DURATIONS, AVERAGE RATES, AND PROBABLE CAUSES OF
LAKE BONNEVILLE EXPANSIONS, STILLSTANDS, AND
CONTRACTIONS DURING THE LAST DEEP-LAKE CYCLE
32,000 TO 10,000 YEARS AGO

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INTRODUCTION

Great Salt Lake has fluctuated widely at levels below 1300 m (4265 ft) during the Holocene Epoch of the last 10,000 years. Great Salt Lake's hydrologic basin of nearly 60,000 sq km (23,000 sq mi) occupies the northeastern 43 percent of the Lake Bonneville hydrologic basin (Figure 1). As an Ice Age predecessor of Great Salt Lake, Lake Bonneville fluctuated at levels as high as 1552 m (5092 ft) during the last deep-lake cycle of the Pleistocene Epoch, between 32,000 and 10,000 years ago. The full range of lacustrine variability that could conceivably occur in the region in the future is probably represented in the stratigraphic record of the last deep-lake cycle. The purpose of this paper is to extract from portions of that record some estimates regarding durations, average rates, and probable causes of Lake Bonneville expansions, stillstands, and contractions. These estimates are intended to place predictive studies of Great Salt Lake fluctuations in a broad context by providing a long-term, extreme-case perspective on the region's hydrologic potential.

The Lake Bonneville—Great Salt Lake closed-basin system is a climate-forced hydrologic system with a very large capacity to store information regarding its past history. That information can be retrieved, interpreted, and applied in a variety of ways (Figure 2). Vertical and lateral
Figure 2. Typical scheme for basin-wide reconstruction and interpretation of late Pleistocene and Holocene closed-basin lakes, with applications to hazard assessment, including possible flooding by unusually high lake stages.