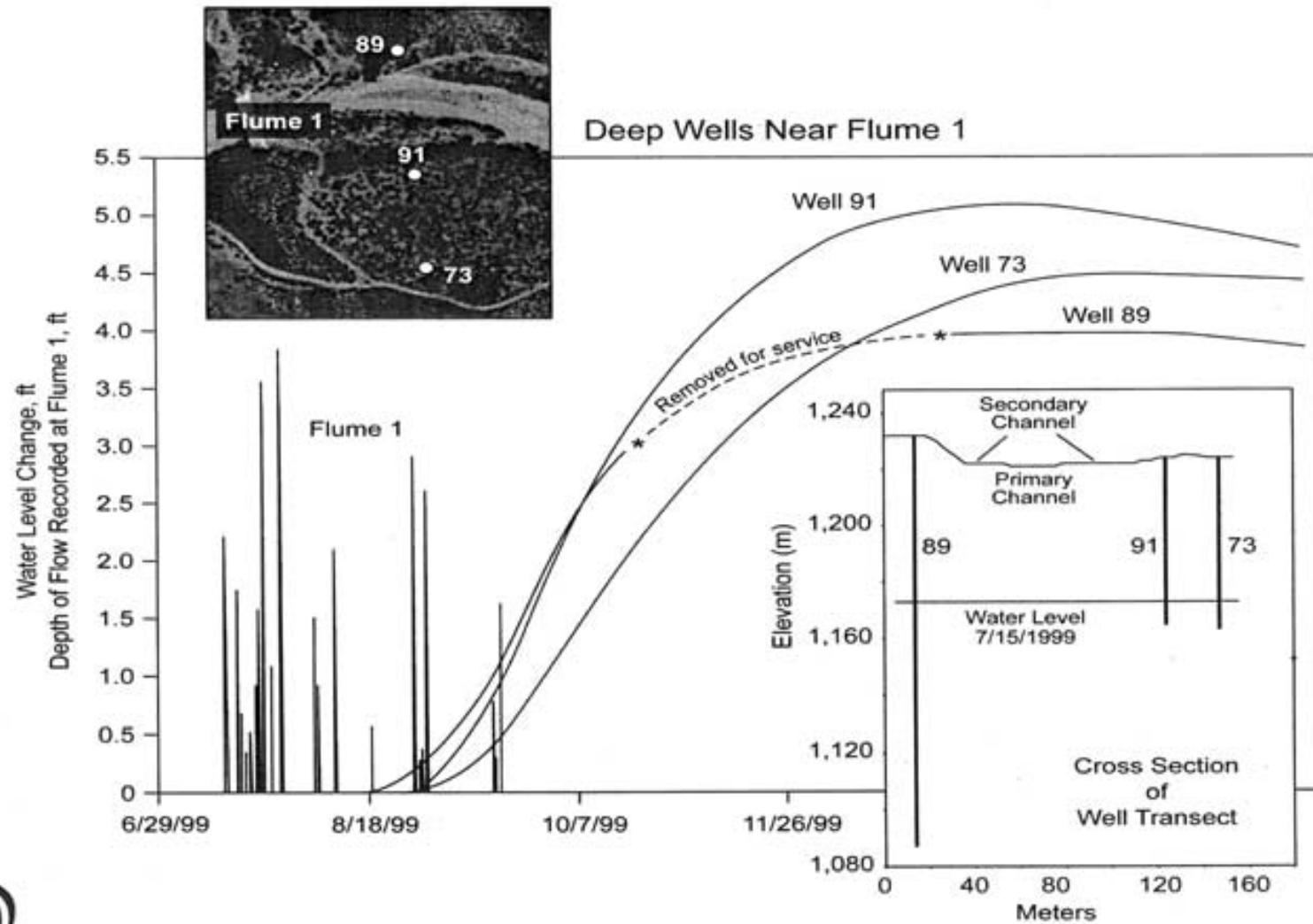
Raingage and Subwatershed Locations

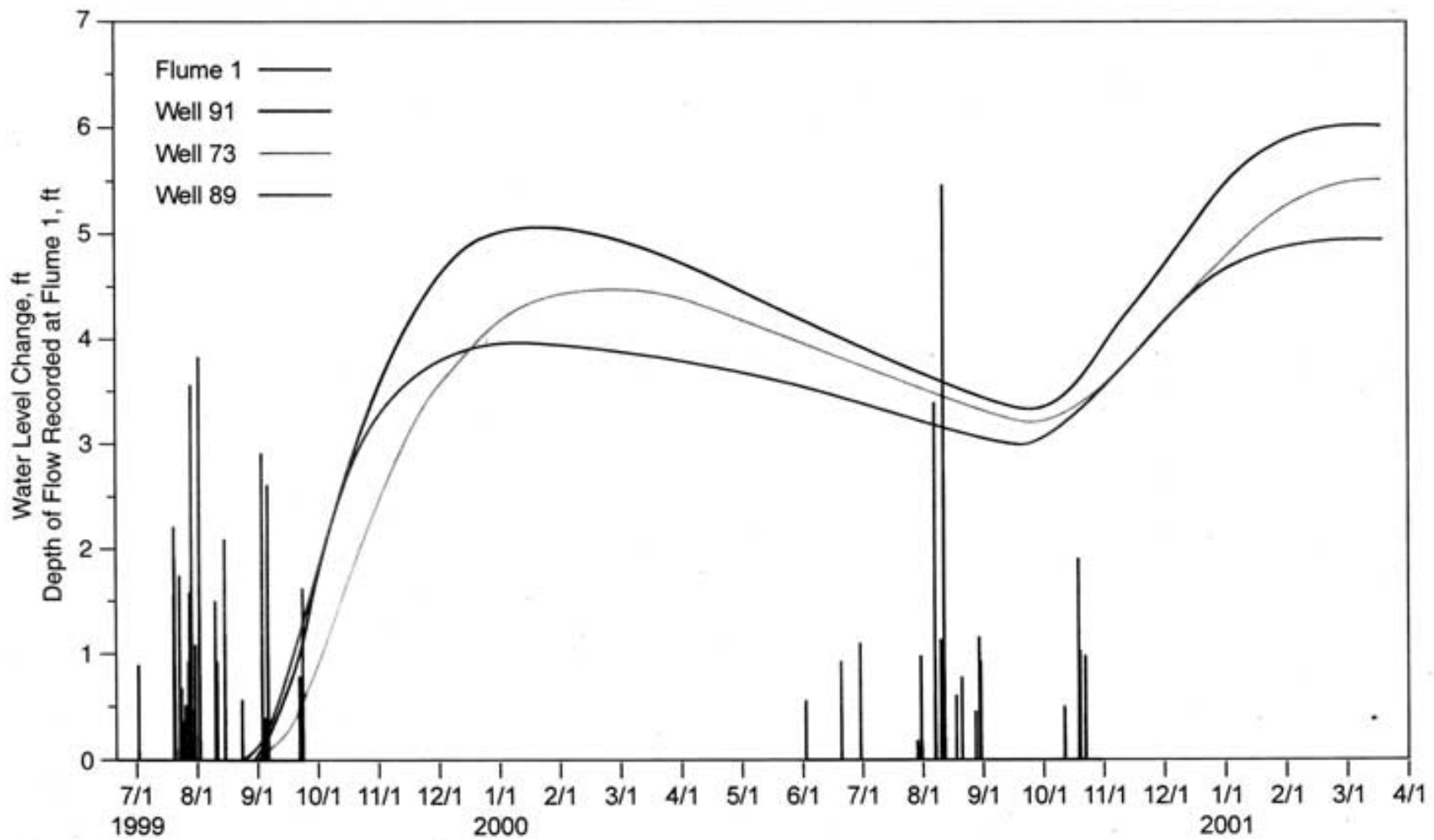


Ephemeral Streamflow



Ephemeral Channel Recharge





Water level changes in deep wells upstream of Flume 1 and flow depth at Flume 1 from 6/15/99 to 4/1/2001.

