

John G. Williams, Ph.D.

Environmental Hydrology

Presentation to the Monterey Water Management District

Considerable concern has been expressed by the Carmel River Steelhead Association and others about the lack of flow in Garzas Creek this summer and fall. Naturally, there is suspicion that increased water use on the San Carlos Ranch, for example on the new golf course, is responsible for the creek going dry. Garzas Creek normally goes dry in its lower reach, where the channel crosses the Carmel Valley alluvium into which the flow seeps. It has long been regarded as perennial in the canyon, however, and even at the end of the last drought some flow in the canyon was acknowledged by the San Carlos Ranch EIR. (Apparently flow data collected for the EIR are contained in reports by Balance Hydrologics, but I do not have these at hand.) This is the reach that reportedly went dry this summer. In any event, the creek also has the reputation of providing good habitat for juvenile steelhead.

The MPMWD has maintained a gage on Garzas Creek at the West Garzas Road bridge since 1991, but the gage is located on the part of the creek where the summer flow goes subsurface, and so does not measure summer baseflow. The MPWMD installed a new gage in the canyon in 2001, and can confirm the lack of flow there, but this cannot be used for comparing 2001 with past years. However, the MPWMD maintains an excellent program for collecting basic hydrological data, and the staff has provided me with data that do allow for putting the summer and fall of 2001 in a relevant context hydrological. Some of these data are presented in the attached figures.

The MPMWD staff measures the flow in the Carmel River upstream from Los Padres Dam about once a month in the low flow season. These data reflect only natural runoff, and show that while flows in the spring of 2001 were slightly below median, the summer-fall flows were very close to median levels (Figure 1A). Inspection of the figure shows that the "recession curves" for 2001 and 1999 were very similar. These are displayed separately, for clarity, in Figure 1B. Precipitation at San at Clemente was also similar for 1999 and 2001 (Figure 2). Total rainfall was higher in 2001, but there were usually heavy rains in October 2000 that probably had little effect on spring runoff.

Streamflow at the Garzas Creek gage was considerably higher in 1999 than in 2001, however (Figure 3). The extent of this difference seems too great to attribute completely to increased consumptive water use on the San Carlos Ranch, so it seems likely that other factors are also involved. Three possibilities come to mind: (1) because of geological differences between the watersheds of Garzas Creek and the upper Carmel River, there may have been a greater carryover effect from the very wet year in 1998 on Garzas Creek; (2) the San Clemente rain gage data may not accurately reflect the average rainfall over the two watersheds, because of spatial variation in the rainfall;¹ and (3) inaccuracies in the Garzas Creek gage data² may exaggerate the difference in flow between the two years.

¹ The San Clemente gage is about five miles from Moores Lake.

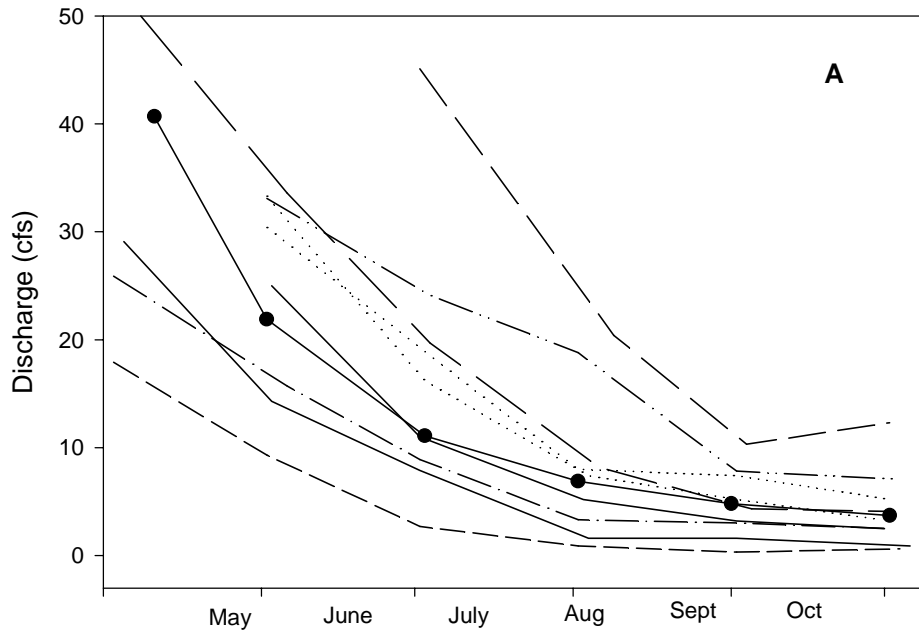
² The MPWMD rates the Garzas Creek data as only "fair," which implies that inaccuracies of 10% are quite plausible.

