was to measure evapotranspiration at representative vegetation study sites throughout the valley (fig. 2) to relate these data to soil and plant characteristics at the sites, to extend the relations to quantify evapotranspiration throughout the valley, and then to synthesize the results in an analysis of the overall hydrologic system.

As part of the studies of native vegetation, Duell (1990) used micrometeorologic equipment to collect detailed evapotranspiration measurements during 1984–85, a period of relatively abundant surface water and ground water in the valley. The results for high-ground-water alkali meadow and alkali scrub communities [fig. 6 and table 3], which are summarized in table 5, show that evapotranspiration rates on the valley floor ranged from about 12 in/yr to about 45 in/yr depending on the type and percentage of vegetative cover. Assuming that these rates are representative of average conditions on the valley floor where the depth to water is approximately 3 to 15 ft, then evapotranspiration is about 3 to 6 times greater than the quantity of precipitation that is available.

During the same period and at the same sites, Groeneveld and others (1986a, 1986b) collected transpiration measurements from native vegetation using a porometer, an instrument that encloses a few leaves of a plant and measures water-vapor flux (Beardsell and others, 1972). These measurements can be converted to transpiration from an entire site using measurements of total leaf area per plant and plant density per site. Results from Groeneveld and others (1986a, p.117) suggest that most of the evapotranspiration measured by Duell (1990) is transpiration from native vegetation.

Coincident monitoring of soil moisture at the same sites indicated that most of the transpired water came from the unsaturated zone, including that part just below the land surface. These findings indicate that the

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**Figure 8.** Annual precipitation as Bishop and Independence, California (sites 2 and 10, respectively, in figure 7).