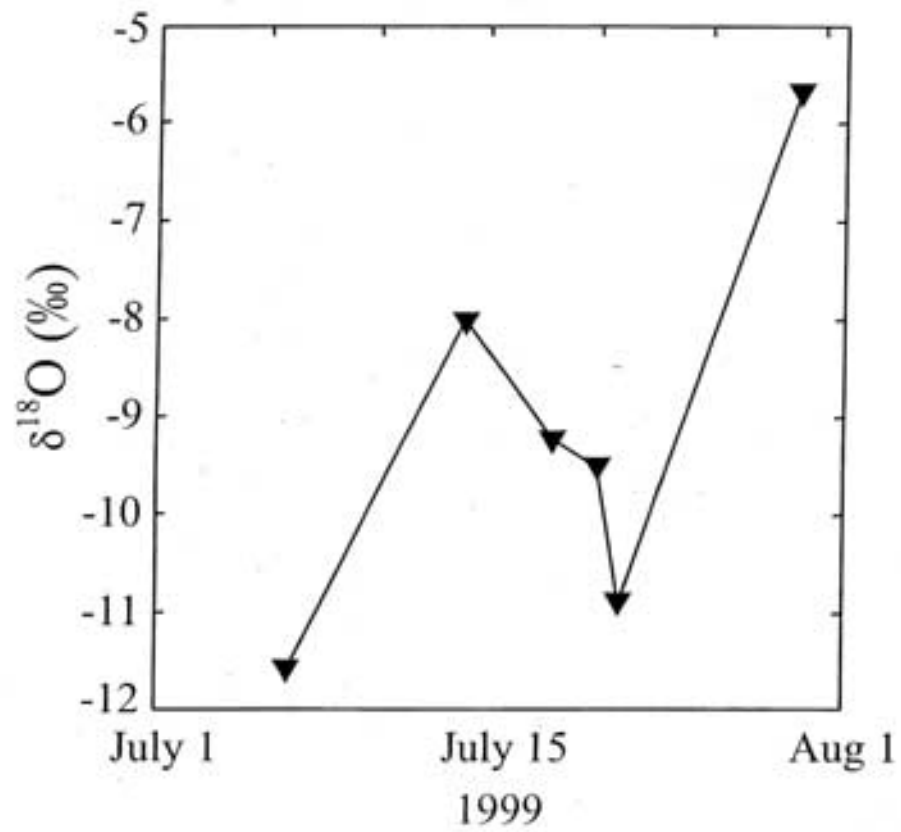
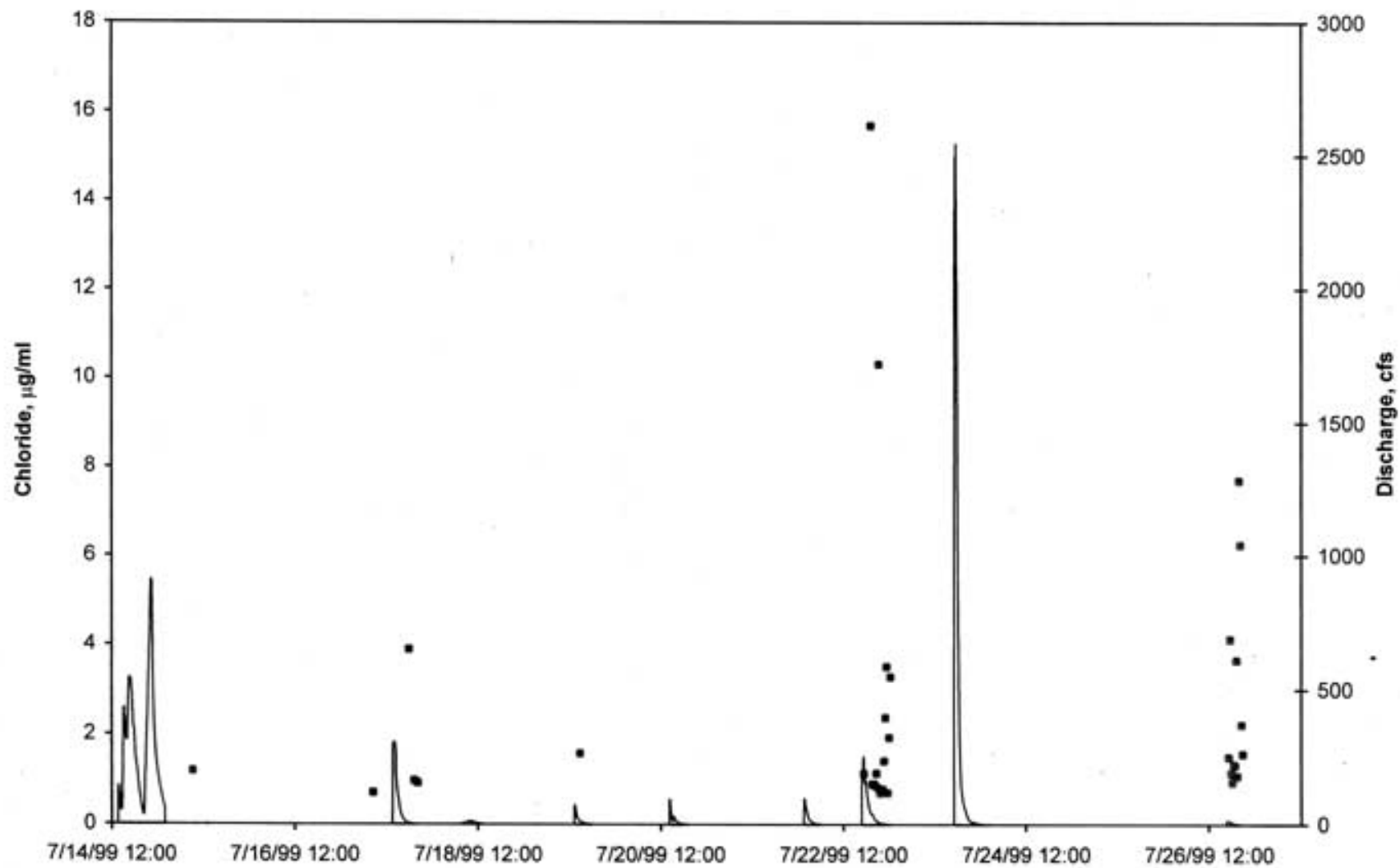


