in a geographic sense, and this basic observation leads to the underlying assumption that modern climatic variations within the Great Basin give an indication of what should be expected precipitation in Nevada for pluvial climates with lower mean annual temperatures.

Runoff

Runoff is a function of precipitation and evapotranspiration; however, evapotranspiration is very dependent upon subtle parameters such as terrain conditions and distribution of precipitation in time and intensity. Thus, when evaluating climate from hydrologic conditions depicted by Equation 4, the right-hand term containing runoff is easier to use.

Runoff is also a dependent variable of temperature. Figure 23, adopted and modified from Schumm (1965, p. 784), clearly demonstrates just how important temperature is with respect to runoff from a given amount of annual precipitation. These curves by Schumm are based on runoff throughout the United States presented by Langbein and others (1949, p. 9). Mean annual runoff and precipitation is compared to weighted mean annual temperature. Weighted mean annual temperature refers to the temperature during the time of runoff, i.e., if the majority of runoff occurred during warmer months, a higher weighted mean temperature would result. In Nevada, where the majority of runoff occurs during spring and early summer from snow melt, weighted means should be close to the mean annual temperature. To aid evaluation in this study, trends were somewhat extended beyond Schumm's data supported curves into the region of low runoff and rainfall, as indicated by the question marks in Figure 23.

Collectively, the basins of northwest Nevada have a mean annual temperature of about 50°F and mean annual precipitation of only 8 inches. Using Figure 23, it would appear that something less than 0.1 inches of runoff theoretically should occur each year. All but a small percentage of the region has less than 1 inch of average annual runoff, as shown on an average annual runoff map (Nevada Hydrologic Atlas, 1972). The small areas where runoff exceeds 1 inch are localized areas of exceptionally high terrain where precipitation is much greater than 8 inches; for example, about 31 inches of precipitation at 43°F yields about 11 inches of annual runoff for a mountain station (Truckee Ranger Station, Calif.). This is a profound difference in availability of runoff and directly comparable to only small areas of the highest mountains in Nevada, such as the Carson Range near Reno, the Santa Rosa Range and Jarbidge Mountains in northern Nevada; also, the Ruby Mountains, Snake Range, and Schell Creek Range in northeastern Nevada, and the Toquima Range and Toiyabe Range in central Nevada. These mountainous areas locally yield more than 10 inches of runoff.

In comparing modern climatic conditions and associated runoff to pluvial climatic conditions and associated runoff, the obvious contrast is demonstrated by the existence of the pluvial lakes (plate 1). In other words, pluvial climatic conditions were clearly conducive to more runoff reaching the lower parts of many of the closed basins in Nevada.

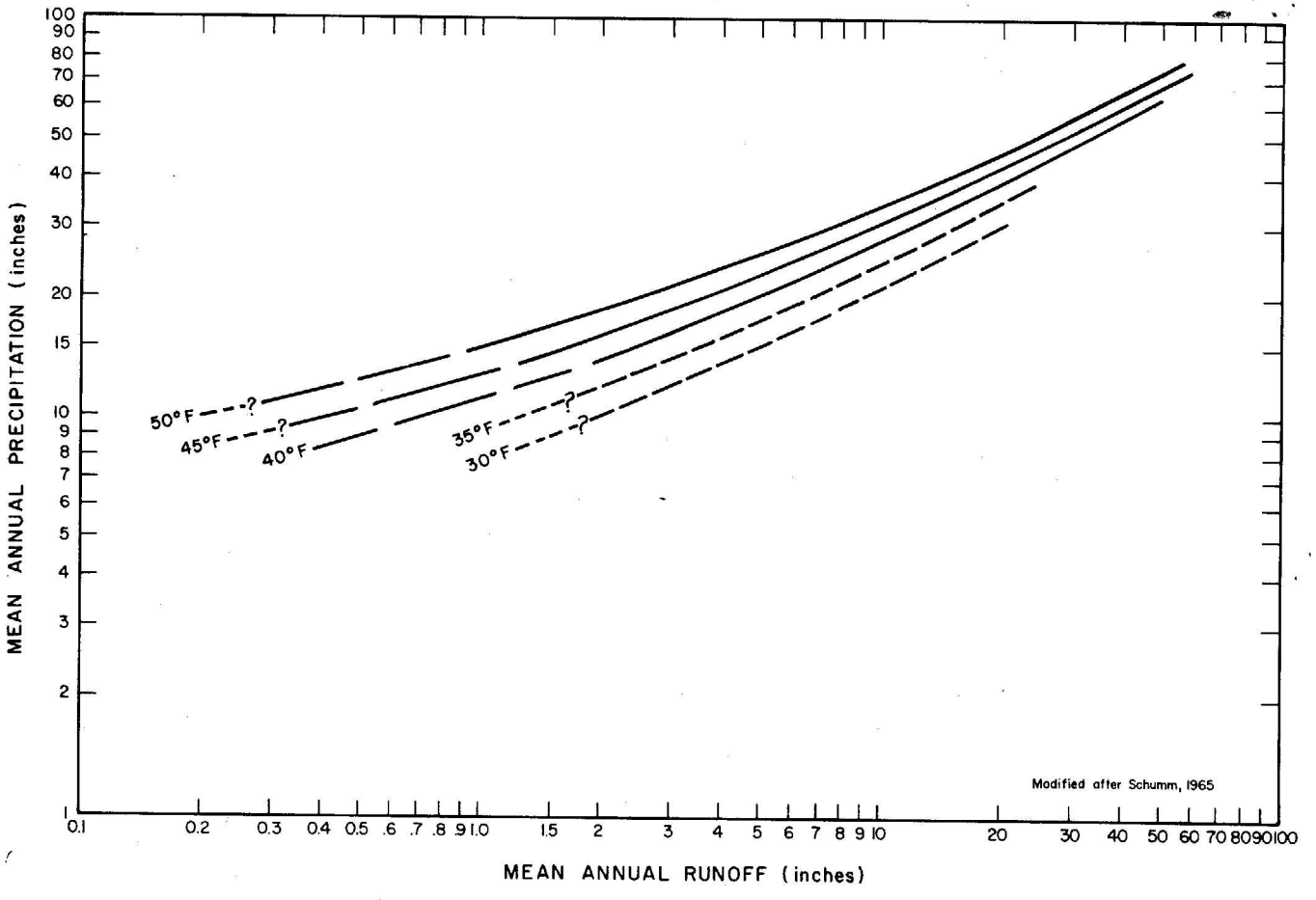

FIGURE 23. Relation between mean annual temperature, precipitation and runoff.