

The larger estimate of future virgin runoff at Lee Ferry, the larger will be the estimate of water supply for the lower basin, although not in direct proportion. With a 4.4 million acre-foot California priority the magnitude of the central Arizona project water supply is more sensitive to the estimate of future virgin flow at Lee Ferry.

I would like to discuss the proposal that we ignore the streamflow records of the Colorado River prior to 1922 as a basis for water supply projections. Our understanding of the basis for this proposal is that the earlier records are unrealistic and that actual recorded runoff at Lee Ferry has been measured only since 1922.

Our projections of virgin runoff of the Colorado River consistently have been based on the longest period of runoff record on the Colorado River which we have identified as starting in 1906 and continuing through today.

Continuous records since 1906 are available at points upstream from Lee Ferry which measure over 70 percent of the runoff which reaches Lee Ferry, and continuous records since 1906 are available at points downstream from Lee Ferry which reflect primarily the runoff at Lee Ferry. By correlating the actual flows at Lee Ferry during the period 1922 to date with these other records, the unmeasured flow at Lee Ferry for the period 1906 to 1922 can be estimated with confidence. Thus, based on reliable records, we believe there can be no serious question that the average virgin runoff of the Colorado River during the period 1906-22 was significantly higher than in the period since 1922.

The purpose of selecting any period of record as the basis of analysis is to guide the projection of the water supply available to a project during its effective life. All reliable data available are normally used for making this projection. There is no more justification for casting out high years because they occurred early in a period than there would be for ignoring low years for the same reason. Rejection of any part of a long-term record would be justified only if there were a question of its accuracy or if there were an identifiable change in conditions that rendered it no longer appropriate.

It is obvious that the runoff of the Colorado River has been less since 1930 than in the preceding 25 years. We do not know the reason. However, changes in runoff sequences have occurred frequently in the past. The available runoff records of the Colorado River show that generally drought conditions prevailed during the year 1896-1903, inclusive, and that this was followed by a major wet cycle from 1904 to 1930, inclusive. Since 1930, the 37 years have been generally ones of drought. The question naturally arises: how long will this major drought last?

On October 1, 1963, Mr. Samuel F. Turner, consulting geologist and engineer, Phoenix, Ariz., presented to the Senate Subcommittee on Irrigation and Reclamation an interesting chart entitled "Accumulated Departure From Average Growth as Indicated by Tree Rings in Colorado River Basin Above Lee Ferry." This chart extended back through the year 1250. For the years prior to 1904, Mr. Turner identified on the chart five major drought cycles, which had durations varying from 48 years (the great drought of Hohokam time) to 24 years. The average length of the five major droughts prior to 1904 identified on Mr. Turner's chart was about 34 years.

The chart also shows that major droughts in the past always have been followed by major wet cycles. For the years prior to 1904, the