Figure 6. Oxygen isotope composition ($\delta^{18}\text{O}$) of rainfall during July 1999 at Flume 2.

Flume 2



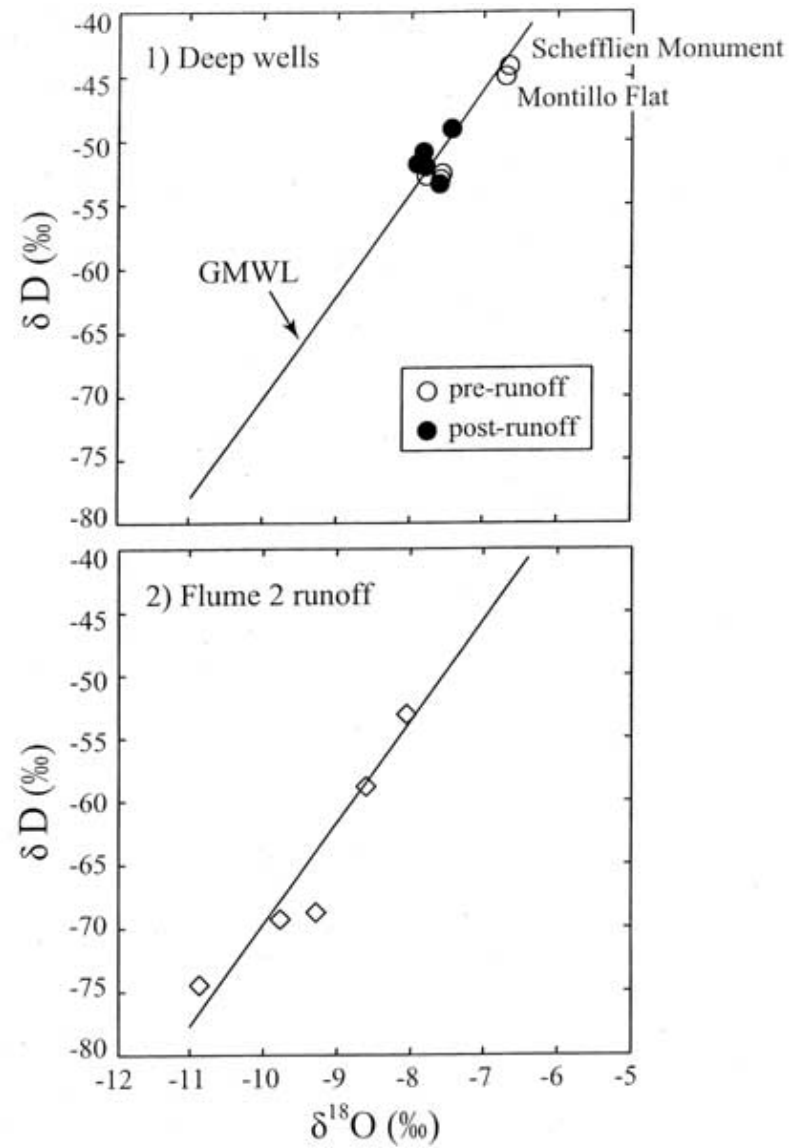


Figure 7. Oxygen ($\delta^{18}O$) and hydrogen (δD) stable isotope composition of 1) representative deep wells collected in June (pre-runoff) and October (post-runoff) of 1999, and 2) runoff water from July 1999.

Deep Wells - Montillo Flute

25.186 - (11)

Run 4.

Point 2.