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Enough data are available to conduct more sophisticated analyses that might shed light on the role of the factors listed above in explaining the apparent discrepancy between the Garzas Creek and San Clemente data. However, these fine points may be of mainly academic interest. The data presented here show clearly that 2001 was not an usually dry year, so it seems very difficult to explain the lack of summer flow in the canyon reach of Garzas Creek except by increased water use on the San Carlos Ranch. The reduction in surface flow in the stream could come either from direct diversions from the surface stream or from Moores Lake, or from diversions of groundwater that affect seepage to the stream.

Sincerely,
John Williams

John C. Williams Ph.D.
 Carmel River Above Los Padres
 Data from MPWMD



Carmel River Above Los Padres
 Data from MPWMD

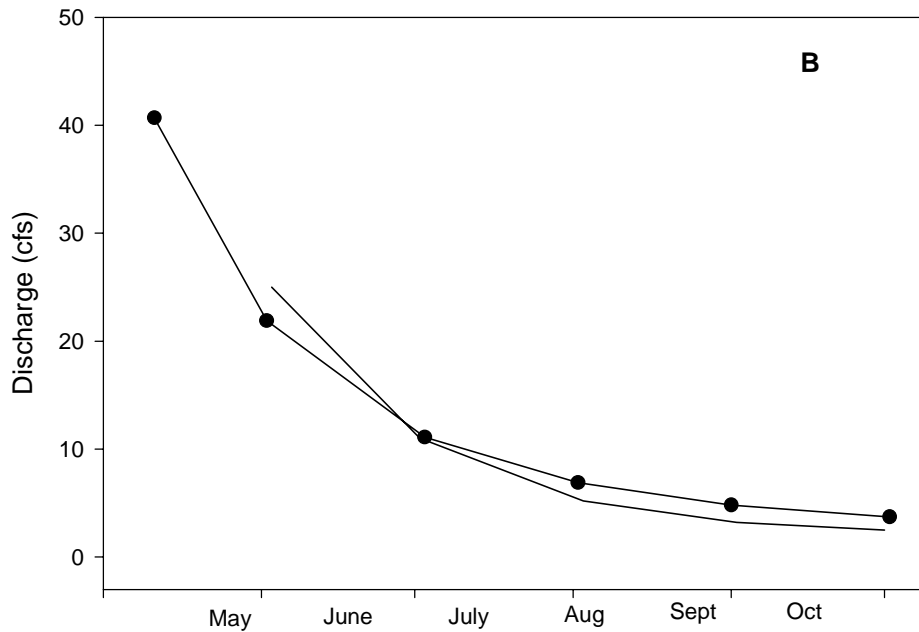


Figure 1: A. "Spaghetti plot" of flow in the Carmel River above Los Padres Dam, for water years 1992 to 2001. Flow in WY 2001 (line with symbols) declines rather early, compared to other years in this data set, but base flow in September and October held up well. B. Recession curves for 1999 and 2001 shown separately, to show their similarity.

