Climate and the Colorado River: The Limits of Management

Steven L. Rhodes,[1] Daniel Ely,[2] and John A. Dracup[2]

"The variety of problems that the future holds in store is full-spectrum. Imminent flood danger will have to be balanced against future water shortages."

Gordon B. Freeny (1981)

Abstract

The flooding in the lower basin of the Colorado River during the spring and summer of 1983 led to discussion of the management of the heavy spring runoff from the upper basin. This analysis stresses that the reasons for the flooding go beyond the climatic events of the year and the U.S. Bureau of Reclamation's response to them. It is argued that the flooding is the result of the convergence of three factors: 1) the 17-year period of filling Lake Powell (Glen Canyon Dam) has ended and the system of water storage reservoirs on the river now considered full; 2) during the filling period, physical encroachment into the lower basin flood plain accelerated; and 3) the climatic variability experienced in the Colorado River Basin.

1. Introduction

During the late spring of 1983, unusually heavy snowmelt runoff in the Upper Colorado River Basin (Fig. 1) resulted in flooding, primarily below Parker Dam, and economic losses in the river's lower basin in Arizona, California, and Mexico. For example, residents and businesses in the communities of Needles and Blythe, Calif., and the Parker Strip and Yuma, Ariz., were affected adversely by the floodwaters.

Public awareness of flooding in the American Southwest and Mexico peaked over the July Fourth weekend as newspapers across the country featured photographs of water pouring over the spillways of Hoover Dam for the first time since 1941, when they were originally (and intentionally) tested. Having heard of the flooding and heavy spring runoff, tourists stayed away during the commercially important Independence Day weekend, further punishing the local economies. Damages have been estimated at nearly $80 million

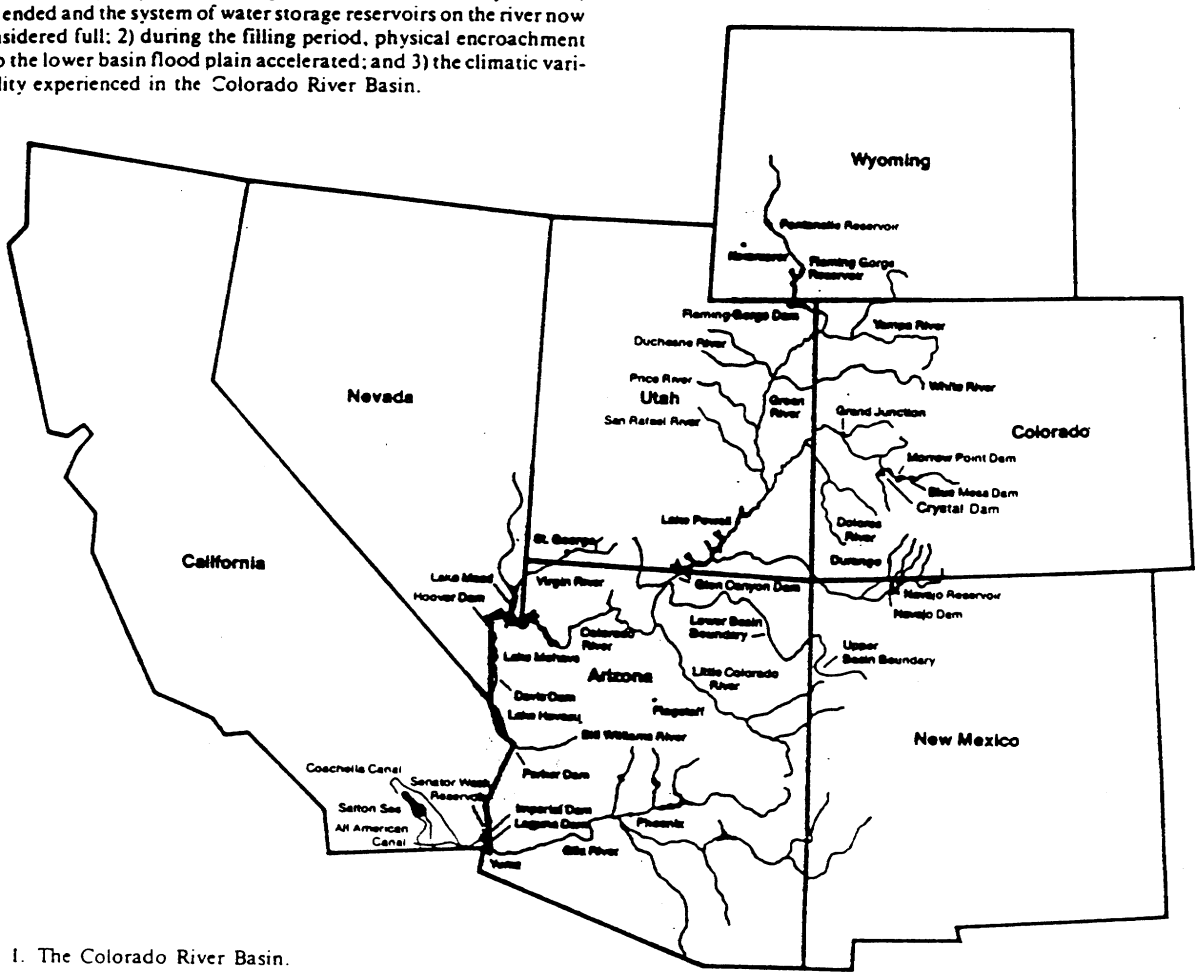

FIG. 1. The Colorado River Basin.

[1] Environmental and Societal Impacts Group, National Center for Atmospheric Research, Boulder, CO 80307. (The National Center for Atmospheric Research is sponsored by the National Science Foundation.)

[2] Department of Civil Engineering, School of Engineering and Applied Science, University of California, Los Angeles, CA 90024.