Flume 6

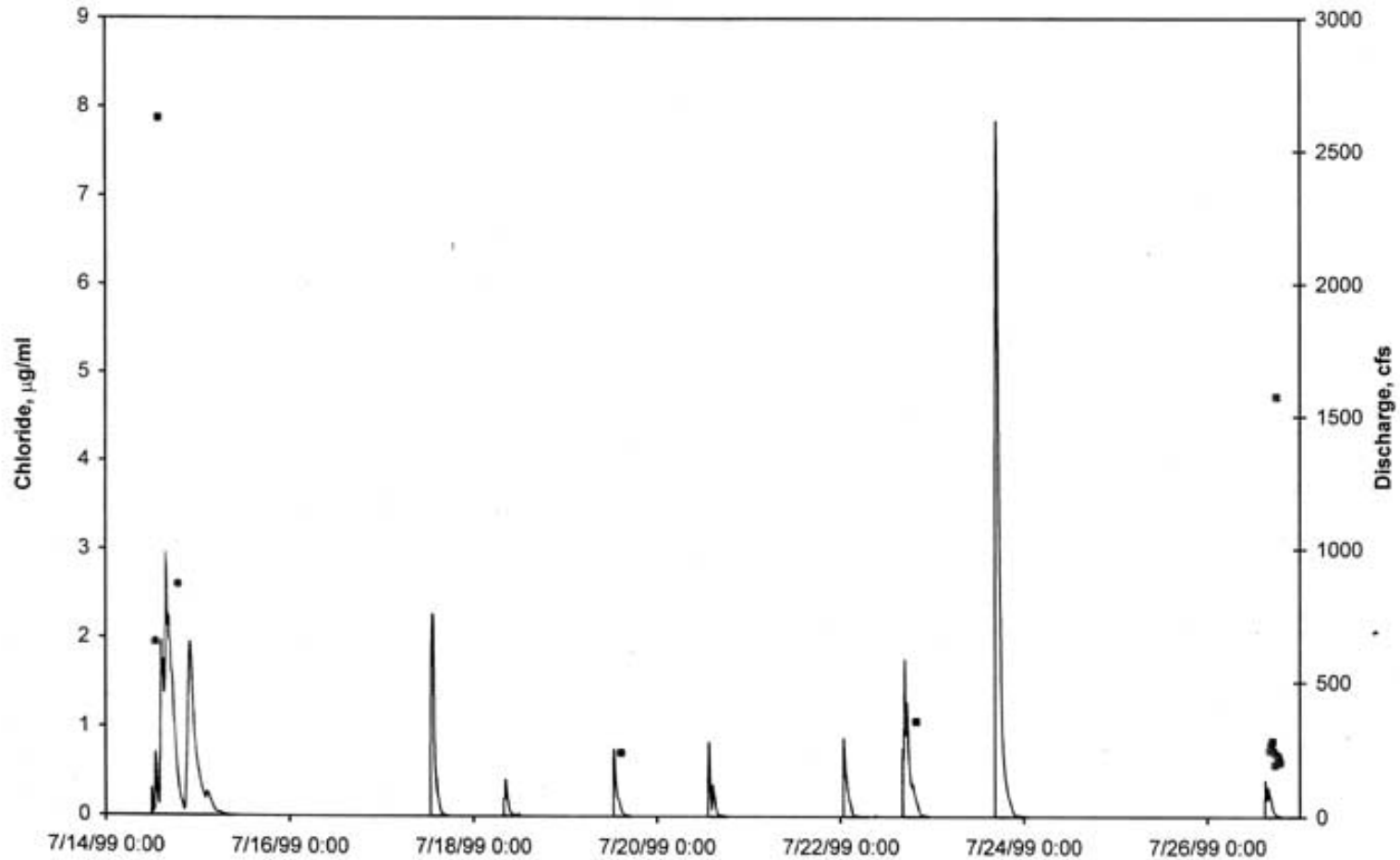


Table 1 - Oxygen isotope values ($\delta^{18}\text{O}$) of water collected from deep wells throughout the Walnut Gulch.

Well #	Location	May-99	Jul-99	Oct-99	Nov-99	Feb-00	Dec-00
24	upper channel	-7.31					
27	upper channel	-7.39				-7.2	
25	Holiday Ranch	-7.47	-7.38			-7.21	
72	City	-7.79	-7.68				
73	City	-7.52			-7.53	-7.36	
77	gun range (above Flume ²)		-7.78	-7.85	-7.8	-7.58	-7.5
-	Sch Monument (off channel)		-6.74	-7.41	-7.63	-7.35	-7.46 →
89	Flume 1		-7.69	-7.76	-8.05	-7.65	-7.85
40	Flume 1		-7.52	-7.55	-7.88	-7.4	-7.69
63	Montillo Flats (off channel)		-6.7		-7.79	-7.29	-7.34 → <i>sluff</i>