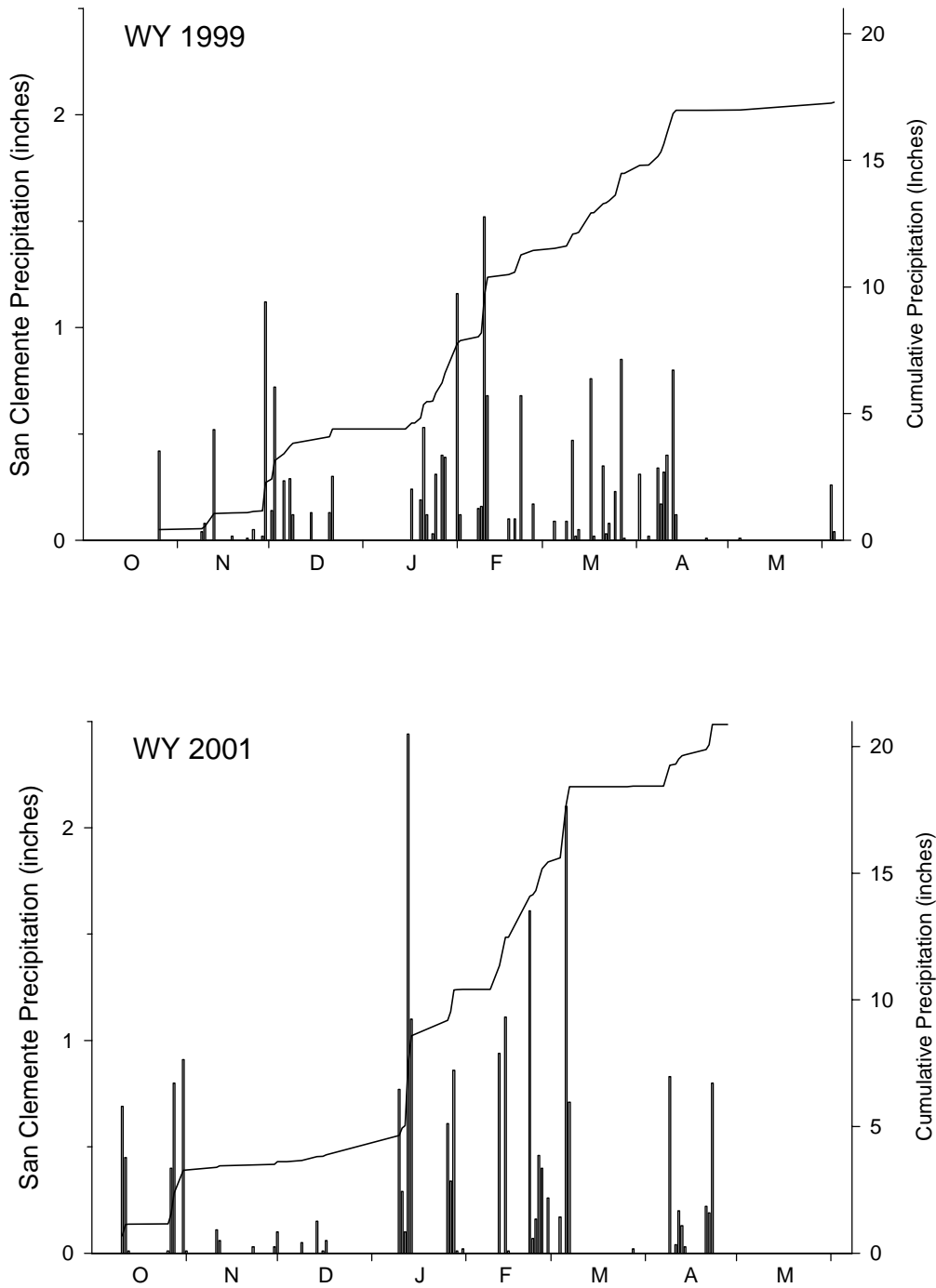


Figure 2. Rainfall at San Clemente Dam in water years 1999 and 2001. Bars show daily totals (left axis) and the lines show cumulative totals (right axis). San Clemente rainfall totaled 17.4 inches in 1999, and 21 inches in 2001. Data collected by Cal-Am.

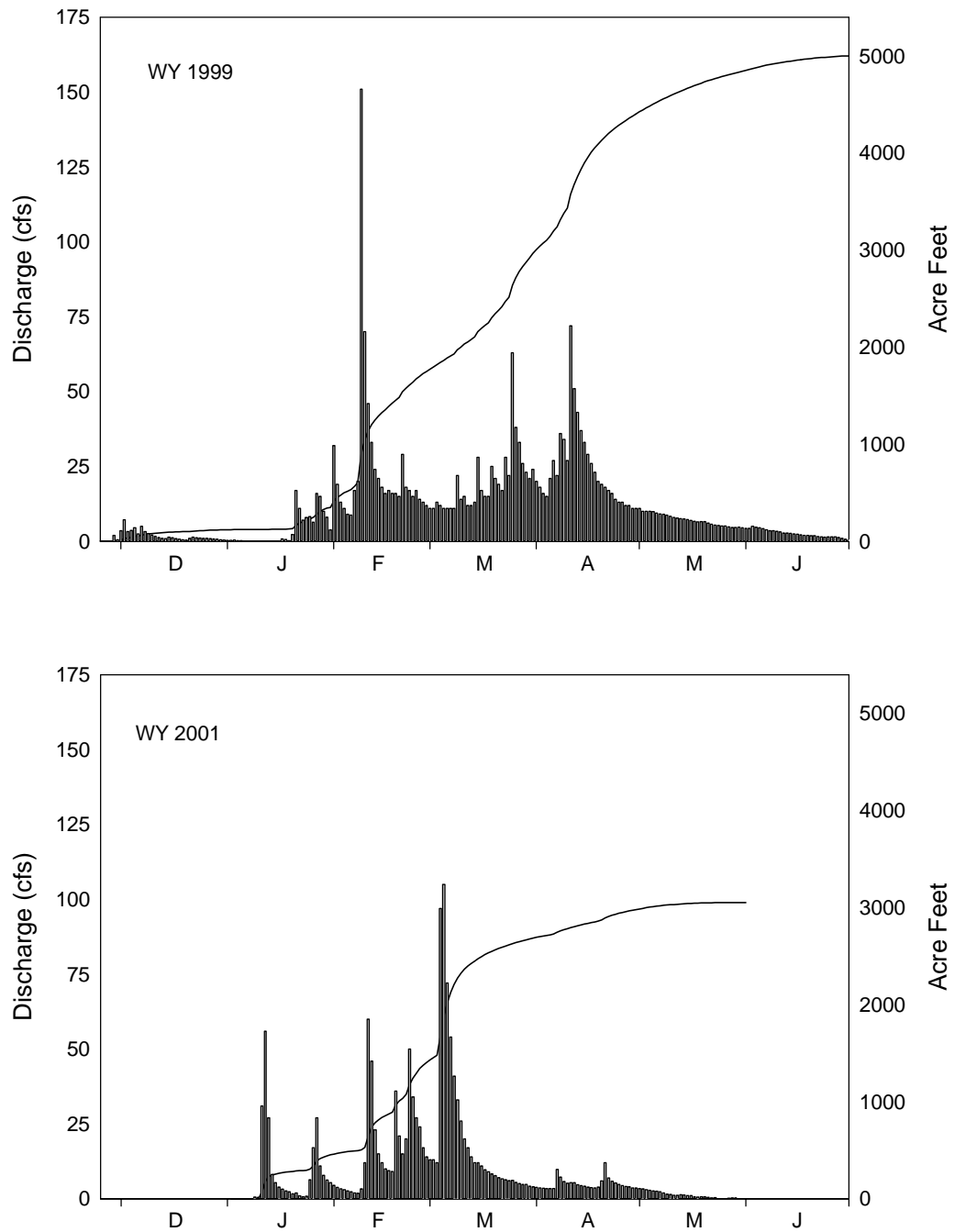


Figure 3: Comparison of flows at the Garzas Creek gage in 1999 and 2001. Bars show average daily flows in cfs, lines show cumulative flows in acre-feet. Flows started later and ended earlier in 2001, and totaled about three-fifths as much. Note the small response in April 2001 to rain that was substantial at San Clemente (Fig. 2).

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